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Report to the Congress; by Elmer B. Staats, Ccmptroller General.

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The Tellicc project is a 38,000 acre water resource and regional economic development project located cn the Little Tennessee River. In January 1977 the courts halted construction of the project because it would destroy the snail darter, an endangered species of fish. As of February 1977, the Tennessee Valley Authority (TVA) had obligated about $103 million on the project and estimated that $13 million to $19 million would be required to complete it. Findings/Conclusions: If the reservoir is not created, some of the project costs could provide benefits for alternate uses of land, roads, and bridges. There were wide differences in estimates of expenditures necessary to provide benefits without prcject completion, with GAO estimating that $56.3 million could provide some benefits but that these would not be proportionate with costs. In weighing alternatives, proponents and opponents of the prcject agreed that even a modified dam and reservoir would endanger the snail darter. TVA claimed that it successfully transplanted over 700 snail darters to the Hiwassee River, but the Secretary of the Interior recommended steps tc conserve the darter population in the Little Tennessee River. Potential alternate uses for the valley include development of agricultural, recreational, and archeological opportunities, none cf which are supported by current cost benefit estimates. The most recent analysis was performed by TVA in 1968 and has nct been updated. Recommendations: The Chairman of TVA should gather and provide to Congress detailed information on remaining costs and benefits of the Tellico project and its alternatives. Until current detailed cost and benefit information is made available, Congress should probihit by law any spending by TVA for work on the project that would further endanger the snail darter or not be necessary if the project were nct completed or modified. (HTW)

REPORT TO THE CONGRESS

BY THE COMPTROLLER GENERAL OF THE UNITED STATES

The Tennessee Valley Authority's Tellico Dam Project--Costs, Alternatives, And Benefits

In January 1977 the nearly completed $116 million Tellico Dam project was stopped because it would harm the habitat of the snail darter--an endangered species of fish. Several alternatives to the project have been proposed. However, neither the current project nor alternatives are supported by current benefit-cost analyses.

The Tennessee Valley Authority should update the remaining benefit-cost data for the Tellico project and alternatives to it. The Congress should prohibit the Authority from further work on the project and should not act on the proposed legislation to exempt the project from the Endangered Species Act until more current information is received.

EMD-77-58

OCTOBER 14, 1977

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-114850

To the President of the Senate and the
Speaker of the House of Representatives

This report summarizes the status of litigation, costs, alternatives, and benefits of the Tennessee Valley Authority's Tellico dam project. It does not take a position on whether the project should be completed, but rather suggests that more information is needed to resolve the controversy.

This review was requested by the Chairman, House Committee on Merchant Marine and Fisheries; Senator James Sasser; Representative John Duncan; and under authority of the Budget and Accounting Act of 1921 (31 U.S.C. 53) and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

We are sending copies of this report to the Director, Office of Management and Budget; the Secretary of the Interior; the Chairman of the Board, Tennessee Valley Authority; the Chairman, Council on Environmental Quality; each member of the Tennessee Delegation; and the House and Senate committees and subcommittees having oversight responsibilities for the matters discussed in this report.

Elmer B. Staats

Comptroller General
of the United States

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

THE TENNESSEE VALLEY AUTHORITY'S TELLICO DAM PROJECT--COSTS, ALTERNATIVES, AND BENEFITS

D I G E S T

In January 1977 the courts halted construction of the Tellico project because it would destroy the snail darter--a three-inch fish protected by the Endangered Species Act.

GAO does not take a position for or against completing the Tellico project, but rather that more information is needed to allow the Congress to act on the questions before it.

GAO looks at the following questions:

--What portion of the dam project already completed would provide benefits if the project were not completed and what costs are involved?

--Can a reservoir be operated in other ways that would not harm the snail darter?

--What benefits would occur if the project were completed?

BENEFITS WITHOUT COMPLETION

As of February 1977, TVA had obligated about $103 million on the project and estimated that $13 million to $19 million--primarily for roads, recreation centers, and reservoir clearing-- would be required to complete the project. The Authority's and the Tennessee Endangered Species Committee's estimates of expenditures that will provide benefits if the project is not completed, differ greatly. The Committee says $80 million will provide benefits if the project is not completed; the Authority, about $25.65 million, but this estimate is limited to the current value of the land plus the estimated cost of roads and bridges needed even without the project.

GAO believes about $56.3 million of the project costs--primarily land, roads, and bridges--could provide some benefits without completing the project. (See p. 10.) The benefits probably will not be proportionate with project costs, however, because the bridges were built higher than necessary without a reservoir and benefits to be derived from roads depend on the use of the land if a reservoir is not created.

In addition, any benefits will be offset by the necessary costs of removing all or part of the completed work to guarantee the darter's survival. About $25 million in wages paid during project construction have already benefited the area.

ALTERNATIVES

Both project proponents and opponents agree that even a modified dam and reservoir at Tellico cannot be operated if the snail darter is to survive. Abandoning the project without removing some of the dam is also not a viable option, for the same reason. (See p. 3.)

The Authority has transplanted over 700 snail darters to the Hiwassee River. Although still questioned by some biologists, the Authority claims its transplant is successful based on survival, maturity, and reproduction. For that reason, and because the project is threatening the snail darter, the Authority petitioned the Secretary of the Interior to change the Little Tennessee River from being listed as the snail darter's critical habitat. The Secretary rejected the petition and recommended steps to conserve the darter population in the Little Tennessee River.

The Authority and others have considered alternate uses for the valley if the project is not completed. These include development of the agricultural lands, cold-water recreational opportunities, and numerous archeological and historical sites. However, none are supported by current benefit-cost estimates

of their feasibility. Until more information is obtained, the merits of these proposals cannot be evaluated.

BENEFITS WITH COMPLETION

The most recent analysis of project benefits was primarily prepared in 1968 by the Authority. It estimated yearly benefits of $3,760,000 and a benefit-cost ratio of 1.7 to 1. Even though project costs have increased about 115 percent, the Authority has not updated its benefit projections.

Some of the assumptions and logic of the Authority's projection would not accurately predict actual benefits. In some instances the methodology did not conform to Federal guidelines and in other instances the statistical projections were not valid. (See p. 27.)

Because of these problems, the benefits claimed for the Tellico project could be over- or understated. A thorough, up-to-date analysis is needed.

RECOMMENDATIONS TO THE CHAIRMAN OF THE TENNESSEE VALLEY AUTHORITY

The Chairman should gather and provide to the Congress, through the Office of Management and Budget, detailed information on the remaining costs and remaining benefits of the Tellico project and its alternatives.

Initial suggestions on developing alternatives and comments on the methodologies, data bases, and resulting analyses should be obtained from the Director of the Office of Management and Budget, the Chairman of the Council on Environmental Quality, and the Secretary of the Interior.

RECOMMENDATION TO THE CONGRESS

The snail darter is an integral part of the broader issue: Is the Tellico project the best use of the Little Tennessee River Valley? Because the snail darter population can be reestablished if conservation measures are taken and if, over the long run, at least a portion of the dam is removed, more current information should be obtained on the project and its alternatives.

The Authority is ready to spend an estimated $13 million to $19 million to complete the project if the U.S. Supreme Court lifts the injunction. Until current detailed cost and benefit information is made available for the Tellico project and its alternatives, the Congress should prohibit by law the Authority from spending any more appropriations for work on the project that would (1) further endanger the snail darter or (2) not be necessary if the project were not completed or were modified.

No action should be taken on the legislation proposed to exempt the project from provisions of the Endangered Species Act of 1973 until the Congress has had time to assess updated information.

AGENCY ACTIONS AND UNRESOLVED ISSUES

The Authority maintains that remaining cost and remaining benefit information should not be obtained for the project or its alternatives because Tellico is nearly complete. The Authority also stated that "scenic river" alternatives have already been considered and rejected by the Congress and that alternatives would require additional funds to restore the project area and to provide public use facilities.

Considering (1) the age of the 1968 analysis, (2) the faults found in the methods used by the authority, and (3) that comprehensive

alternatives have never been measured, GAO believes that remaining cost and remaining benefit information on the project and its alternatives is necessary.

The Department of the Interior agreed with GAO's findings and is interested in helping the Authority assess project alternatives. The Council on Environmental Quality would like to comment on a remaining cost-benefit analysis but cautioned that the depth of its comments would be limited by the resources available at that time. The Office of Management and Budget had no comments or suggestions.

Because of items pointed out by the Department of the Interior and the Authority, GAO revised the report where applicable. Basic differences with the Authority remain and are discussed in chapter 5 and appendix VIII.

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ABBREVIATIONS

GAO	General Accounting Office
NEPA	National Environmental Policy Act of 1969
TESC	Tennessee Endangered Species Committee
TVA	Tennessee Valley Authority

CHAPTER 1

LEGAL AND ENVIRONMENTAL CONSIDERATIONS

At the requests of the Chairman, House Committee on Merchant Marine and Fisheries, Senator James Sasser, and Representative John Duncan, we have reviewed certain aspects of the Tennessee Valley Authority's (TVA's) Tellico project (see app. I, II, and III). Based on the original requests and subsequent agreements with the Committee we identified

--what portion of project expenditures would provide benefits if the project were not completed,

--alternative methods of operating a reservoir that would not have an adverse impact on the snail darter, and

--the benefits that would occur if the project were completed.

We interviewed TVA personnel and reviewed pertinent legal documents, records, correspondence, and reports. We also contacted individuals and organizations opposed to the project and reviewed all data provided. In company with officials of TVA, the Tennessee Endangered Species Committee (TESC) 1/, and others, we toured the project area and observed the current project configuration.

The Tellico project is a 38,000 acre water resource and regional economic development project located on the Little Tennessee River in Loudoun, Monroe, and Blount Counties, Tennessee. The project has been challenged by various groups because it would create a 30-mile reservoir covering 16,500 acres of land, including prime farmland in the three-county area as well as numerous historical and archeological sites. The Tellico reservoir would provide recreation, shoreline development, and flood control.

1/ TESC is a Knoxville, Tennessee, area organization which is knowledgeable about the Little Tennessee River Valley. During our review, TESC provided us with information on behalf of the Little Tennessee River Alliance, an organization with a current membership of about 25,000 persons.

These and other project benefits, such as navigation and electric power generation, are discussed in detail in chapter 4.

TVA developed the Tellico project proposal in 1963, and funds were first appropriated by the Congress in October 1966. Construction on the dam began March 7, 1967. The dam is complete as are many other features of the reservoir; however, some work, such as final land clearing, recreation facility preparation, and highway construction, is not yet finished. The entire Tellico project is about 90-percent complete and the reservoir is ready for impoundment. Through February 1977, $116 million has been budgeted for the project, of which about $103 million has been obligated.

LITIGATION

Legislation enacted after TVA began the Tellico project eventually led to construction delays. Beginning in 1971 environmentalists and affected landowners filed suit in Federal courts seeking to halt Tellico construction. These groups contended that TVA had not filed an adequate environmental impact statement as required by the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.) (NEPA). Project opponents obtained a preliminary injunction and halted the project for 21 months. In October 1973 a district court concluded that TVA's final statement fully complied with NEPA and lifted the injunction. The decision was affirmed by a Federal appeals court.

In August 1973, when the project was about 50-percent complete, a University of Tennessee ichthyologist discovered a previously unidentified species of fish, the snail darter, living in the Little Tennessee River. A search of ecologically comparable rivers confirmed that the Tellico project portion of Little Tennessee River was virtually the exclusive preserve of the snail darter.

About 4 months after the snail darter's discovery, Congress passed the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.). The act provided, among other things, a means to protect ecosystems on which endangered species depend, and empowered the Secretary of the Interior to compile a list of endangered and threatened species which would receive protection under the act. On November 10, 1975, the Secretary included the snail darter on the endangered list primarily because of the threat the Tellico project posed on the species.

Beginning on February 28, 1976, a group of scientists and environmentalists sought to permanently enjoin project completion in the same Federal court which granted the earlier injunction. While the case was awaiting trial, the Department of the Interior's Fish and Wildlife Service designated the lower Little Tennessee River as the snail darter's critical habitat.

The trial was held on April 29 and 30, 1976. The court concluded:

> "* * * the preponderance of the evidence demonstrates that closure of the Tellico Dam in January 1977 and the consequent creation of the Tellico Reservoir will result in the adverse modification, if not complete destruction, of the snail darter's critical habitat, * * * Almost all of the known population of snail darters will be significantly reduced if not completely extirpated * * *"

Not withstanding, the court weighed the snail darter's survival against the projected benefits of the Tellico project, denied the injunction, and dismissed the action.

Because environmentalists immediately filed an appeal, a Federal court of appeals enjoined dam closure pending the outcome of the case. On January 31, 1977, a court of appeals reversed the lower court ruling and ordered a permanent injunction to preclude dam closure and other activities which would threaten the snail darter's habitat. The court concluded that the evidence indicated a clear violation of the Endangered Species Act and that the act does not permit an analysis of equities. The court of appeals ruled that the injunction should remain in effect until the Congress exempts the project from compliance with the act, the snail darter has been deleted from the list of endangered species, or its critical habitat has been redefined. On May 30, 1977, TVA, in conjunction with the Solicitor General of the United States, filed a petition with the U.S. Supreme Court to appeal the court of appeals decision.

MODIFYING THE RESERVOIR CONFIGURATION WILL NOT PRESERVE THE SNAIL DARTER

TVA and TESC officials told us the project cannot be modified to preserve the snail darter and provide projected reservoir benefits. Low and intermediate pool levels would still effect the snail darter's habitat and would decrease the amount of project benefits.

Abandoning the project without removing at least a portion of the dam is also not a viable option. Life-cycle studies of the snail darter indicate that the Tellico Dam in its present form threatens the darter's survival, even with the sluice gates open. The darter spawns in shallow water upriver from Tellico dam. As the eggs hatch, many of the larva swim into the river current and float downstream, through the sluice gates of Tellico Dam and into Watts Bar Reservoir. With the onset of maturation, these snail darters swim back toward their spawning area in the Little Tennessee River. Since closure of the north channel in August 1975, the darter's upstream migration has been stopped. TVA, TESC, the Tennessee Wildlife Resources Agency, and the Department of the Interior's Fish and Wildlife Service biologists agree that the continued existence of a normal level snail darter population in the Little Tennessee River is in serious doubt.

TVA transplanted over 700 snail darters to the Hiwassee River and has claimed a successful transplant as judged by survival, maturity, and reproduction. Interior's Fish and Wildlife Service and the ichthyologist who discovered the snail darter, however, said that from 5 to 15 years may be required to determine whether the snail darter can successfully survive in its new environment.

Because TVA believes its transplant was successful and predicts elimination of the snail darter in the Little Tennessee River, TVA petitioned the Secretary of the Interior in February 1977 to delist the Little Tennessee River as the snail darter's critical habitat. In July 1977 the Secretary rejected the petition and recommended certain steps to conserve the darter population in the Little Tennessee River.

There is no feasible compromise. Only completion of the Tellico project can provide those reservoir benefits which TVA projected for the area. Likewise, alternatives for the project area must include removing a portion of the dam to ensure the snail darter's survival in the Little Tennessee River.

CHAPTER 2

PROJECT COSTS AND BENEFITS IF THE PROJECT IS NOT COMPLETED

Through February 1977 TVA had obligated about $103 million of the $116 million estimated cost of the Tellico project. In our opinion, about $56.3 million of the project costs--primarily land, roads, and bridges--could provide some benefits for alternate uses of the project area if the reservoir is not created, but the benefits to be derived will depend on how the land is used. Because bridges were built higher and longer than normal to accomodate a reservoir and many of the roads were built to replace existing roads scheduled for inundation, the benefits probably will not be proportionate with the cost.

PROJECT COSTS

Since the Congress first appropriated funds for the Tellico project in 1966, the project cost estimate has increased from $45 million to $116 million. TVA officials attributed a large portion of this increase to rising construction costs and delays resulting from court injunctions.

On the basis of TVA's estimated cost at the end of February 1977, about $13 million would be required to complete the Tellico project. One official in TVA's Engineering Design and Construction Office stated, however, that the estimated completion costs may have increased to $19 million because of continued delays and rising costs. These funds are required primarily for completion of two major road projects, recreation centers, an interreservoir canal, access roads, and about 100 acres of reservoir clearing.

Through February 1977 TVA had obligated about $103 million on the Tellico project in three basic categories:

--Land ($25.5 million).

--Construction features ($63.0 million).

--Engineering, general and administrative expenses, and outstanding commitments ($14.7 million).

A description of the investment made in each of these categories follows.

Land costs

Land costs of $25.5 million include the purchase price of land plus improvements and other expenses related to the acquisition, as shown in the following table.

Land Acquisition Costs
for the Tellico Dam Project

Type of expense	Cost (millions)	
Purchase price		
Land	$16.9	
Improvements	5.2	$22.1
Other related costs		
Acquisition expense	$ 1.9	
Surveying and mapping	0.8	
Legal	0.2	
Relocation	0.5	3.4
Total		$25.5

The project area purchased by TVA encompasses 38,000 acres, including about 17,100 acres of high quality agricultural land. This land, which comprises about 14 percent of the class I and II land in the three-county area, has few or no limitations, a slope of less than two percent, and is suitable for cultivated crops, pasture, range, woodland, or wildlife. The remainder of the land in the project area has a steeper slope and requires more complex land management measures but generally has the same potential uses as the higher quality land. Before TVA began purchasing property for the project, the land was used primarily for grazing and, to a lesser extent, farming.

Of the 38,000 acres in the project area, about 16,500 acres would be inundated at normal reservoir levels, and an additional 2,900 acres would be used for flood control. The remaining land was purchased, according to TVA, to maximize project benefits and to insure that the shoreline land would be available for planned development purposes in cooperation with local and State agencies. Buying additional land in some cases avoided severance damages and the expense of building access roads to isolated tracts. TVA considers the resale of property made more valuable by the public works

as a way to recover some of the public investment made on the reservoir project. In this regard, if the project is completed, TVA plans to sell about 16,500 acres of this land and estimates annualized benefits of $455,000 on the basis of these sales, as discussed in chapter 4.

The land acquisition costs as shown in the above table included all land improvements, such as barns, houses, wells, fences, and any existing natural resources. Most of these improvements, originally valued at over $5 million, were removed during reservoir clearing operations.

Construction costs

By the end of February 1977, TVA had expended about $63 million for construction features of the Tellico project, as shown in the following table. This amount includes about $24.7 million in direct labor costs.

Construction Features Costs for the Tellico Dam Project

Type of expense	Cost (millions)	
Dams		
Concrete dam and spillway	$ 5.0	
Main earth dam	16.2	
Auxiliary dams	1.3	$22.5
Reservoir roads, bridges, and other adjustments		
Highways and bridges	$25.6	
Railroad and bridge	4.1	
Reservoir clearing and rim treatment	4.0	
Utility relocations and miscellaneous	2.0	35.7
Other		
Access roads	$ 2.1	
Interreservoir canal	1.8	
Public use facilities	0.1	
General yard improvements and miscellaneous	0.8	4.8
Total		$63.0

Most of the construction funds have been expended on dams, about 65 miles of State, county and local access roads, and three major bridge replacement projects. All of the dam structures have been completed and $24.1 million has been spent for completed road and bridge projects. TVA has also invested $3.6 million in two major road projects which are not scheduled for completion until the dam is closed. Most of the roads are to be used as replacements for those which would be covered by the reservoir. Similarly, bridge replacements were required because of design modifications necessary to allow navigation on the higher water levels of the reservoir. In addition, the State of Tennessee has spent over $1 million in its program to provide roads and improvements in the project area.

According to an official of the Tennessee Department of Transportation, the State will continue limited maintenance on State highways in the reservoir area until the dam is closed. The official did not know what the State would do with incomplete highway projects if the reservoir is not created and said that the Department of Transportation could not complete any project without an appropriation from the state legislature. He considered it unlikely that the State would ever complete the Tellico Parkway--one of the major road projects--presently being funded entirely by TVA.

Other expenditures and revenues

TVA has expended about $14.7 million on various aspects of the Tellico project other than land and construction, as shown in the following table.

Other Costs for the Tellico Dam Project

Type of expense	Cost (millions)
General engineering and design	$ 1.6
Planning, surveying, and model tests	3.2
Environmental studies, construction supervision and support, and nonallocated overheads	8.2
Contracts not yet paid in full	1.7
Total	$14.7

TVA has cumulatively received about $665,000 in revenue related to the Tellico project. Structures and timber were sold from reservoir clearing operations for about $99,000 and farmland and houses on land purchased by TVA have been leased for a total of about $566,000.

Costs if the project is not completed

In the event the Congress determines that the project should not be completed and that the project area should be restored to its natural state, TVA will incur additional costs. Because life-cycle studies of the snail darter indicate that the Tellico Dam in its present form threatens the snail darter's survival in the Little Tennessee River, at least a portion of the dam will have to be removed to preserve the natural population.

We believe that the cost of removing all or a portion of the work completed to date could vary considerably depending on the extent of restoration deemed necessary. According to TESC, removing a portion of the earthen dam to restore the north channel and to allow the Little Tennessee River to flow more freely could be accomplished at an estimated cost of $2 million to $3 million. However, TVA maintains that removing only a portion of the dam will result in periodic flooding of some of the prime agricultural land in the valley. TESC agrees that some flooding could occur but that it would be highly localized at the base of the dam if enough construction is removed.

TVA estimates that removing the concrete and earthen dams and restoring the entire project area could cost as much as $16 million, as shown in the following table.

TVA's Estimate of Removing Dams and Restoring Project Area

	Estimated cost
Remove concrete dam and spillway	$ 3,800,000
Remove auxiliary dams	700,000
Fill interreservoir canal	3,300,000
Reforest river banks and reservoir	500,000
Obliterate incompleted roads and site facilities	1,100,000
Restore fill at Old Fort Loudoun, Chota, and Blockhouse	700,000
Remove 411 and railroad bridges	200,000
Remove miscellaneous facilities	400,000
Total	$16,000,000

We believe an analysis of the benefits and costs of alternatives being proposed for the project area should include the cost of removing all or a portion of the work completed to date.

BENEFITS FROM INVESTMENT IF PROJECT IS NOT COMPLETED

Some portions of the vestment made in the Tellico project could provide benefits for alternate uses of the project area if the reservoir is not created. The amount of the investment that would provide benefits and the extent of such benefits, however, are subject to varied estimates and depend on the ultimate use of the project area.

TESC contends that $80 million of the $103 million could provide benefits. In contrast, TVA estimates that $25.65 million of the investment is recoverable. These estimates are not comparable, however, because TVA's valuation is limited to an estimate of the current value of the land plus the estimated cost of roads and bridges which were needed even without the project. As shown in the following table, we believe that $56.3 million of the project investment could provide benefits although such benefits probably would not be proportionate with these costs.

Category	Cost as of February 28, 1977	TVA estimate of recoverable cost	Estimate of amounts that could provide benefit	
			GAO	TESC
Land	$ 25.5	$21.0	25.5	$25.5
Construction:				
Dams	22.5	0.0	0.0	0.0
Roads, bridges and other reservoir facilities	35.7	3.3	26.5	34.0
Other facilities	4.8	0.0	0.0	5.5
Other costs	14.7	1.35	4.3	
Total	$103.2	$25.65	$56.3	a/ $65.0

a/ In addition to the $65 million, TESC also contends that $15 million in salaries will provide benefits.

Our analyses of the value of land, construction, and other investments in the project, as well as benefits resulting from direct labor wages, are presented in the following sections.

Land values

Project opponents and proponents agree that the land purchased by TVA would provide benefits even if the project is not completed. How TVA would dispose of the project land, however, is uncertain. The TVA Board of Directors could declare the entire project area surplus property and make it available for sale at public action or, in the event an alternative land use plan is adopted, TVA could use the land or convey title to another Government agency or to the State of Tennessee.

TVA's estimate of recoverable project costs includes $21 million as the estimated gross selling price for the 38,000 acres of project land. In estimating this value TVA evaluated land transactions in the three-county area affected by the project, considering several factors which might affect property values. These factors included accessibility by roads or highways, availability of potable water lines, value of existing improvements, size of the tract, intended use, and real estate market conditions.

TVA concluded that the increase in property values since the land was acquired has been more than offset by the administrative acquisition costs of $3.4 million and the removal of much of the houses, barns, fences, wells, and timber which were valued at about $5.2 million when the land was purchased. In addition, some of the access roads and bridges have been destroyed or removed which TVA believes has reduced the value of the land. One TVA official said that if the land were sold at auction, property values would be severly depressed, selling costs would be incurred, and the proceeds from such a sale could be considerably less than the $21 million estimated by TVA.

We obtained land value estimates from three realtors and a bank president who were referred to us by TESC and who worked in communities near the Tellico project area. These persons estimated land values ranging from $600 to $1,500 per acre for the higher quality land and from $200 to $1,000 per acre for all other land in the project area. Application of these values results in a range of $14.4 million to $46.6 million as an estimated gross value of the land.

Chapter 3 will discuss various alternative uses that have been proposed for the land. In our opinion, the public benefit that can be derived from the Tellico land depends on its ultimate use or disposition. We believe the full acquisition cost of the land--$25.5 million--will provide some benefit regardless of whether the project is completed.

Construction

The $63 million spent on Tellico construction consists primarily of dams, roads, and bridges. In our opinion only about 42 percent of that investment--about $26.5 million relating to roads and bridges--could provide significant benefit unless the project is completed.

TVA considers that three bridge projects will provide public benefit if the reservoir is not impounded. These are a four-lane state highway bridge and two new two-lane bridges which replaced substandard one-lane bridges. According to TVA, two of these bridges were designed for navigational clearance and, without a reservoir, could have been built much lower, shorter, and for about three-quarters of the cost. TVA estimated these bridges, costing about $6.0 million, could have been constructed for about $4.65 million without the special reservoir design requirements.

All road construction costs are considered nonrecoverable by TVA because the new roads are somewhat circuitous and replace the existing road system which was satisfactory for the limited amount of traffic without the reservoir. Similarly, TVA's position is that the existing railroad bridge was adequate and that the new bridge which replaced it was built only because of navigational clearance requirements. One TVA official said that although there has been no quantification of increased useful life, the new roads and bridges are significant improvements over those previously existing.

We believe that all of the roads and bridges completed will provide some incremental benefit because each offers improved quality and extended life over those replaced. However, we believe the amount of benefits to be derived will depend on how the land is used. Because bridges were built higher and longer than normal to accomodate a reservoir and many of the roads were built to replace existing roads scheduled for inundation, the benefits probably will not be proportionate with the cost.

About $3.6 million has been spent for two major road projects which are not expected to be completed until after the reservoir is impounded and about $3.0 million for a

bridge across the proposed interreservoir canal. Accordingly, we excluded these costs from our estimates because this investment will not likely provide benefits without project completion unless an alternate development proposal would include completing the roads. We also excluded $4.8 million of other construction costs, such as reservoir clearing and the interreservoir canal.

Other investment

Of the $14.7 million not included in land or construction costs, about $8.2 million is unallocated overhead and $1.7 million is for outstanding contracts on the Tellico project. We believe that approximately $3.5 million of the overhead will be allocated to features which will provide some benefit. Of the outstanding contracts, only $0.8 million is for items which will prove beneficial without a reservoir.

The remaining $4.8 million spent by TVA on the project included general engineering, planning, and model testing required for the dam. We do not believe that any significant benefit will result from these expenditures if the project is not completed.

Benefits from wages

Another type of benefit associated with the Tellico project is the economic stimulation generated by the salaries and wages paid to project workers. TESC contends that $15 million in salaries and wages should be included as benefits to be derived if the project is not completed. However, since the direct benefits created by these wages have already been realized and any secondary stimulation that might occur from the wages also will be realized without regard to whether the project is completed, we have excluded these payments as "benefits." In addition, the wages for roads, bridges, and some other construction features are already included in our $56.3 million total.

As shown below, TVA has expended about $24.7 million in direct labor wages through February 1977.

Direct Labor Costs for
the Tellico Dam Project

	Cost (millions)
Dams and spillway	$ 8.7
Roads and bridges	6.6
Reservoir clearing, relocations, and general yard improvements	3.0
Interreservoir canal and temporary construction facilities	3.6
Other	2.8
Total	$24.7

CONCLUSION

About $56.3 million of the $103 million invested in the Tellico project could provide some benefit if the project is not completed. The amount of benefit to be derived from the investment depends largely on the ultimate use, however, and probably will not be proportionate with the original cost. An analysis of alternatives for the project area must include the cost of removing all or a portion of the work completed to date. According to TVA, this could cost as much as $16 million.

Chapter 3

MORE INFORMATION IS NEEDED ON PROJECT ALTERNATIVES

The snail darter controversy renewed interest in project alternatives, including the costs of alternative proposals and the benefits to be realized. Alternative proposals have been developed by TVA, the State of Tennessee, and various proponents of river-based area development, but none are supported by current benefit-cost analyses. Until more current information is obtained, the economic merits of each proposal cannot be evaluated.

ALTERNATIVES DEVELOPED AND EVALUATED BY TVA

In its 1963 Tellico project proposal, TVA neither identified nor evaluated any alternate uses for the project area. According to a TVA official, no comparison of alternatives was made because existing statutes did not require documented comparisons, and because TVA's philosophy and experience at that time indicated that a multipurpose reservoir was the best economic stimuli for a depressed area.

In 1972, 5 years after construction started, TVA included an evaluation of p oject alternatives in its environmental impact statement to comply with Section 102 of the National Environmental Policy Act of 1969. At that time TVA identified six alternate project designs, estimated the costs and benefits of each, and compared the results to the 1968 Tellico analysis. A summary of these alternatives is shown in the following table.

Alternatives Evaluated by TVA

Project design	Characteristics	Estimated annual costs	Estimated annual benefits	Percent of Tellico benefits
Lower dam	3,200 acre pool extending 25 miles	$1,426,000	$3,560,000	60
Lower dam and scenic stream	3,200 acre pool; 8 mile scenic stream	1,444,000	3,602,000	61
Intermediate dam	8,000 acre pool extending 29 miles	1,745,000	3,500,000	59
Intermediate dam and scenic stream	8,000 acre pool; 4 mile scenic stream	1,761,000	3,509,000	59
Scenic stream	33-mile scenic river corridor	a/ 82,000	b/ 129,000	2
No further action	Project abandonment	a/ -0-	101,000	1.7
Tellico Project	Full pool level with Ft. Loudoun reservoir	1,507,000	5,903,000	100

a/ Excludes cost of removing all or a portion of the Tellico dam and any area restoration that might be necessary.

b/ Estimate is limited to recreation benefits.

Low and intermediate dam designs provided about 60 percent of the net economic benefits estimated for the Tellico project, while the scenic river concept and project abandonment provided about two percent. On the basis of these analyses, TVA concluded that the Tellico project provided the most economic benefit for the area.

As discussed in chapter 1, low and intermediate dams would be incompatible with preserving the snail darter's habitat. Of the six alternate project designs, only the scenic stream proposal remains a viable alternative. TVA estimated scenic river costs and recreation benefits on the basis of the same development level as the Buffalo Scenic Riverway in Tennessee. Public access areas, camping, hiking, canoeing, picnicking, and sanitary facilities, as well as acquisition of a land corridor along the river bank, were included in TVA's computation. TVA's scenic stream proposal did not include other benefits which might also be derived from a developed river valley such as agriculture, historical, cultural and industrial development, fish and wildlife, shoreline development, and redevelopment benefits.

TVA has not updated the scenic stream benefit-cost analysis or studied new alternatives. Although economic conditions have changed since alternatives were evaluated in 1971, TVA believes the relative economic benefits from the project and alternatives have not been radically altered and that a reservoir is still the best way to develop the area. In early 1977 TVA claimed a new benefit-cost ratio for the project of 7 to 1 on the basis of original benefits and remaining costs. As discussed in chapter 4, however, we do not believe these benefits are representative of actual benefits to be derived.

According to TVA officials, all efforts to complete the current Tellico project will be exhausted before alternatives are again considered. These efforts include its appeal to the U.S. Supreme Court, petition to the Secretary of the Interior to delist the Little Tennessee River as the snail darter's critical habitat, and attempts to gain Congressional exemption from the Endangered Species Act.

ALTERNATIVES DEVELOPED BY THE STATE OF TENNESSEE

In 1971 Governor Dunn of Tennessee reviewed the Tellico project and concluded that the interests of the State would be best served if TVA discontinued plans to impound the Little Tennessee River. Because of the area's location, nationally

acclaimed trout fisheries, numerous historical and archeological sites, and great acreage of productive woodland, cropland, and pastureland, Governor Dunn stated that the Little Tennessee River could best serve Tennesseeans as the focal point for a scenic river recreational gateway to the national wilderness lands beyond.

In rebuttal TVA Board Chairman Aubrey Wagner pointed out that while most of Governor Dunn's statement concerned only the recreation aspect of the Tellico project, TVA had to consider all the effects of a project. Mr. Wagner also said that the Governor's proposal would sacrifice the much broader benefits of comprehensive development provided by the Tellico project.

At Governor Dunn's request, the Executive Office of the State issued a recreation plan in August 1973, emphasizing the unique natural, historical, and cultural values of the Little Tennessee Valley. Three complementary recreation area concepts were proposed: (1) a scenic river corridor from Chilhowee Dam to the confluence of the Tennessee river to provide quality floating and fishing, (2) an archeological and historic area to protect and restore 14 outstanding sites along the river, and (3) an 1,100-acre State park to provide popular day-use activities and recreation. No benefit estimates were included in the preliminary plan; however, TESC used the State plan as the basis for a more elaborate recreational-cultural development proposal which is discussed later.

In September 1973 the State presented its preliminary recreation plan at Federal court proceedings concerning the Tellico environmental impact statement (see chapter 1). After the court ruled in TVA's favor, the State suspended all alternative planning.

The present State administration actively supports the Tellico project. Current plans for community development and recreation facilities, including State operated historical, archeological, and recreation parks, complement, and in some cases are dependent on, a reservoir. In addition, the Tennessee Legislature has passed three joint resolutions urging the Congress to support Tellico completion and, according to the results of a recent questionnaire, residents of the three-county area support project completion about 9 to 1. (See app. IV.)

OTHER PROPOSALS

Since 1964, various individuals and groups, including some area residents, fishermen, and environmentalists, have challenged the Tellico reservoir project in favor of river-based area development. Encouraged by the court-ordered halt of the project in February 1977, TESC, the most active of these groups, currently is developing alternate-use plans for the Little Tennessee River Valley. A draft proposal, incorporating and expanding the principal elements of the 1973 State plan, outlines eight development plans. TESC said that these plans do not represent the full range of possibilities for developing the valley, however, because other opportunities, such as industrial development, were not included in the draft proposal.

TESC plans include estimated development costs but do not project benefits. The proposals range from returning all lands to private individuals at negligible costs to extensive recreational and agrarian development estimated to cost $5.4 million. The overall goal of each alternative is to preserve a unique and economically valuable region while complying with the Endangered Species Act. The major characteristics and estimated costs of each proposal are shown in the following table.

Land-use Alternatives Proposed by Other Groups

Proposal number	Major elements	Estimated costs (note a)
(1)	Declare the Little Tennessee River a Class II pastoral river. Acquire easements: 2891 acres scenic and 764 acres public use. Acquire islands: 730 acres. Provide 3 access sites.	$ 20,000
(2)	All aspects of plan (1) plus two added access sites. Develop 14 archeological and historic sites. Construct a visitor center at Halfway Town.	1,998,500
(3)	All aspects of plans (1) and (2) plus 11,000-acre State park, stable facilities at several historic sites, 15 cabins, 50-trailer campground with facilities, and a group lodge for 60 persons.	5,450,800
(4)	Return all land to private ownership.	Negligible
(5)	All aspects of plan (2) and return adjacent lands to private ownership and agricultural development. Provide five access sites. Develop 14 archeological-historical sites.	1,998,500
(6)	Designation of Class II river, develop archeological and historical sites, establish a State park, and return agricultural lands to private or semiprivate control.	5,450,800
(7)	All aspects of plan (1) plus return all land to private ownership. Provide scenic and public use easements and three access sites.	20,000
(8)	Return all land to private or semiprivate ownership with minimal control by a managing authority. Use area as a model agricultural management region in combination with a recreational facility. Construct a loop system to maximize tourism.	No estimate

a/ GAO did not verify the cost estimates or determine associated project benefits. Estimates exclude the cost of removing all or a portion of the Tellico dam and any area restoration that might be necessary.

A July 1977 study by the School of Architecture at the University of Tennessee indicated that numerous uses can be made of the Little Tennessee River Valley. The study presented a matrix of eight land uses and seven program options which could be applied to the valley under three basic strategies: river retention, river impoundment, and river basin retention with selected tributary impoundment. The variety of options presented did not include benefit-cost analyses, however, and the study concluded that even further study of complementary alternatives and variations was justified.

Proposals of river-based area development generally divide the unique qualities of the region into three basic themes: recreational, cultural, and agricultural opportunities.

Recreational opportunities

The Little Tennessee River is located between the Great Smoky Mountains National Park and the southern half of the Cherokee National Forest. According to TESC the Little Tennessee River is one of the largest streams in the area suitable for family floating and canoe trips and is equally suited for adjacent day-use activities, such as hiking and horseback riding.

The Great Smoky Mountains records about 8 million vists annually and offers many of the same activities proposed for the Little Tennessee River Valley. An analysis of visitor activities in the Great Smokies in 1963 compared to 1975 shows the increased popularity of these activities.

Activity	1963	1975	Percent increase
Total visits	5,258,700	8,541,474	62
Conducted trips	11,501	19,590	70
Self-guiding facilities	923,222	1,280,806	39
Overnight camping	525,080	679,930	23
Lodge	2,764	8,097	293
Hiking	166,998	222,305	33
Horseback riding	31,495	51,407	63

If travel to the park continues to increase at a rate comparable to that of the past 25 years, 11.3 million visits can be expected by 1985. Park officials told us the activities that presently strain park resources are the same activities that could be developed along a scenic riverway. In their opinion, comprehensive development of the valley as a scenic riverway would more effectively alleviate overcrowding

at the park than would a reservoir, as well as provide a controlled access corridor to the park area.

Trout fishing is another recreational attribute of the Little Tennessee. Although trout must be stocked regularly, TESC contends that the growth rate in the Little Tennessee is equal to or better than artifically fed hatchery trout and catches regularly range from 5 to 12 pounds.

TESC believes that a scenic river and a reservoir offer different recreational opportunities and points out that reservoir-oriented activities are already available at 20 lakes within 100 miles of the Tellico site. TESC reasons further that river oriented recreational opportunities on the Little Tennessee would be irretrievably lost and can not be duplicated in East Tennessee if the Tellico reservoir is completed.

Cultural opportunities

The Little Tennessee River Valley is the ancestral home of the Overhill Cherokees and the site of the first British fort west of the Applachians. Numerous historical and archeological sites are located along the Little Tennessee. Of these, TESC proposes restoration and development of 14 significant sites as shown in the following table.

Archeological and Historical Sites Proposed For Development

Site	Significance	Development
Halfway Town	Cherokee village	Vistor center, museum, stables, picnic area, boatguide service, interpreter.
Citico	Cherokee village	Canoe access, information display, hitching station.
Chota-Tenasi (note a)	Cherokee capitol village	Reconstructed village, museum, canoe access, horse hitching and watering station, interpreter residence.
Toqua	Cherokee village and temple mound	Canoe access, picnic area, information display, hitching and watering station.
Tommotley	Cherokee village	Canoe access, information display, hitching station.
Tuskegee	Cherokee village-birthplace of Sequoyah	Partially reconstructed village, canoe access, information displays, hitching station.
Fort Loudoun (note a)	British fort	Reconstructed fort, stables, interpreter residence, museum, ferry service, canoe access, picnic area, tent camping.
Tellico Blockhouse (note a)	Site of militia blockhouse (1795)	Reconstructed blockhouse, canoe access, hiking, trailhead, ferry service, information displays.

a/ To be preserved by TVA if the Tellico project is completed.

Site	Significance	Development
Militia Springs	Local militia mustering grounds (1790s)	Information display, picnic area.
Mialoquo-Rose Island	Cherokee village	Canoe access, picnic area, information displays.
Bat Creek Mounds	Site of enigmatic stone	Canoe access, information display.
Coytee Springs	Grist mill site	Reconstructed grist mill, picnic area, canoe access, interpreter residence.
Bowman House	House and grounds of early Indian agent	Restored house, interpreter residence, canoe access, picnic area.
Bussell Island	Coytee treaty site and burial mounds	Interpreter residence, canoe access, picnic area, museum, tent camping.

Of the more than 200 recorded archeological sites within the reservoir area, all major sites have been partially investigated under funding by TVA, the National Park Service, the National Geographic Society, and the Cherokee Historical Association. Major habitation sites, including some mounds, contain material from several Indian cultures which preceded the early period of European contact. According to the Chairman of the Department of Anthropology at the Smithsonian Institution, these sites

> "* * * will be critical in understanding early tribal movements and events in this most unstudied period in Eastern United States archaeology. Most of these sites have not been thoroughly investigated; their loss and that of the other archaeological and historic resources of the area would be tragic."

In contrast, Dr. Alfred K. Guthe, Professor of Anthropology at the University of Tennessee, and a key member of the team that investigated the archeological sites at Tellico, recently stated that funds provided as a result of the Tellico project have made it possible to carry out an extensive and orderly program of investigation and excavation which has extended through a period of 10 years. He said the major sites have been extensively investigated and that a great deal of archeological and historical information, as well as artifactual material which was unavailable under private ownership and would otherwise have been lost or destroyed, has been retrieved.

The historical and archeological significance of the Little Tennessee River Valley is undisputed; only the best development strategy is in question. Proponents of river-based area development support extensive investigation of several sites. By comparison, if the project is completed, TVA would preserve and develop a few sites along the reservoir in conjunction with prereservoir site investigation.

Agricultural opportunities

To determine agricultural suitability, the Department of Agriculture classifies soils into eight classes according to slope, erosion, and other features. Land use Class I has few limitations or none, while Class VIII has many. The three-county area adjacent to the project has a total of 240,000 acres of land in land use Classes I, II and III, including about 25,000 acres in the project area. All of this land is suitable for agricultural use.

TVA acknowledges that the reservoir would reduce agricultural production in the three-county area. In its opinion, these losses will be offset many times by economic gains resulting from the project.

The Tellico environmental impact statement reported 1964 agricultural production of $1.9 million on project property or about 15 percent of the agricultural production in the three-county area. TESC states that this level of production is not a good indicator of the current agricultural potential, however, because changes have occurred in farm policy since the 1960s, when much of the land in the project was in the Federal soil bank. Farm policy now encourages maximum use of fertile farm lands. TESC, in its draft propsal of alternative use plans, estimates annual yields of $17 million at 1973 prices if tillable lands are used for intensified cultivation. TVA, on the other hand, estimates that annual yields would not total more than about $6.4 million annually.

CONCLUSION

Numerous alternate uses exist for the Little Tennessee River Valley if the reservoir is not completed. However, neither the Tellico project nor its alternatives are supported by current benefit and cost estimates. The State of Tennessee currently supports the reservoir project as the best way to develop the area. TESC and others, on the other hand, contend that some alternative that preserves both the snail darter and the natural and cultural characteristics of the valley should be adopted. In our opinion, more information is needed to resolve the Tellico question.

CHAPTER 4

ASSUMPTIONS AND LOGIC TVA USED TO ESTIMATE TELLICO BENEFITS

The most recent analysis of Tellico benefits was prepared in 1968. Our analysis of these projections showed the assumptions and logic used by TVA to estimate some benefits are not valid predictors of Tellico benefits. In some instances the methodology did not conform to Federal guidelines for estimating the benefits of water projects and, in other instances, statistical projections were not valid. TVA officials said their methodology, procedures, and data bases have improved significantly since they projected Tellico benefits in 1968, but that using these different methods to reevaluate project benefits would not significantly affect the results of their original analysis.

TVA'S TELLICO BENEFIT ANALYSIS

Benefit-cost analyses are developed and reported to the Congress by Federal water resource construction agencies to show the economic feasibility of proposed projects. These analyses are one of several factors used to decide on the best use, or combination of uses, of water and land resources.

TVA made an analysis of Tellico benefits and costs in 1968. Although project costs have since increased 115 percent--from $54 million to $116 million--TVA has not updated its benefit projections because it is not its policy to update a project analysis once a project is funded and underway.

Because the benefit-cost analyis is important in congressional and agency decision making, Federal guidelines were developed for evaluating the benefits and costs of proposed projects. At the time TVA estimated Tellico benefits, these guidelines were printed in the basic and supplements to Senate Document 97, 87th Congress, 2d session.

TVA calculated direct benefits of $3,760,000 annually, with a benefit-cost ratio of 1.7 to 1, and secondary benefits of $3,650,000 annually with a total benefit-cost ratio of 3 to 1. Secondary benefits were based on additional job opportunities that would be available in the Tellico area as a result of industrial development. TVA estimates that a minimum of 4,000 industrial jobs would be attributable to those industries and an additional 2,600 trades and services jobs would be created.

As requested, our review was limited to the assumptions and logic used by TVA to estimate direct benefits of the Tellico project. Accordingly, we neither attempted to verify or evaluate the accuracy of the data TVA used in the analysis nor attempted to quantify the effect of problems we found.

TVA divided direct annual benefits into eight categories. The summary schedule of these benefits shown below is followed by an analysis of each category.

Tellico Direct Annual Benefits

Recreation	$1,440,000
Shoreline development	710,000
Flood control	505,000
Navigation	400,000
Power	400,000
Fish and wildlife	220,000
Water supply	70,000
Redevelopment	15,000
Total	$3,760,000

Recreation

Senate Document 97 defines recreation benefits as the value of net increases in the quantity and quality of boating, swimming, camping, picnicking, and similar outdoor activities resulting from a project. TVA projected the recreation use at Tellico by dividing the total annual visits at existing reservoirs including their adjacent parks in the TVA system by the number of shoreline miles at these reservoirs. This average was then multiplied by the shoreline miles at Tellico. Adjustments were made to (1) give more weight to East Tennessee reservoirs and the proximity of the project to the Great Smoky Mountains National Park and (2) to exclude fishing visits which TVA included under fish and wildlife benefits. An estimated growth factor was applied to arrive at total annual visits which were divided among commercial, TVA access and public use categories. Values, ranging from 50 cents to $1.25 per visit, were assigned to each category and multiplied by the estimated number of visits for each category.

Using this method TVA predicted that the Tellico reservoir would receive about 1.6 million annual visits by the 6th year of the project and that the number of visits

would increase annually until it leveled off at about 2.6 million visits during the 15th year to yield $1,440,000 in annual benefits over the expected 100-year life of the project.

Our analysis showed that the arithmetic average of visits per shoreline mile used by TVA does not reflect the great variations, or the reasons for variations, among the individual reservoirs used in the analysis. For example, the visits per shoreline mile used to compute the average ranged from 258 at the Appalachian reservoir and 577 at the Nolichucky reservoir to 19,351 at the Fort Patrick Henry reservoir and 11,220 at the Guntersville reservoir. A TVA recreation official agreed that a number of factors affect the recreation use of a reservoir. They stated that if this analysis were to be made again, factors such as water quality, the type and amount of shoreline development, the amount of land devoted to public access, and the proximity to a population center would be given consideration. We did not attempt to determine the effect these factors would have on the Tellico visitation estimate.

In commenting on our draft report, TVA stated that independent estimates of expected Tellico visitation by Economics Research Associates in 1971 substantiated the general range of recreation visits projected for Tellico. However, we noted that the 6-year-old study was critical of TVA's approach and that it pointed out that TVA's methods do not give a truly valid picture of probable visitation directly associated with the Tellico reservoir.

Supplement No. 1 to Senate Document 97 points out important factors that should be considered in estimating recreation use, including the availability and attractiveness of existing alternative recreation opportunities. Because several reservoirs exist near the Tellico project area, TVA agreed that some recreation benefits would be lost at other recreational areas as a result of the project. However, TVA did not make allowances in its estimate for recreation visits that would represent transfer from an existing reservoir to the new Tellico reservoir. In such cases no benefits are created; rather, the increased visitation at Tellico is offset by decreases at other reservoirs. TVA believes the transfer question is not relevant because it expects all reservoirs in the area to be at capacity in the future. We noted, however, that most if not all of the 20 reservoirs within 100 miles of the project are not currently at capacity and that visitation rates vary considerably between reservoirs.

Shoreline development

Shoreline development benefits of $710,000 are derived from the conversion of agricultural lands into higher valued industrial, residential, and commercial lands. In projecting shoreline development benefits, TVA assumed that 16,500 of the 38,000 acres purchased by TVA would be sold to end users and developers within 12 years after project completion. The anticipated selling price for this land has an annual equivalent value of about $455,000. TVA claimed the entire selling price as shoreline development benefits since the original cost is included on the "cost" side of the cost-benefit ratio. In addition, TVA also claimed about $255,000 in benefits for further price increases which it projected for these same lands over the next 38 years.

Our analysis showed that benefits derived from about 1,000 acres of Tellico land were claimed under both shoreline development and recreation categories. The 1968 estimate of recreation benefits provided for this land to be used as a State park, while the shoreline development benefit calculation assumed this land would be sold for development. The TVA Land Branch had deleted this land from its shoreline development benefit estimate, but the land was added back when all the benefit categories were consolidated. This duplication caused shoreline development benefits to be overstated by about $27,000.

In addition to shoreline development benefits, TVA also computed navigation benefits (transportation savings) that would accrue to industries that purchase industrial sites at Tellico. We believe, however, that the factors which make the Tellico sites more desirable to industry, such as navigation, would be reflected in the increased land prices industry would be willing to pay. Accordingly, we believe some duplication exists between navigation and shoreline development benefits. Additional discussion on this point is included under the navigation benefits section of this report. (See p. 31.)

We also believe that price increases anticipated after TVA sells the land are attributable, at least in part, to other factors, such as inflation, improvements made by the buyer, and demand for land in general. Although some price increases may result from the project, this increment should be identified and the benefits attributed to the project should be limited to this amount.

Flood control

Flood control benefits are defined by Senate Document 97 as the reductions in all forms of damage from inundation of property, including the higher use of property made possible as a result of lowering the flood hazard. The Tellico project, according to TVA hydrological studies, would add 126,000 acre-feet of flood storage to the TVA system worth $505,000 annually. TVA calculated the value of this storage by estimating the value of each acre-foot of storage already in the TVA system (dollar value of damages prevented divided by the number of acre-feet of storage in the system) and multiplying this value per acre-foot by Tellico reservoir storage capacity.

TVA's method of estimating flood control benefits assumes each additional acre-foot of storage provides as much flood protection as existing storage. In our opinion, the value of added storage per acre-foot decreases as downstream areas approach 100-percent protection. TVA's use of an average value per acre-foot is not consistent with Senate Document 97's definition of a benefit--the net increase in value with the project compared to the value without the project. We believe the value of flood damages with and without the Tellico project should be compared, and only the value of incremental flood protection provided should be projected as flood control benefits.

TVA, in commenting on this analysis, stated that a March 1973 flood caused damages estimated at about $35 million in Chattanooga--the principle area to be protected by the Tellico dam. TVA estimated that the Tellico project would have reduced these damages by about $15 million. Conversely, TESC stated that little or no damage in Chattanooga would have been averted by the project because the flooding was caused by water from Chickamagua Creek, not the Little Tennessee River. While we did not verify the accuracy of these estimates, we believe that this type of procedure--comparing damages with and without the project--should be used to calculate flood control benefits over the life of the project.

Navigation

The navigation benefit of $400,000 is based on projected transportation savings expected from moving various commodities by barge compared to the least expensive alternative mode--normally by rail. Because no industries were located adjacent to the proposed reservoir, TVA computed navigation benefits by reviewing actual transportation savings of 44 industrial

firms which located along the Tennessee River between 1953 and 1963. These savings were totaled and divided by the total number of land acres occupied by these firms to obtain a savings-per-acre. After time-phasing, discounting, and amortization, the resulting $80 per acre was multiplied by the 5,000 acres of industrial lands at Tellico.

TVA's procedure assumes a strong correlation between transportation savings and industrial acreage. Our analysis of transportation savings at each of the 44 firms in the TVA analysis did not show a strong correlation between industrial acreage and transportation savings because of the great variation in savings between industries. For example, 27 of the 44 firms did not have transportation savings. The 17 firms that did have savings from use of a waterway ranged from $26 to $19,894 per acre. In our opinion, a case-by-case analysis should be made rather than using a purely statistical average because of this wide variation.

In commenting on our report, TVA stated that the majority of the 27 firms with no savings chose to take advantage of reduced rail rates which resulted from competition with barge lines rather than using an available waterway. We believe, however, that no navigation benefits are created unless the shippers actually use the waterway because the reduction in transportation costs for the shippers are offset by reductions in income for the railroad industry.

TVA further stated that it prepared an analysis in 1971 which estimated transportation savings for two different industrial complexes whose needs could be met by Tellico sites. According to TVA, this analysis substantiated the reasonableness of its 1968 benefit estimate. We did not verify the accuracy of these estimates but we believe the basic procedure of identifying specific industries and related shipments would be preferable to the methods used in the 1968 analysis. Since this data is at least 6 years old, however, we believe a current analysis using improved methods would result in a different savings projection.

In addition to being statistically weak, TVA's analysis did not consider two other factors. First, TVA plans to restrict industrial development at Tellico to those industries compatible with adjacent recreation and residential areas. Despite this, some of the 44 firms analyzed for transportation savings were in industries which would be restricted from Tellico. For example, one TVA official said that a paper mill would probably not be allowed to locate at Tellico. However, the TVA projections included transportion savings of this type industry.

Second, as discussed earlier, we believe that part, if not all, of the navigation benefits were already included in the "shoreline development" benefit. TVA calculated the shoreline development as the value of agricultural land transformed into industrial land as a result of navigation, water supply, zoning, and other factors. A TVA navigation official told us that the claimed shoreline benefits would include the value of navigation only if the industrial land is sold at market value, which includes some value for navigation advantages. TVA Land Branch officials said they are planning to receive market value, for the land, but contend this value does not include the capitalization of transportation savings. We believe that the market value of the land, however, would reflect navigation savings since this is one of the factors which would make the land more valuable.

Power

Although the Tellico dam does not have generators, TVA attributes power benefits of $400,000 to the project because it will divert additional water through a 1000-foot canal to the Fort Loudoun Dam turbines, which are large enough to utilize flows diverted from the Little Tennessee River. TVA hydrologic studies showed that this additional water volume would increase energy output by 200 million kilowatt hours annually. TVA computed the value of this power by comparing the overall TVA system cost to satisfy a given power demand both with and without the project. Since hydro power is less costly than some other power generating methods (coal, gas turbine), the TVA system cost per kilowatt hour would be decreased by adding this increment of lower cost power.

In 1968 TVA estimated the value of this power benefit to be $290,000 annually. When TVA prepared the 1971 environmental impact statement, it increased power benefits to $400,000; however, TVA did not update costs associated with the power benefit that may have also changed during the 3-year period from 1968 to 1971. TVA said it did not increase costs because the revised power benefits were expressed in 1968 prices, but there were no documents or supporting schedules to show how this increase in benefits was computed. TVA said the power benefit was increased to reflect the increased cost of alternate energy sources during the period.

In 1975 TVA reevaluated Tellico power benefits. This analysis showed that power benefits had increased by over $1 million to about $1.6 million annually. TVA officials said this increase was primarily attributable to the large increases in the cost of coal and other fuels that would be used to produce this same amount of power.

Fish and wildlife

Fish and wildlife benefits of $220,000 as estimated by TVA are the difference between the value of fishing and hunting with the Tellico project compared to the value of fishing and hunting without the project. Fishing values are the most significant in these estimates; hunting comprises only a very small portion of the claimed benefits.

TVA estimated the number of annual reservoir fishing trips on the basis of a 12-month TVA study of reservoir fishing at Norris Dam on the Clinch River. The number of visits derived was multiplied by an assigned value per visit from Senate Document 97 to obtain the Tellico fishing benefit. TVA also added a market value for commercial fishing at Tellico on the basis of such fishing at four east Tennessee reservoirs.

TVA's estimate of fishing without the reservoir was based on a 15-month interagency study of fishing on the Little Tennessee River prepared by the State of Tennessee, TVA, and the Department of the Interior. The fishing visits estimated were multiplied by a cold-water-fishing value and deducted from the reservoir fishing benefit estimate to obtain the net fishing benefit for the Tellico project.

Our analysis showed that TVA's method did not consider the number of fishing trips that might be drawn from other reservoirs. TVA fisheries' biologists agree that the value of these trips should have been deducted from the estimated benefits and told us that their 1968 analysis was one of TVA's first attempts to quantify the value of fishing and hunting at a reservoir. These officials said further that their estimating procedures and data bases have improved significantly since the Tellico estimate was prepared, but that a new analysis would not provide substantially different results.

As stated earlier TVA believes the transfer question is not relevant because it expects all reservoirs in the area to be at capacity in the future. However, most if not all of the 20 reservoirs within 100 miles of the project are not currently at capacity, and visitation rates vary considerably between reservoirs.

Our analysis also showed that TVA based its values for fishing and hunting trips on an interim guideline range of values issued in 1960 by an interagency committee on water resources. Before TVA prepared its analysis in 1968, however, these values were formally increased by Supplement No. 1 to

Senate Document 97. TVA used the midrange value for reservoir fishing in both the interim guidelines and Supplement No. 1. However, the value used by TVA for non-reservoir fishing--the midrange under the interim guidelines--was the lowest allowed under Supplement No. 1. If TVA had consistently used the middle of the acceptable range, it would have increased the value of nonreservoir fishing, and, correspondingly, reduced the net annual benefits claimed for reservoir fishing by about $55,000. TVA believes the lowest value is justified considering (1) the criteria and examples given for specialized recreation in Senate Document 97 and (2) the cost involved in stocking trout in the Little Tennessee River.

Water supply

TVA computed the water supply benefit of $70,000 by calculating the amount of power and construction costs that could be saved if industrial firms pumped 70 million gallons of water per day from a reservoir rather than a river. Internal correspondence showed that the estimated water usage rates TVA used were based on actual water consumption of two firms which TVA projected to eight firms that could locate at Tellico.

Our review showed, however, that the TVA analysis did not consider the amount of industrial acreage available at Tellico. We determined, on the basis of the acreage occupied by the two actual firms, that the eight firms used in TVA's analysis would require over twice the acreage set aside for industrial development in the project. TVA stated that it believes its comprehensive land-use planning would enable these industries to locate at Tellico within the acreage set aside for industrial development.

Personnel turnover and lack of documentation prevented TVA officials from explaining exactly how the $70,000 annual benefit was computed. However, a 1971 TVA analysis using the same 70 million gallons per day withdrawal rate showed an average annual equivalent benefit of only $24,000. This study applied assumed water usage rates as high as 150 million gallons per day to 13 industrial plants that were potential candidates for the Tellico area. The average annual equivalent benefit for the highest assumed usage rate--which was over twice that of the actual rates found in 1968--is $80,000 in 1968 dollars.

Redevelopment

The TVA redevelopment benefit of $15,000 is a projection of increased employment of otherwise unemployed and underemployed labor in the area resulting from the construction, operation, and maintenance of the Tellico project. To quantify this benefit, TVA officials reviewed construction, operation, and maintenance labor requirements; employment applications; wage rates; and existing unemployment data to identify the increased employment effect of the project.

TVA supporting schedules appeared to support this benefit category.

CONCLUSION

In view of the age of the most current TVA benefit estimates and the problems noted regarding the methodologies used by TVA in making these estimates, we do not believe the benefit projections are representative of the actual benefits that would be derived if the project is completed. Because our analysis was not intended to determine the net effect of these problems, TVA's projected benefits could either be understated or overstated. Due to this uncertainty, we believe TVA's benefit analysis does not provide the confidence in the benefit estimates necessary to make an informed decision on the project.

CHAPTER 5

CONCLUSIONS, RECOMMENDATIONS, AND AGENCY COMMENTS

CONCLUSIONS

We have concluded that

--as much as $19 million is required to finish the project, primarily for completion of roads, visitor centers, and reservoir clearing;

--about $56 million of the $103 million obligated through February 1977 on the Tellico project will provide benefits if the project is not completed, but the benefits will probably not be proportionate with the original costs;

--the reservoir configuration cannot be altered to insure survival of the snail darter in the Little Tennessee River and at the same time provide the level of reservoir benefits estimated by TVA;

--a portion of the construction must be removed, over the long run, if the project is not completed because the dam in its present form threatens the snail darter's survival; the estimated cost of removal varies from $2 million to $16 million, depending on the extent of restoration desired;

--alternatives to the Tellico project have been proposed because of the agricultural, cultural, and recreational opportunities of the Little Tennessee Valley, but none are supported by current benefit and cost estimates;

--in view of the age and problems noted, TVA's benefit projections for the Tellico project are not representative of the actual benefits which could be derived; and

--more current benefit and cost information is needed on the project and its alternatives before an informed decision can be made.

AGENCY RECOMMENDATIONS

We recommend that the Chairman of the Board, TVA, gather and provide to the Congress, through the Office of Management and Budget, detailed remaining cost and remaining benefit information on the Tellico project and its alternatives.

To provide a balanced perspective, we further recommend that initial suggestions on developing alternatives and subsequent comments on the methodologies, data bases, and resulting analyses should be obtained from the Director of the Office of Management and Budget, the Chairman of the Council on Environmental Quality, and the Secretary of the Interior in view of (1) his involvement in the Endangered Species Act of 1973, (2) his funding of archeological investigations in the Little Tennessee River Valley and involvement in the National Historic Preservation Program, and (3) the impact of the project on overcrowding at the Great Smoky Mountains National Park. These comments should be included in the information submitted to the Congress.

RECOMMENDATION TO THE CONGRESS

The decision of whether to exempt the Tennessee Valley Authority's Tellico project from the provisions of the Endangered Species Act of 1973 involves more than comparing the value of the snail darter with benefits that could be derived from the completed project. The snail darter is important, however, because it is an integral part of the broader issue of whether the Tellico project is the best use of the Little Tennessee River Valley.

While biologists recognize that the Tellico dam is threatening the snail darter's survival in the Little Tennessee River, they believe that former population levels can be reestablished in the river if conservation measures are taken, and, over the long run, if all or part of the dam is removed. Since time permits, we believe more current information should be obtained on the project and its alternatives.

TVA is ready to impound the reservoir and spend an estimated $13 million to $19 million to complete the project if the U.S. Supreme Court rules in favor of TVA's appeal and lifts the current injunction on project construction. For this reason and because current detailed cost and benefit information is not available, we recommend that until the remaining cost and remaining benefit information on the Tellico project is received from the Chairman of the Board,

TVA, including the comments of the agencies referred to above, the Congress prohibit by law the expenditure of existing appropriations and defer further appropriations for work on the project that would (1) further endanger the snail darter's survival, such as closing the sluice gates, or (2) not be necessary if the project is not completed or is modified. We further recommend that the Congress not act on the proposed exemption legislation until it has had time to assess the updated information.

* * * * *

These recommendations should not be construed that we are either for or against completing the Tellico project, but rather that we believe additional information is necessary to allow the Congress to act on the questions before it.

AGENCY COMMENTS AND OUR EVALUATION

TVA

In August 14, 1977, comments (see app. VII) on this report, TVA stated that gathering remaining cost and remaining benefit information on the project and its alternatives is not necessary. It said that our concerns about the age and faults in the methodology of the 1968 reservoir cost-benefit analysis would be relevant if the present issue was whether to authorize a new project, but that because Tellico is over 90-percent complete, the project should not be delayed merely to recount benefits. TVA maintains that the current value of any one of the project's major benefits more than justifies the relatively small cost to complete Tellico.

TVA believes it is unwise to examine project alternatives because alternatives would be a waste of public funds already invested in the project and because "scenic river" alternatives have already been considered and rejected by the Congress. TVA maintains that a scenic river would provide only 2 percent of the benefit levels projected for the Tellico reservoir. Further, TVA stated that additional public funds would be required to restore the project area and to provide public use areas and other facilities.

We disagree with TVA that the Congress should ignore the major problems found with the Tellico benefit analysis.

disregard nonreservoir alternatives, and allow TVA to spend an additional $13 million to $19 million, merely because the project is near completion.

We agree that in deciding whether Tellico should be completed the Congress should consider the investment already made in the project. In addition to this, however, there are many important issues which have surfaced since the project was conceived and which must also be carefully considered in any current decision on the Tellico Project, for example:

--The project would threaten the survival of the snail darter, which is important not only as an endangered species but also for its role in setting a precedent for future decisions under the Endangered Species Act of 1973.

--The project would destroy a rich archeological valley despite public concerns to preserve our historical and cultural foundations as demonstrated by the National Historic Preservation Program.

--The project would render useless about 16,500 acres of prime agricultural land at a time when the Department of Agriculture and the President's Council on Environmental Quality recently issued statements encouraging Federal agencies to consider the preservation of such lands in carrying out programs.

--The project would convert the last large flowing river in the region into a reservoir, despite a projected 33-fold increase in stream fishing by 1990 and the existence of 20 underutilized reservoirs within 100 miles of the project area.

--A scenic riverway rather than a reservoir would more effectively alleviate overcrowding at Great Smoky Mountains National Park--the fourth most widely used national park in the United States.

If TVA is required to perform a remaining cost-benefit analysis for both the project and its alternatives, the Congress would have before it, for the first time, a current detailed projection of costs and benefits for both the proposed reservoir project and a comprehensive river-based regional development project offering such opportunities as

recreation, agriculture, and historical, cultural, and industrial development.

In preparing rebuttals to our draft report, TVA found it useful to update its estimate of power benefits for the project. We believe a complete analysis, as that described in our recommendations, would be even more useful to the Congress.

TVA has stated that improved estimation criteria and additional data could be used to prepare a more refined analysis, but that these would not significantly effect the results of the 1968 analysis. Conversely, TVA also reports that project costs have increased 115 percent and power benefits have increased 12-fold. Considering those sharp increases and the other problems noted in chapter 4, we believe a new analysis would look considerably different from the one prepared over 9 years ago.

TVA also stated that since only $56 million of the $103 million expended will provide some benefit, then $47 million of public funds would be completely wasted if the project were not completed. We disagree. As discussed in chapter 2, area economic stimulation has already been realized from salaries and wages paid to project workers, and secondary stimulation will occur whether or not the project is completed.

Our evaluation of specific TVA comments is included in appendix VIII.

Department of the Interior

The Department's August 2, 1977, comments (see app. VI) on this report state that it was in general agreement with our findings and recommendations.

With regard to overcrowding at the Great Smoky Mountains National Park, the Department confirmed that a scenic riverway would more effectively alleviate overcrowding at the park than would a reservoir. The Department stated further that it would be happy to assist TVA in assessing river-based recreational alternatives along the Little Tennessee River.

Council on Environmental Quality

The Council, in August 8, 1977, oral comments on this report stated that it had neither problems nor suggestions to the report. The Council stated it would appreciate the

opportunity to comment on a remaining cost-benefit study, but cautioned that the depth of the Council's comments would be limited by its resources available at that time.

Office of Management and Budget

In a July 25, 1977, letter, the Office of Management and Budget stated that it had no comments or suggestions at this time. (See app. V.)

APPENDIX I

JOHN J. DUNCAN
[redacted] DISTRICT, TENNESSEE

[redacted] RAYBURN HOUSE OFFICE BUILDING
PHONE: (AREA CODE 202) 225-5435

COUNTIES:
[redacted]

COMMITTEE:
WAYS AND MEANS

Congress of the United States
House of Representatives
Washington, D.C. 20515

February 17, 1977

Mr. Henry Eschwege
Director
Resources and Economic
Development Division
U. S. General Accounting Office
Washington, D. C. 20548

Dear Mr. Eschwege:

As you may recall, I contacted the Comptroller General last February 19 requesting information on necessary procedures for requesting a cost-benefit analysis of the Tennessee Valley Authority's Tellico Dam Project in my Congressional district. That request was forwarded to you, and after a staff consultation, I received a letter from you, under date of March 25, 1976, which stated, in part, that "in view of the advanced status of the project and the litigation, we do not consider it advisable to undertake a detailed and costly benefit-cost study of the project".

I am sure you are aware of the renewed interest in the Tellico Project which has been generated by the recent decision of the Sixth Circuit U. S. Court of Appeals which granted a permanent injunction against any further construction on the dam until such time as judicial or legislative relief may be given.

In light of the controversy which this decision has created, and in view of the fact that any further judicial or legislative action may set precedents with potentially grave implications for other, similar, public works projects, I think that a GAO cost-benefit study of the

APPENDIX I

Mr. Henry Eschwege
February 17, 1977
Page 2

Tellico Project would be most appropriate. I would, therefore, like to renew my request of a year ago that GAO conduct such a study.

Thank you for your consideration.

Very truly yours,

JOHN J. DUNCAN
Member of Congress

JJD/slc

APPENDIX II

March 2, 1977

Honorable Elmer B. Staats
Comptroller General of the United States
General Accounting Office
Washington, D.C. 20548

Dear Mr. Staats:

Legal questions have arisen between the Federal Endangered Species Act of 1973 (16 U.S.C. 1531 ff) and the nearly-completed reservoir segment of the Tennessee Valley Authority Tellico Project, a recreational-industrial development project in East Tennessee with associated benefits in barge-navigation, peaking power generation, and incremental water control.

The terms of the permanent injunction in the U. S. Sixth Circuit Court of Appeals call for a halt to all construction work on the reservoir portion. The appropriate Congressional Committees may consider a specific project exemption from the Endangered Species Act, based upon review of the value of the project with a reservoir component as originally designed, and of the value to the public if project assets are modified for alternate public land and water uses.

The specific inquiries necessary to provide information for Congressional review of these alternatives are the following:

1. To quantify the value of the resources and materials directly invested in the dam structure to date for which there is no alternative public utility or which would be irretrievably lost in the event that Congress decides that the Valley should not be flooded.

2. To assess the potential value of the recoverable project expenditures in land, road facilities, bridges, and infrastructures, when developed for alternative utilizations to a reservoir, e.g., agricultural production management, historical site management, national river recreation area

APPENDIX II

Honorable Elmer B. Staats (2) March 2, 1977

management, and non-reservoir industrial development, or a combination thereof, including consideration of unquantifiable public values and of alternative management models prepared by the State of Tennessee and University of Tennessee researchers.

3. To analyze the current Tellico cost-benefit analysis, its assumptions and data basis, and ascertain for Congress' review of alternatives the actual public benefits and losses that would be produced by a decision to complete dam expenditures and flood the reservoir portion of the Valley. Such a review should reflect the existence of the immediately adjacent reservoirs of Melton Hill, Fort Loudon, Watts Barr, and Chilhowee, in flatwater recreation, industrial development performance, water quality, agriculture, etc.

4. To analyze the extent to which projected reservoir-based benefits, in recreation, industrial development, flood control, etc., could be achieved by a river-based management model as opposed to a reservoir-based management model.

Our committee requests that a study be undertaken to examine these questions and to supply Congress with a thorough analysis of this issue. For purposes of ongoing communications with your office, please contact Mr. James W. Spensley, Counsel for the Subcommittee on Fisheries and Wildlife Conservation and the Environment (225-7307), who will act as coordinator for the Committee on this fact-finding project.

Sincerely,

John M. Murphy
Chairman
Committee on Merchant Marine and Fisheries

Robert L. Leggett
Chairman
Subcommittee on Fisheries and Wildlife Conservation and the Environment

Edwin B. Forsythe
Ranking Minority Member

APPENDIX III

JIM SASSER
TENNESSEE

COMMITTEES:
APPROPRIATIONS
BUDGET
GOVERNMENTAL AFFAIRS

United States Senate

WASHINGTON, D.C. 20510

March 14, 1977

Honorable Elmer B. Staats
Comptroller General of the United States
General Accounting Office
Washington, D. C. 20548

Dear Mr. Staats:

I write to support a review by the General Accounting Office of the Tellico Dam project on the Little Tennessee River in East Tennessee.

The Tennessee Valley Authority has asserted that the dam is highly important to the prospects of industrial development in the region. It cites recreational facilities associated with the reservoir, benefits of barge transport, power production and flood control.

Citizens opposed to the project have asserted that the potential benefits are overstated and do not outweigh the actual public losses if the valley is flooded. They have sought review of alternative use plans for the project area.

To assist in resolving this dilemma, I support a study of the facts by the GAO to determine the real public costs and benefits associated with the project and the alternatives. The study has been requested by Representatives John M. Murphy, Robert L. Leggett and Edwin B. Forsythe.

I hope that the study may begin quickly and that a report will be forthcoming soon.

Sincerely,

Jim Sasser
United States Senator

APPENDIX IV

JOHN J. DUNCAN
2nd District, Tennessee

2400 Rayburn House Office Building
Phone: (Area Code 202) 225-5435

COUNTIES:
BLOUNT
CAMPBELL
CLAIBORNE
KNOX
LOUDON
MORGAN
ROANE
SCOTT
UNION

Congress of the United States
House of Representatives
Washington, D.C. 20515

COMMITTEES:
WAYS AND MEANS
BUDGET
JOINT COMMITTEE ON INTERNAL REVENUE TAXATION

April 26, 1977

Honorable Elmer B. Staats
Comptroller General of the United
States
General Accounting Office
441 G Street
Washington, D. C. 20548

Re: Tellico Dam Reservoir
Project

Dear Sir:

It is my understanding that your office has been conducting an investigation regarding the completion of the above captioned project.

I am sure you are aware of the fact that the project is approximately 99% complete, and that it has received President Carter's approval. I also call to your attention the fact that funds for the project are contained in the President's budget recommendations.

Shortly after the project was halted by an injunction issued by the Sixth Circuit Court of Appeals under the Endangered Species Act of 1973, I mailed every resident in Monroe and Loudon Counties, Tennessee, the two counties most affected by the project, a letter, a copy of which is attached, with a question at the bottom concerning the completion of the project. From Monroe County, 713 responses were received, of which 673 favored the project's completion and 40 did not. From Loudon County, I received 939 responses. Of these, 864 were for completion and 75 were not.

In additionato the above survey, a question regarding completion of the Tellico Project was included on my annual questionnaire which was mailed to every household in my Congressional district. The overwhelming sentiment for completion is indicated as follows:

APPENDIX IV

Honorable Elmer B. Staats
April 26, 1977
Page 2

COUNTY	FOR	AGAINST
Blount	1700	231
Campbell	468	21
Claiborne	278	19
Knox	7890	1343
Loudon	787	81
McMinn	522	59
Monroe	526	32
Scott	143	22
Union	119	17
TOTALS	12,430	1,825

All of the above information is available for your inspection.

Very truly yours,

JOHN J. DUNCAN
Member of Congress

JJD/slc
Enclosure

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

July 25, 1977

Mr. Victor L. Lowe
Director, General Government
Division
General Accounting Office
Washington, D.C. 20548

Dear Mr. Lowe:

This is in response to your request for our comments and suggestions on your draft report, "The Tellico Dam Project - A Brief Assessment of Costs, Alternatives and Benefits."

We have reviewed the subject draft report and have no comments or suggestions at this time.

Sincerely,

James T. McIntyre, Jr.
Deputy Director

APPENDIX VI

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

August 2, 1977

Mr. Henry Eschwege, Director
Community and Economic Development Division
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Eschwege:

We have reviewed the draft report on "The Tellico Dam Project--A Brief Assessment of Costs, Alternatives and Benefits, Tennessee Valley Authority" and the following confirms oral comments previously given.

We are in general agreement with findings and recommendations of the report. References to the snail darter as a "minnow" should be changed to disclose that it is a member of the perch family.

The TVA petition to delist the present critical habitat for the snail darter and transfer the remaining fish to locations other than the Little Tennessee River was denied on July 6, 1977.

We confirm the statement on page 30 which says "a scenic riverway would more effectively alleviate overcrowding at the park than would a reservoir...."

The extent to which overcrowding would be reduced is dependent upon the land area to be allocated to the various uses, the design of facilities to support these uses and ultimately the management of the area. Impacts on the Park cannot be quantified until the above variables can be studied and specific alternatives developed. Based on information in recent regional visitor use studies, sightseeing, picnicking, camping, stream-fishing, horseback riding and boating are favored visitor activities. State and Federal planners forecast a 33-fold increase in streamfishing, by 1990, in the Smoky Mountain Region. Areas within this region such as the valley of the Little Tennessee, capable of accommodating streamfishing and the other popular activities should reduce the recreation demand on the Park.

We believe a river-based recreation area located outside the Park offering many experiences comparable to those found in the Park would help encourage traffic flow around the Park. Traffic circulation around the Park would provide visitors with excellent views of the Park; would provide access to existing developments on the edge of the Park; and would provide an

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APPENDIX VI

opportunity for private enterprises to provide visitor facilities outside of the Park.

The National Park Service would be happy to assist TVA in assessing river-based recreational alternatives along the Little Tennessee. We believe a river-based recreation/cultural complex could offer an attractive alternative to the Smokies for many Park visitors.

We appreciate the opportunity to review and comment on GAO's report and look forward to participating in any future studies or actions.

Sincerely,

for Larry E. Meierotto
Richard R. Hite
Assistant Secretary
Policy, Budget, and Administration

APPENDIX VII

TENNESSEE VALLEY AUTHORITY
KNOXVILLE, TENNESSEE 37902

August 10, 1977

Mr. Monte Canfield, Jr., Director
Energy and Minerals Division
General Accounting Office
General Accounting Office Building
441 G Street
Washington, D.C. 20548

Dear Mr. Canfield:

Thank you for the opportunity to comment on the General Accounting Office's revised draft report on TVA's Tellico project. Our detailed chapter-by-chapter comments are enclosed.

We are disappointed that many of the comments we previously provided to GAO were not included in the revised draft report, and we again suggest that they be included in the final report in order to provide a more balanced presentation of the issues, as well as to correct a number of errors and mischaracterizations that remain. As you know, during the week of July 11 these comments were submitted to and discussed with GAO's Atlanta staff. It was our understanding that the substance of TVA's comments would be incorporated into the final report to balance the presentation of contrary views of the Tellico opponents, which had been presented in the earlier draft without critical analysis. Many of the corrections and changes agreed to as necessary for accuracy and balance have not been included in the revised draft.

Even without the incorporation of our comments, however, we believe that the material in the revised draft report does not support GAO's primary conclusion that the Tellico benefit-cost analysis should be updated to determine whether the virtually completed project should be used. The draft expresses concern over the age of the benefit-cost analysis, certain faults which GAO believes exist in the methodology used by TVA in 1968 to estimate some of the benefits, and ultimately concludes that GAO is unsure whether the Tellico benefits have been understated or overstated. If the present issue were whether or not to authorize a new project, those concerns would be relevant. The Tellico project, however, is over 90 percent complete and over $103 million of the estimated $116 million total cost has already been invested (as of February 1977) to achieve the project's benefits. And, although GAO questions certain methodology used by TVA in 1968 to value benefits, it is apparent that the current value of any one of the project's major benefits more than justifies the relatively small cost to complete it.

APPENDIX VII

Mr. Monte Canfield, Jr., Director August 10, 1977

According to GAO's calculations, some $47 million of public funds would be completely wasted if the project is not completed. While some public benefit would be recovered from the remaining $56 million, GAO found that those benefits "probably will not be proportionate with project costs." In addition, before the "scenic river" developments which the report suggests be considered in the reanalysis could be undertaken, approximately $16 million of new money would have to be spent to remove the reservoir related structures and restore the project area. To obtain any benefit from the "scenic river" alternative for more than a few individuals, substantial additional expenditures would be required for public use areas and other facilities.

As the GAO draft report recognizes, the "scenic river" alternatives suggested by project opponents are not new. These are the same alternatives which have been considered and rejected time and again by Congress both before and after Tellico's initial funding. The "scenic river" alternatives were also fully examined as a part of the 1971 review performed by TVA pursuant to the National Environmental Policy Act and found to be 2 percent of the Tellico benefits. Neither passage of time nor technical inaccuracies in some of the benefit-cost methodology, even if true, would change the result of this analysis. We simply do not think it makes sense to lose the public benefits from Tellico, waste the nonrecoverable expenditures in the project, and spend an additional $16 million in an effort to return the land to the state it was in at the time Congress decided that the project should be begun.

We wish to make clear that TVA would hasten to prepare an updated benefit-cost analysis of the Tellico project and its alternatives if one were needed or appropriate under the circumstances. We do not think one is. Over the last decade, Congress has authorized the expenditure of over $100 million to make possible the public benefits Tellico will provide. The project has been studied and restudied, argued and reargued, and the project has now been built and its benefits ready to be enjoyed. Those benefits justify its completion now regardless of how they were evaluated in 1966 or whether improved benefit-cost methodology can refine the precision of their statement. For example, each year the project will generate some 200 million kilowatthours of electricity, presently valued at about $3.5 million. The value of this as well as the value of other benefits, such as flood control, the 6,600 new jobs that will be created in an area characterized by

APPENDIX VII

Mr. Monte Canfield, Jr., Director August 10, 1977

poverty and outmigration of young people, navigation, and recreation, have obviously changed somewhat over time; but it makes little sense to delay their realization simply to recount them.

In addition, from a national policy standpoint we question the desirability of this approach. We believe to require still another full-scale review at this time will create an unfortunate precedent which might keep every congressional project in a perpetual state of uncertainty. Nevertheless, if Congress wishes us to perform another benefit-cost analysis, we will gladly undertake it.

In the event our suggestions are not incorporated into the text of the final report, we ask that this letter and the enclosed chapter-by-chapter comments be included in your report to Congress.

Sincerely yours,

Lynn Seeber

Lynn Seeber
General Manager

Enclosure

APPENDIX VII

COMMENTS ON REVISED GAO REPORT, TELLICO PROJECT

CHAPTER I

This chapter is mainly descriptive; nonetheless several errors and omissions should be mentioned.

1. Petition to delist--The report incorrectly refers in several places (pp. ii, 6(a)) to two TVA petitions to delist the Little Tennessee River as the critical habitat of the snail darter. As we pointed out to GAO on several occasions, only one petition has been filed. Because the Fish and Wildlife Service had not acted on TVA's February 28 petition, TVA sent a followup letter to the Service on June 30, 1977. The petition has still neither been acknowledged nor acted upon. The petition was filed because biologists now generally agree that the Little Tennessee River, with the dam structures in place, cannot support a natural viable population of snail darters. In contrast, the Hiwassee River, where 700 fish were transplanted, apparently will support a snail darter population, and the current snail darter population in the Hiwassee is several times as large as the one in the Little Tennessee River.

2. NEPA lawsuit--In the earlier Tellico litigation brought under the National Environmental Policy Act (NEPA) by environmentalists and one affected landowner (rather than "affected landowners" as indicated by GAO (p. 3)), the loss of

one or more rare or endangered species of fish and the development of a scenic river alternative to the Tellico project were expressly conside. , and the adequacy of TVA's EIS was upheld by the courts.

3. What is TESC?--The Tennessee Endangered Species Committee (TESC) is referred to throughout the report without identifying the group. It is a Knoxville area organization of about 100 current members, mainly students or recent graduates of The University of Tennessee, who oppose the Tellico project. Moreover, it was three individuals (two law professors and a law student), and not "a group of scientists and environmentalists" (p. 4), who originally filed the snail darter suit.

CHAPTER II

Although we do not fully agree with GAO's conclusion in Chapter II, that chapter does contain an objective analysis and assessment of the nonrecoverable costs if the Tellico project is not completed and used. One significant error should be corrected, however.

Site restoration--With regard to site restoration if the Tellico project is scrapped, the report (p. 14) suggests that "a portion of the earthen dam" could be removed "without great expense" but fails to point out the dangers involved. As we informed the GAO investigating team, partial removal of the

APPENDIX VII

earthen section of the dam would not only cause periodic flooding behind the dam but, upon such flooding, would also create the probability of the failure of the remainder of the earthen section of the dam, with the consequent downstream damage to life and property, as well as the heavy sedimentation of the Tennessee River. Safe engineering practices would not permit the suggested partial removal of the earthen dam.

CHAPTER III

The discussion of alternatives in Chapter III is perhaps the most unbalanced presentation in the report. GAO reports the Tellico opposition proposals without any scrutiny of or challenge to the unrealistic cost estimates or claims made to support them. The report, in many instances, either fails to incorporate or distorts TVA's views on a number of issues, including archaeology, recreation, and agriculture.

1. Early alternatives--The discussion (beginning on p. 21) of the early consideration of alternatives is incomplete. It fails to mention that the Tellico Dam, as an extension of the Fort Loudoun project, has been planned as a part of the overall Tennessee River control system since the early 1940's. Indeed, the Fort Loudoun turbines were sized and built to accommodate the diversion of the Little Tennessee River flow. Congress first funded the project in 1942, but due to war material priorities, work was halted. Since, historically, a

principal design feature of Tellico was to provide a navigable canal between the existing Fort Loudoun Reservoir and the new reservoir which would provide additional navigation and hydroelectric power benefits without the cost of building a lock or adding generating facilities, the discussion of physical alternatives in the 1963 planning report was limited to dam design and site alternatives.

2. TVA's position on the need to reconsider alternatives--The report states that TVA "has not updated the scenic stream benefit-cost analysis or studied new alternatives" (p. 24), but fails to include the following statement which was submitted to the investigating team:

> It is TVA's position that the question of the need for the project and the best use of the river has been fully debated in Congress, beginning in 1965 and 1966 when both project opponents and proponents expressed their views in hearings before both the House and Senate Appropriations Committees; that project alternatives were fully explored in the Tellico final EIS which was provided to Congress and approved by the courts in the NEPA litigation; that Congress has retained oversight of the project and has carefully analyzed it yearly; and that Congress, with full knowledge of the project and the snail darter situation, has directed TVA to complete the project "as promptly as possible in the public interest." The project is now virtually completed and has been ready for closure and use since January 4, 1977. It is TVA's feeling that the public should be allowed to receive project benefits for which over $103 million in public funds has been invested to achieve.

In addition, the proposed scenic river alternative, which forms the heart of all the Tellico opposition proposals, was

analyzed by TVA in 1971 as a part of the Tellico review under the National Environmental Policy Act and found to provide a level of benefits equal to 2 percent of the Tellico project benefits. Time has not changed this basic point.

3. Recreation--(a) The national park--The report includes a statement that Smoky Mountains National Park officials think that a scenic stream would more effectively alleviate overcrowding at the park than would a reservoir (p. 30). This is in sharp contrast to the statement of Vincent Ellis, former Superintendent of the Smoky Mountains National Park. After reviewing the Tellico Reservoir Recreation plan, Mr. Ellis stated in a letter to TVA dated April 3, 1972:

> This wide variety of recreational facilities adjacent to a sizable water impoundment seems to be a well-conceived plan. Its close proximity to the Great Smoky Mountains National Park would offer an opportunity to spread the area visitor use and perhaps relieve some of the congestion currently being experienced.

(b) Balanced presentation of the recreation issue--TVA's views on the desirability of the reservoir from a recreation standpoint were provided to the GAO investigators, but were not included in the report (p. 30). In summary, we pointed out:

> Even if one looks solely at the question of recreation, we believe that a comparison of the relative merits of the river without a reservoir with the Tellico Lake tips decisively in favor of the project. Tellico Lake, which will be nestled among the mountains between the Smoky Mountains and the

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Cherokee National Forest--together comprising over a million acres of primitive public land (without including the extensive, adjoining Pisgah, Nantahala, Chattahoochee, and Jefferson National Forests)--will have a spectacular beauty and recreational appeal which will attract as many as two million visitors annually, far more than the river could possibly support if developed only as a scenic river. The Tellico Lake will have only minimum winter drawdown and will have over 300 miles of highly usable shoreline permitting extensive use for recreation, such as boating, fishing, camping, picnicking, hiking, swimming, and other outdoor activities. Major historical sites are being reconstructed or restored for use in State-operated historical parks within the project area. The lake and developments along its shorelines would expand recreational opportunities presently being offered in the area and help alleviate high use pressures in the park.

TVA also believes that the conversion from a river to a lake will have very little effect on river recreation diversity in the area. The Little Tennessee River, as a canoe stream, has a number of counterparts nearby which are its equal or superior. The Hiwassee is considered far superior; and the Holston below Cherokee Lake, the French Broad above and below Douglas Lake, the Clinch below Norris, and the Nolichucky, all are at least its equal. The greater amount of trout fishing which occurs in the Little Tennessee waters takes place on the upper reaches of two of its tributaries, Tellico River and Citico Creek, which will not be affected by the project. Present trout fishing on the main stream occurs primarily on the upper 8 to 10 miles. This will be reduced to the upper 3 or 4 miles where trout fishing will still be possible on a put-and-take basis as at present. Contrary to the TESC statement in the report that trout from the river "regularly range from to five to twelve pounds," TVA's studies indicate that the average length

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> of a brown trout caught in the Little Tennessee is about 10 inches. In addition, opportunities for fishing of other types would be enormously increased through the creation of Tellico Lake. Finally, the availability of unimpounded streams will only be minimally affected since impoundments on tributary streams having a drainage area of over 25 square miles occupy less than 15 percent of the original river miles.

4. Cultural values--Here the report (pp. 31-34) appears to intentionally create the impression that TVA has not fully considered archaeological and historical values in designing and carrying out the Tellico project. TVA's detailed comments on the site development proposals of project opponents are not included in the report. We think they are absolutely necessary for a balanced picture. A copy of those comments are therefore attached as an exhibit. Additional comments on the cultural value section which were excluded in the revised report are summarized below:

> From the outset TVA recognized the historical and archaeological values of the Little Tennessee River Valley and has undertaken in cooperation with the National Park Service, The University of Tennessee, and others, an orderly and extensive program of survey and investigation of the archaeological resources in the project area, extending over a period of 10 years. The major archaeological and historical sites have been excavated, and three are being developed at substantial expense to accommodate the reservoir setting. The entire archaeological program has been reviewed and approved at regular intervals by TVA's Board of Archaeological Consultants, made up of nationally renowned archaeologists, including

Dr. J. O. Brew, Peabody Professor Emeritus of Archaeology at Harvard University and former Chairman of the Secretary of the Interior's Committee on Recovery of Archaeological Remains; Dr. John M. Corbett, former Chief Archaeologist of the National Park Service, who, after his death, was replaced by Dr. Stewart Struever of Northwestern University; and Dr. Robert L. Stevenson, former Chief of River Basin Surveys for the Smithsonian Institute.

The great wealth of information and material that has been recovered has provided important knowledge of the several prehistoric cultures and also the historic Cherokee presence in the Valley. Much of this material and information would have been unavailable with the land in private ownership and would otherwise have been lost or destroyed through flooding, erosion, cultivation, and looting. Representative collections are being made available to the Cherokee Nation and the Eastern Band of Cherokees. Based upon the unanimous report of a committee appointed by the principal Chief of the Cherokee Nation, TVA was commended for the archaeological work being conducted.

Funding for the recovery effort is believed to constitute the largest expenditure on archaeological investigation, survey, and salvage made on a reservoir project anywhere in the United States. TVA's preservation of the Chota townhouse site and its ongoing restoration of Fort Loudoun and the Tellico Blockhouse in a lake setting have the formal approval of the Advisory Council on Historic Preservation. The Bowman House and the McGhee Mansion, both National Register properties, have been acquired and are available to responsible historical groups for restoration. TVA regards these developments, plus its plans for the Citico and Bat Creek interpretive centers, as constituting significant preservation of the most important historic and archaeological sites in the project area.

6. Agriculture--This is one of the more glaring examples of the lack of balance and accuracy in this report. Not only is the TESC farm productivity story reported (pp. 34-35) unchallenged and even unexamined by GAO, TVA's position is not fully reported, and to the extent that it is reported at all, it is reported incorrectly.

The report acknowledges that in 1964 farm agricultural production on project property was $1.9 million. It goes on to say that "TESC estimates annual yields of $17 million at 1973 prices," but that TVA "estimates that annual yields would not yield more than about $6.4 annually." What TVA actually said was:

> TVA's 1964 analysis, which was based on a survey of project area farmers and the agricultural census, estimated agricultural sales in the 38,000-acre project area as yielding $1.9 million, with only 160 acres of land in the Federal soilbank. Much of the income was from dairy sales, a high income product. If the analysis were updated using 1974 U.S. agricultural census data and factoring in present area farming changes, estimated sales would be approximately $3.7 million. While TVA is not privy to the details of the Tellico opponents agricultural analysis . . . the $17 million figure is totally out of line. Even assuming that all of the 25,500 acres of Class I-III farmland were placed into production--a highly unlikely circumstance since some of the land was devoted to roads, outbuildings, fences, or left with trees--and assuming that intensive farming methods were used, such as double cropping wheat or barley with soybeans, such land would yield about $253/acre, according to University of Tennessee's 1974 Farm Planning Manual, an officially

> recognized source for the state. Even with such generous assumptions, the annual yield would be about $6.4 million and not the $17 million indicated. That higher figure would require farm production yields of over $660/acre for every Class I-III acre in the project area. A more realistic evaluation would recognize that some acreage would not be farmed, that double-cropping is not recommended for this area by the Tennessee Extension Service, and that Class III lands cannot be used for crops repeatedly year after year.

The report also failed to include the following information which was provided by TVA:

> Based on TVA's evaluation at the time of the environmental statement, farming on what is now Tellico project lands accounted for less than 15 percent of the agricultural production in the three-county area and employed about 183 farmers. These losses, while significant, are considered acceptable in light of the estimated 6,600 industrial and trades and services jobs that will be created as the reservoir's industrial potential is developed, and in light of the present lack of employment opportunities which has caused outmigration of many of the young people from the area.

CHAPTER IV

TVA's comments previously provided to the GAO, in our opinion, amply demonstrate that the basic benefit analysis for Tellico was and remains sound, and that most of the so-called technical flaws in methodology cited in the report do not exist. The state of the forecasting arts has improved since 1968, but the refinement of earlier forecasts would not significantly

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change the results, and, in the meantime, the benefits from a virtually completed project are being foregone. The 1968 economic analysis for Tellico was reexamined in 1971 in connection with the NEPA review. All of Volume III of the Tellico EIS is devoted to the benefit-cost analysis. It contains a critical analysis prepared by opponents of the project of both the general approach and the specific dollar value estimates used by TVA in calculating project benefits and TVA's discussion and rebuttal of the major points raised by the critical analysis. In approving TVA's final EIS as adequate under NEPA, the district court was highly complimentary of TVA's economic analysis, saying: "We can scarcely imagine a more satisfactory disclosure than that contained in final statement."

The discussion of specific primary benefits follows:

1. Recreation--On pages 38-39 of the report, GAO notes that TVA calculated the number of recreation visits to Tellico based on an average from other reservoirs. The report then questions the use of average figures which do not take into consideration factors such as water quality, shoreline development, public access, and proximity to population centers. What the report does not say, however, is that each of these factors weigh in favor of the Tellico project. TVA provided the following information which was not included in the report:

> [T]he Tellico Reservoir, because of its proximity to the heavily used Smoky

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> Mountains National Park and the Cherokee National Forest, its relatively small water level fluctuation and good water quality, its scenic natural setting, good transportation access (I-75, U.S. Highways 11 and 411), the extensive development of historical and archaeological sites and attractions along the reservoir, the public control of the shoreline with provision for many points of access, can properly be expected to be one of the more popular recreational reservoirs in the Valley.
>
> TVA also points out that its earlier analyses applied the existing state-of-the-art projection techniques, and while dependent upon professional judgment, produced reasonable results. Independent estimates of Tellico visits by Economic Research Associates in 1971 (1.5 million by 1980 and 2.1 million by 1995) substantiate the general range of recreation visits TVA projected for Tellico.

While criticizing TVA for not making allowances in its estimate for recreation visits that would represent transfer from other reservoirs to Tellico (p. 40), the report fails to incorporate TVA's position which was stated to GAO as follows:

> TVA does not consider recreation transfers a problem for the Tellico visitation/benefit analysis because demand for such recreation generally exceeds supply, and the reservoir will be available to relieve pressures on the heavily used national park. According to the most current published information, a supply demand analysis conducted by a private research firm, Midwest Research Institute, for the 1969 Tennessee Statewide Comprehensive Outdoor Recreation Plan, the capacity of existing reservoirs in the southeast Tennessee region will not be nearly sufficient to accommodate the future regional demand for lake-oriented recreation activities. While these research results were not available

> at the time of the 1968 benefit-cost analysis, the results indicate that without this project the potential demand for lake fishing opportunities alone would require an additional 754,000 acres of water by 1980. Even with the project, 738,000 more acres of water would be needed to satisfy fishing demand by 1980 and over 1,000,000 acres by the year 2000. Given a demand situation that far outstrips the capacity of the existing supply, the transfer question is not relevant.

2. Shoreline development--On pages 40-42, GAO questions the estimated value of this benefit on the grounds that (a) 1,000 acres appeared to GAO to be counted in both the shoreline and recreation categories; (b) some navigation benefits may be included in the value of the shoreline benefit; and (c) the sales price of the land in this benefit may improperly include improvements by the buyer. TVA's position on each of these questions was previously provided to GAO as follows:

(a) The 1,000 acres was not double counted:

> [T]he recreation benefit does not include visits to a 1,000-acre state park. When the shoreline development and recreation benefits were estimated, discussions were being held with the State of Tennessee concerning their interests in developing a state park on the 1,000 acres of land. Later, at the time the benefit-cost analysis was prepared, the State had still not made a commitment for the park. The Land Branch in computing shoreline development benefits did not include the 1,000 acres because it assumed the land would be reserved for a state park, while the Recreation Branch assumed no state park would be developed. This discrepancy was

corrected in preparing the final analysis by adding the 1,000 acres to the shoreline development benefits.

(b) The navigation benefits claimed by TVA are not part of the shoreline development benefit:

TVA agrees with GAO that the addition of navigability, as well as other project features such as consolidation of land ownership, industrial zoning, creation of a local port authority, etc., enhances land values beyond its value as agricultural land; however, this benefit is captured ONLY under the shoreline development category and is not counted a second time under Navigation. Navigation benefits are based on savings on the shipment of materials and products after the entrepreneur invests capital to produce a product. Future savings in transportation costs over a 50-year period are not capitalized and included in the price an industry is willing to pay for the land. The reason for this is that substantial uncertainty exists as to the size of the actual savings and the ability of the firm to retain them in a competitive market.

(c) The calculated benefit did not claim the value resulting from development investment by the purchaser (or the effects of inflation):

In reality, the schedule of prices used in developing the shoreline benefits was compiled from a market study of comparable areas located on Fort Loudoun and Watts Bar Reservoirs. The schedules reflect prices for raw, undeveloped lands on sales during the respective 18 and 23 years of experience on these two reservoirs, adjusted to constant value price levels to eliminate the effects of inflation.

3. Flood control--GAO questioned the methodology TVA used in calculating this benefit, stating that an incremental analysis would be more appropriate (pp. 42-43). As we informed GAO, TVA considers the flood storage values used for the Tellico analysis appropriate because:

> (1) impoundment of the lower Little Tennessee River is considered part of the overall system flood control plan presented to Congress in 1936 pursuant to the requirements of Section 4(j) of the TVA Act; (2) the project is strategically located to provide needed flood protection to the city of Chattanooga, the most vulnerable locality in the Valley; and (3) the interconnecting canal between Fort Loudoun and Tellico Reservoirs provides system flexibility beyond the construction of a single reservoir by allowing the interchange of storage capacity to help control uneven distribution of storm runoff. An example of the project's flood control benefits is illustrated by the flood which occurred in March 1973. This flood was centered over the area downstream from the large tributary area reservoirs and caused damages estimated at about $35 million at Chattanooga. If the Tellico project had been completed at this time, the damages would have been reduced by approximately $15 million.

As previously pointed out, the approach used by TVA is consistent with Senate Document No. 97 which contains

> . . . allowances for intangibles which are not reflected in the tangible benefits and economic costs and thus justifies departure from maximization of net benefits. It states in part that "a higher degree of flood protection, particularly in urban areas, than is feasible on the basis of tangible benefits alone may be justified in consideration of the threat to lives, health, and general security posed by larger floods."

4. Navigation--The GAO report (pp. 44-44a) takes issue with the methodology and data base used by TVA in 1968 to calculate this benefit and renews its speculation of double counting of the shoreline and navigation benefit.

The 44 firms selected by TVA for the 1968 economic analysis included some that were actually using water transportation and realizing direct savings from navigation; it also included some firms which had access barge transportation, but at the time of the study had decided to take advantage of water-competitive rail rates. These additional savings related to navigation development were not included in the benefit level derived for Tellico; however, their existence provided the basis for including all 44 firms in the sample. Indeed, this data base tends to underestimate the savings per acre for firms using water transportation. The methodology issue is moot, however, as TVA in 1971 actually performed the specific industry-type analysis GAO prefers. As we reported to GAO:

> The analysis selected two different industrial complexes whose growth trends and location requirements indicated they would find Tellico sites suitable to their needs. Tons of bargeable commodities related to each complex were estimated and the results in both cases indicated the transportation savings exceeded the savings derived in 1968 analysis, substantiating its reasonableness. A detailed discussion of this analysis is contained in Volume III of the Tellico EIS (pages III-3-20 to III-3-21).

The second point, the question of the double counting of navigation savings (with shoreline development), has already been

addressed. The calculated navigation benefit estimates the transportation savings on raw materials and products shipped by water, after the sale of Tellico land and the development of private industrial facilities have been completed. As TVA informed GAO, the calculated shoreline benefit would include the value of these navigation benefits only if the land were sold at a price

> . . . that includes the future stream of transportation savings that could be attained by the buyer and retained by him. . . . [I]n actuality this price is never paid by industries because of the uncertainty as to the size of the savings and whether competitors will permit their retention; in addition, such an advance payment nullifies the location advantage.

5. Power--While raising some collateral questions on this issue (p. 45), GAO concedes the power benefit. Indeed, the 200 million kilowatt-hours of clean hydroelectric energy that will be produced by Tellico in an average year has a current annual value of about $3.5 million.

6. Fish and Wildlife--The transfer issue has already been addressed under the recreation heading. GAO also questioned TVA's selection of the nonreservoir fishing value in deriving the calculated benefit (p. 47). We believe the value used was justified and we reaffirm the statement provided to GAO:

> [T]he trout fishing value of $2 used was a midrange value under the Interim Guidelines, which provided a value of $1 to $3 for cold water and bass fishing . . . .

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Supplement No. 1 to Senate Document 97 regrouped all fishing under two headings: lake fishing under General Recreation with a value of $0.50 to $1.50, and trout fishing under Specialized Recreation with a value of $2 to $6, leaving the selection of value to the professional judgment and discretion of the evaluator. Considering the criteria and examples given for specialized recreation, and the artificiality of the trout fishing situation in the Little Tennessee River (e.g., absolute river flow control which varies with releases from Chilhowee Dam from 1,350 to 11,000 cubic feet per second, maintenance of the trout population by continuous stocking, the proximity of 1,200 miles of natural trout waters in east Tennessee and the seasonal influx of warm water sport fishes, such as sauger and white bass from Watts Bar Reservoir) TVA biologists consider the $2 per trip value for trout fishing justified. This is supported by a 1964-65 fishing survey of Little Tennessee River fishing, which determined that the average per angler out-of-pocket expense per trip was $2.41 before netting out expenses of providing the fishing opportunity. In 1964-65, the cost of stocking trout in the Little Tennessee was calculated to be $58,000. This cost would have reduced the trout fishing benefit calculated and continues to be a substantial annual cost.

6. Water supply--While GAO initially raised two questions on this point, it apparently now acknowledges that the comprehensive land use planning will assure that adequate industrial acreage is available to realize this benefit. The report (at p. 48) still questions the dollar value of the benefit, however. In support of its position, GAO misuses the values in TVA's 1971 analysis, which actually confirms the reasonableness of the originally calculated benefit. As we reported to GAO,

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that analysis used 13 industrial plants from different categories that were potential candidates for the Tellico area. For the purpose of the 1971 study, a range of 70 to 150 million gallons per day at different pumping heads were selected (the firms selected for the sample were using an average of about 110 million gallons per day). The corresponding range of average annual benefits derived from the analysis was $24,000 to $80,000 (in 1968 dollars), which in our view substantiates the reasonableness of TVA's earlier $70,000 benefit estimate. GAO, however, ignored the differences in the two studies and erroneously compares the 70 million gallons per day water use rate in the two studies to support its position.

Secondary Benefits

The Tellico benefit-cost analysis, prepared in accordance with Senate Document 97, properly included the substantial secondary benefits in the form of new jobs and economic opportunities that the project will create. While the GAO report acknowledged (p. 37) that the enhanced employment opportunities raised the annual benefits from Tellico by $3,650,000 (in 1968 dollars) and the benefit-cost ratio computed by TVA to 3.0 to 1, the secondary benefits are not discussed further.

TVA believes that these job opportunities are the heart of the project, improving the quality of life in an area now characterized by unemployment, low incomes, and the out-migration of young people. TVA estimates that 4,000 basic

industrial jobs and 2,600 trades and services jobs will be created along the reservoir over a 25-year development period. By comparison, less than 200 families made a living farming this land before it was acquired for the project.

New jobs are clearly needed. Monroe County, in which about half of the project is located, currently has a per capita income of only 56 percent of the national figure. More than 26 percent of its families have income below the poverty level and its current unemployment rate exceeds 12 percent. The three-county area affected by the project had more than 3,300 people on the unemployment rolls in 1976. Moreover, it should be noted that TVA's estimates of industrial development at Tellico are fully supported by independent consultants' studies performed by The Fantus Company and the Real Estate Research Corporation in 1972.

ARCHAEOLOGICAL AND HISTORICAL SITES PROPOSED FOR DEVELOPMENT BY TELLICO OPPONENTS, WITH TVA'S COMMENTS

Site	Significance	Proposed Development	TVA's Comments
Halfway Town	Cherokee village	Visitor center, museum, stables, picnic area, boatguide service, interpreter.	Location has not been determined by archaeological excavations since the area where it supposedly existed will not be inundated. Therefore, completion or noncompletion of the project will have no effect on any possible development at this site. However, it is probably on land already acquired for the project. TVA plans a recreational area in the vicinity, but will see that no historic remains are destroyed.
Citico	Cherokee village	Canoe access, information display, hitching station.	Late prehistoric mound has been excavated and the associated aspects of the site extensively investigated by UT. Since the work has stopped, pot hunters have destroyed most of the late prehistoric remains of the site. The Cherokee portion of the site has also been vandalized, but to a lesser degree. TVA plans an interpretive center near the site.
*Chota-Tanasee	Cherokee capitol village	Reconstructed village, museum, canoe access, horse hitching and watering station, interpreter residence.	TVA has constructed an extensive fill above the original townhouse site and connected it to land above the proposed reservoir pool level by an earth fill and riprap causeway. The site has been readied for a lake setting and a "reconstructed village" on the original ground level would not now be possible without removal of the fill and causeway.
Toqua	Cherokee village and temple mound	Canoe access, picnic area, information display, hitching and watering station.	The referenced "Temple Mound" no longer exists since it was completely excavated to below ground level by UT. This was part of a large prehistoric Indian settlement of the Dallas phase of the Mississippian period, and the surrounding village area was also extensively investigated by UT. Another element of Toqua is a large historic Cherokee village where the locations of two townhouses were identified by UT archaeologists, although only one such public building was indicated on early maps.

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Site	Significance	Proposed Development	TVA's Comments
Tomotley	Cherokee village—birthplace of Sequoyah	Partially reconstructed village, canoe access, information displays, and hitching station.	The description as the "birthplace of Sequoyah" is incorrect. Sequoyah was born at Tuskegee, the site of which is only generally known despite extensive search and testing. UT archaeologists determined the former location of the townhouse at Tomotley and recovered both Cherokee and prehistoric Dallas material from the site.
*Fort Loudoun	British Fort	Reconstructed fort, stables, interpreter residence, museum, ferry service, canoe access, picnic area, tent camping.	The original site of Fort Loudoun has been raised and the reconstruction planned for a lake setting. It would be unsuitable for public display in its present form and elevation unless surrounded by water.
*Tellico Blockhouse	Site of militia blockhouse (1795)	Reconstructed blockhouse, canoe access, hiking, trailhead, ferry service, information displays.	The correct dates for the Blockhouse were 1794-1807. TVA has applied protection to the lower portion in anticipation of impoundment of Tellico Lake. This would be inappropriate without a lake setting. Described as a "militia blockhouse," Tellico was manned by militia for two years only and thereafter was garrisoned by regular troops of the United States Army. Its significance was not that of a military outpost, but as a part of Secretary of War Henry Knox's factory system of trade with and civilizing of the Indians.
Militia Springs	Local militia mustering grounds (1790's)	Information display, picnic area.	This site is outside the Tellico project area, and completion or noncompletion of the project does not affect it. However, the actual site has been damaged or destroyed by the State's construction of U.S. Highway 411 many years ago, and by the later erection of a branch bank and parking lot.
Mialoquo-Rose Island	Cherokee village	Canoe access, picnic area, information displays.	The major portions of the site of the former Cherokee village of Mialoquo were destroyed by the Bowaters Southern Paper Company through land planning and other construction activities in connection with its Rose Island nurseries. The principal archaeological importance of the area was the early archaic site excavated by The University of Tennessee on the northern tip of the island from which material dating to 7200 B.C. was recovered.

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Site	Significance	Proposed Development	TVA's Comments
Bat Creek Mounds	Site of enigmatic stone	Canoe access, information display.	No mounds remain at this site, but a trace of one Woodland burial mound is above pool level. Another burial mound described by Thomas in a Smithsonian publication in the 1880's had been destroyed by digging or cultivation by the time the Tellico project was begun. The third mound, a Dallas phase Mississippian mound, was fully excavated by UT. TVA plans an interpretive center near the site.
Coytee Springs	Grist mill site	Reconstructed grist mill, picnic area, canoe access, interpreter residence.	Since no mill exists at Coytee Springs and any attempt at a reconstruction might be of questionable authenticity, TVA believes it would be more appropriate to restore the Hopewell Mill which has been acquired, is partially standing and restorable, and is available for transfer to an interested and responsible historical group.
*Bowman House	House and grounds of early Indian agent.	Restored house, interpreter residence, canoe access, picnic area.	This is described as a home of an "early Indian agent." There is no historical record that George Bowman was ever an Indian agent. The house is on the National Register, is owned and has been preserved by TVA, and is available for conveyance to a responsible historical group for restoration.
Bussell Island	Coytee treaty site--burial mounds	Interpreter residence, canoe access, picnic area, museum, tent camping.	This site will be preserved by TVA whether or not Tellico is completed since it is below the dam and will not be inundated. The opponents describe the island as the "Coytee Treaty site." The actual site for the signing of the Coytee Treaty is unknown, however, and there are no burial mounds remaining on Bussell Island. UT investigation has recently identified, in addition to the late Indian occupations previously known, deeply stratified early Indian living floors, dating to 7500 B.C. TVA is currently nominating this site to the National Register of Historic Places.

Additional Comment: The McGhee Mansion which is on the National Register, has been acquired by TVA and will be transferred to the State upon request for development as a part of the historical park complex around Fort Loudoun. Also, the Hopewell Mill, an early grist mill near the Tellico River, has been acquired by TVA and is available to a responsible historical body for restoration. The same is true of Coytee School, circa 1870.

*To be preserved by TVA if Tellico Project is completed.

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APPRAISAL OF TVA COMMENTS

On July 8, 1977, an advance copy of our report was sent to TVA for comments and suggestions. In response, TVA provided lengthy comments and suggested revisions. Some of the comments were useful for making corrections and for providing greater clarity and balance throughout the report. Many other comments, however, were either contradictory with previous information received from TVA or other sources, irrelevant to the issue at hand, or pertained to areas out of the scope of our review as agreed with the House Committee on Merchant Marine and Fisheries.

After carefully considering each of TVA's comments, we made revisions to the report where appropriate. A revised draft was sent to TVA for a formal written response. TVA's August 10, 1977, letter expresses disappointment that many of its earlier comments were not included in the later version and again mentioned many of these comments. (See appendix VII.)

Our appraisal of TVA's general comments are included in chapter 5. This appendix includes a summary of each of TVA's specific comments and our responses.

CHAPTER 1

Petition to delist

Comment:

TVA states that it told us on several occasions that it filed only one petition to delist the Little Tennessee River as the critical habitat of the snail darter and that the petition has still neither been acknowledged nor acted on.

Response:

The Deputy General Counsel of TVA told us on July 5, 1977, that TVA filed two petitions to delist the Little Tennessee River--one on February 28, 1977, and one on June 29, 1977. Since that time the Department of the Interior informed us that a June 30, 1977, (not June 29, 1977) letter was received from TVA but that it merely urged the Department to act on the February petition. As indicated in the Department's comments to our report (see app. VI), TVA's petition was formally denied on July 6, 1977.

Comment:

TVA states that the Hiwassee River will apparently support a snail darter population.

Response:

Interior's Fish and Wildlife Service and the ichthyologist who discovered the snail darter said that from 5 to 15 years may be required to determine whether the snail darter can successfully survive in its new environment.

NEPA lawsuit

Comment:

TVA states that earlier Tellico litigation under NEPA was brought by environmentalists and one affected landowner (rather than landowners) and that the development of a scenic river alternative was expressly considered.

Response:

Support for the phrase "affected landowners" is found in a description of the NEPA litigation in the January 31, 1977, decision of the U.S. Court of Appeals which enjoined the Tellico project on the basis of the Endangered Species Act. Hill v. Tennessee Valley Authority 549 F.2d 1064, 1067 (6th Cir. 1977). The Court did not determine which of the alternatives was the best but rather that alternatives were adequately disclosed. We believe that the "scenic river" alternative considered by TVA was not adequate because, among other things, it did not include benefits to be derived from agriculture, historical, cultural and industrial development, and fish and wildlife.

What is TESC?

Comment:

TVA stated that we refer to TESC without identifying the group and offered its description of TESC.

Response:

TESC is mentioned throughout the report because it is quite knowledgeable about the Little Tennessee River Valley and represents a different viewpoint from

that provided by TVA on many issues. TESC is perhaps the most active group opposing the Tellico project, but it is only one of the 9 groups that comprise the Little Tennessee River Alliance, an organization formed to opposed the project. The Little Tennessee River Alliance has a statewide membership of about 25,000 members and is comprised of the following groups: TESC, Tennessee Conservation League, Sierra Club, Trout Unlimited, Tennessee Audubon Society, Eastern Band of Cherokee Indians, Smoky Mountains Hiking Club, Tennessee Outdoor Writer's Association, and the Tennessee Environmental Council.

Comment:

TVA stated that three individuals (rather than a group of scientists and environmentalists) filed the snail darter suit.

Response:

While two law professors and a law student originally filed the snail darter suit, the Audubon Council of Tennessee, Inc., and the Association of Southeastern Biologists later jointed as plaintiffs in the suit.

CHAPTER 2

Site restoration

Comment:

TVA states that it informed our investigating team that partial removal of the earthen section of the dam would create the probability of failure for the remainder of the section and that safe engineering practices would not permit the suggested removal.

Response:

At no time in any previous discussion, including Senate hearings, did TVA mention that safe engineering practices would not permit the suggested partial removal of the earthen dam.

Because TVA provided this information after completion of our site work, we did not evaluate this assertion, but we agree that unprotected sections of the earthen dam could be eroded from heavy rainfalls and river currents. TESC, however, told us that protecting the earthen banks with broken stone--a procedure commonly used in reservoirs, including the banks of

the proposed Tellico reservoir--would greatly reduce erosion. TESC believes that the necessary broken stone would be available locally and that the procedure would not add significantly to the estimate for removing a section of the dam. TESC stated further that since river water would not collect behind the dam, no risk to life or property would be added downstream.

CHAPTER 3

Comment:

TVA states that we reported Tellico opposition proposals without scrutinizing or analyzing unrealistic cost estimates or claims made to support them.

Response:

No cost-benefit analyses have ever been prepared by project opponents for any proposals. In addition, we agreed with the House Committee on Merchant Marine and Fisheries to identify, but not evaluate, alternatives to the proposed reservoir project.

Early alternatives

Comment:

TVA offers information which indicates that the Tellico Dam was planned as an extension of the Fort Loudoun project in the early 1940s and, for that reason, TVA did not consider river-based alternatives when the project was planned in 1963.

Response:

The information provided by TVA is irrelevant to the decision before the Congress and generally supports the position in our report that TVA decided to build the Tellico Dam without first considering river-based alternatives.

TVA's position on the need to reconsider alternatives

Comment:

TVA states that (1) the Congress has debated the best use of the river beginning in 1965, (2) project alternatives were fully explored in the Tellico environmental impact statement which was provided to the

Congress and approved in the courts, and (3) Congress carefully analyzed the project annually and directed TVA to complete the project promptly. TVA also mentions that the scenic river alternative it analyzed for the 1971 environmental impact statement was found to provide only 2 percent of the level of Tellico reservoir project benefits.

Response:

We believe that sufficient information has not been provided to the Congress for it to adequately question whether the Tellico project is the best use of the Little Tennessee River Valley. As mentioned in chapter 5, many other factors--including the snail darter--have arisen or increased in public importance since TVA last prepared a detailed evaluation of Tellico.

TVA's analysis of a scenic river alternative for the 1971 environmental impact statement did not include benefits to be derived from agriculture, historical, cultural and industrial development, and fish and wildlife. In addition, the Department of the Interior said that it did not have access to the supporting methodologies and data bases used by TVA and thus was unable to properly question the results of the Tellico environmental impact statement at that time.

Earlier this year, the Congress deleted all funding from nine previously approved water development projects, including seven projects which were under construction and as much as 26 percent complete. With current, detailed information on both the project and its alternatives, the Congress may also wish to reconsider its funding of Tellico.

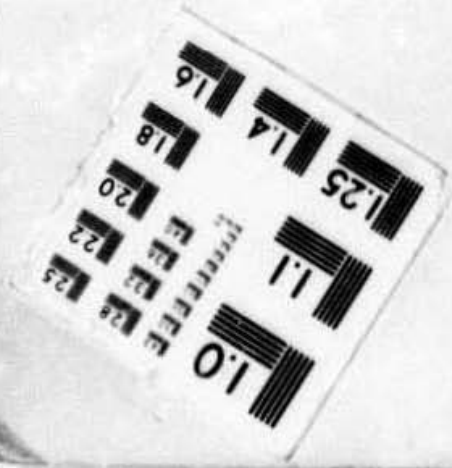
Recreation--(a) The National Park

Comment:

TVA states that a former Superintendant of the Smoky Mountains National Park mentioned in a 1972 letter that recreational facilities adjacent to a reservoir would perhaps relieve some of the visitation pressure of the park.

Response:

The Department of the Interior, through the National Park Service, is responsible for the Great



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Smoky Mountains National Park. The Department points out, as shown in appendix VI, that "a scenic riverway would more effectively alleviate overcrowding at the park than would a reservoir."

Recreation--(b) Balanced presentation of the recreation issue

Comment:

TVA provides a lengthy description of why it believes another reservoir would provide greater recreational benefit than would the existing river.

Response:

We have not verified or included in our report this information submitted by TVA because it is out of the scope of our review as agreed with the House Committee on Merchant Marine and Fisheries. The information presented concerning the attractiveness of the proposed Tellico reservoir, however, tends to support our position that TVA's estimated visitation rates should be reduced to reflect transfers from other reservoirs, including the 20 lakes within 100 miles of Tellico.

Comment:

TVA states that the Little Tennessee River as a canoe stream has a number of equal or superior counterparts. TVA also states that trout fishing primarily occurs on the upper 8 to 10 miles and that river impoundment will merely reduce this area to the upper 3 to 4 miles.

Response:

Although we were not asked to examine either of these assertions, TESC has previously told us that other rivers are superior to the Little Tennessee River for "white water" canoeing, but that these rivers are not acceptable for such recreational uses as family float trips. TESC believes trout fishing in the Little Tennessee will be adversely affected because the trout will be compressed into a very small area and will be forced to compete for survival with other types of fish.

Cultural values

Comment:

TVA provides a lengthy description of its archeological efforts in the Little Tennessee River Valley and stated that it believes its plans constitute significant preservation of the most important historical and archeological sites in the project area.

Response:

Although detailing the archeological efforts of TVA was not part of the scope of our review, Tellico archeological project researchers told us that most of the 200 archeological sites recorded to date have only been investigated about 5 percent and that only three sites would be preserved with a reservoir. With regard to the preservation of three sites, TESC points out that one will not be flooded, the second is now covered with 30 feet of fill, and the third is partially covered with fill to lift it above the valley floor. In addition, the Eastern Band of the Cherokee Nation strongly opposses the inundation of its major cultural historical sites. TVA's comments concerning the Tomotley site are not pertinent because TVA did not realize that we included its comments in the revised draft.

Agriculture

Comment:

TVA states that, on the basis of figures in the University of Tennessee's 1974 Farm Planning Manual, even if all agricultural acreage were placed into production and double cropping was used, the annual yield would be about $6.4 million, not the $17 million indicated by TESC. TVA also criticized us for not examining the TESC estimate and for incorrectly reporting TVA's position.

Response:

We have neither verified nor examined the information submitted by either TVA or TESC because performing a study to determine the anticipated agricultural yield of the land was not in the scope of our review. However, according to the information submitted

by TESC, techniques used in deriving the $17 million agricultural yields ($16 million in revenue, $1 million in wages) were set forth in the University of Tennessee's 1973 Farm Planning Manual and the estimates were based on using 50 percent of the available acreage and double cropping both wheat and barley.

We do not believe we reported TVA's position incorrectly but rather that we merely summarized TVA's lengthy explanation.

Comment:

TVA believes that losing the 183 farming jobs that existed before the project is acceptable when compared to an estimated 6,600 industrial and trades and services jobs which would be created by industries locating near the reservoir.

Response:

We believe that today's land use priorities may be quite different from that of the early 1960's and that the agricultural and industrial job opportunities of a developed river valley should be determined if a meaningful comparison is to be made with job opportunities of a developed reservoir.

CHAPTER 4

Comment:

TVA stated that although the state of the forecasting arts has improved since 1968, refinements of 1968 forecasts for the Tellico project would not significantly change the results because the basic benefit analysis is sound, and flaws in the methodologies do not exist.

Response:

Current, detailed information on the project and its alternatives is needed for the Congress to properly act on the questions before it. Many important issues have surfaced since the project was conceived and the effect of these issues has never been evaluated. Congress must consider, for example, the effect of the project on

--the snail darter, both as an endangered species and as a formal precedent under the Endangered Species Act of 1973;

--the rich archeological culture of the valley and possible conflicts with the intent of the National Historic Preservation Program;

--the prime agricultural land of the valley at a time when the Department of Agriculture and the President's Council on Environmental Quality recently issued statements encouraging Federal agencies to consider the preservation of such land when carrying out programs;

--the last large flowing river in the region and the recreational opportunities it offers; and

--alleviating overcrowding at the Great Smoky Mountains National Park, compared to the effect of a river corridor on park overcrowding.

In addition to considering these issues for the first time, we believe a new analysis of remaining costs and benefits for the project and its alternatives would look considerably different if improved forecasting methods and current data were used. TVA points out, for example, that its estimate of power benefits has increased over 12-fold since 1968. We believe other benefits may also have changed or, on the basis of improved estimating methods, may be nonexistant.

Comment:

TVA stated that a critical analysis of its benefit-cost analysis was included in the environmental impact statement, along with TVA's discussion and rebuttal of major points. TVA points out that the district court approved the environmental impact statement and offered compliments on the amount of disclosure in the statement.

Response:

As mentioned earlier, we believe TVA's 1968 benefit-cost analysis is outdated and contains numerous methodological problems. In addition, many factors, including the snail darter and agricultural, historical,

and cultural values, have increased in public importance since that time and have not been evaluated by TVA for alternatives to the Tellico project.

While a critical analysis of TVA's 1968 study was included in the 1971 environmental impact statement, the critics were not able to properly evaluate the projected benefits because they did not have access to TVA's supporting methodologies and data bases. The critics also explicitly stated in the analysis that they got virtually no cooperation from TVA.

Nevertheless, several of the critics' arguments have merit and were not convincingly rebutted by TVA. For example, they criticized TVA's recreation benefit because it did not properly consider the population centers from which visitors would be drawn and because it did not consider the number of visitors that would use Tellico instead of the other numerous reservoirs in the area. TVA responded by stating that it expected Tellico to draw a substantial proportion of visitors from beyond a 50 to 60 mile radius from the project because the reservoir would have a relatively constant water level and because it is easily accessible by several major highways. We believe that the critics' arguments have more merit because TVA ignored the transfer question and because there are 17 other reservoirs within a 50-mile radius of Tellico.

Recreation

Comment:

TVA states that the factors which were omitted from the 1968 analysis--water quality, shoreline development, public access, and proximity to population centers--weigh in favor of the Tellico project. TVA expects Tellico to be one of the more popular recreational reservoirs in the valley. One of the several reasons cited by TVA is its extensive development of historical and archeological sites and attractions along the reservoir.

Response:

Throughout our analysis we did not attempt to determine whether benefits were either overstated or understated and as mentioned in the report, we did not attempt to determine the effect these factors would

have on the Tellico visitation estimates. If Tellico would be one of the more popular recreational reservoirs in the valley, this further supports our position that visitation transfers from other reservoirs need to be expressly considered. As pointed out earlier, TVA's extensive archeological development plans include only 3 of the 200 recorded archeological sites in the valley.

Comment:

TVA states that independent estimates of expected Tellico visitation by Economics Research Associates in 1971 substantiate the general range of recreation visits TVA projected for Tellico.

Response:

The independent study of Tellico visitation by Economic Research Associates in 1971 criticized TVA's approach. The study pointed out that TVA's methods do not give a truly valid picture of probable visitation directly associated with the Tellico reservoir. We believe a current study using improved methods is still needed.

Comment:

TVA states that its position on the transfer question was not included in the report. TVA's basic position is that the transfer question is not relevant because a private research firm stated that the capacity of reservoirs in the southeast Tennessee region will not be adequate to meet future demand.

Response:

TVA's basic position is included in the report. Also included in the report is our statement that most, if not all, of the 20 reservoirs within 100 miles of Tellico are not currently at capacity and that visitation rates vary considerably between reservoirs. Further, TESC has stated that the Tennessee Valley has more flat water acreage per capita than any other region in the world but that the Little Tennessee River is the last clean, large flowing river in the area.

In commenting on our report, the Department of the Interior pointed out that a scenic river would be more useful than a reservoir for relieving visitation pressures at Great Smoky Mountains National Park. In

addition, State and Federal planners predict a 33-fold increase in stream fishing by 1990 in the Smoky Mountains Region. Because the Little Tennessee River is considered by many to be the finest trout river in the Southeastern United States, we believe it might attract a substantial portion of this increased demand.

Shoreline development

Comment:

(a) TVA states that the recreation benefit does not include visits to a 1,000-acre State park.

Response:

TVA officials who prepared the comments to our report are in disagreement with the TVA officials in the respective branches which prepared the 1968 analyses. Whether or not TVA's analysis explicitly considered a State park at Tellico is not important, however, because the figures TVA actually used to determine visitation rates at Tellico were based on visitation rates at lakes with parks. Thus, the analysis implicitly assumes a park will be created and counts the benefits from the 1,000 acres under both shoreline development and recreation.

Comment:

(b) TVA states that navigation benefits are not part of the shoreline development benefit because future savings in transportation costs over a 50-year period are not reflected in the market price of the land.

Response:

Navigation benefits are at least partially double counted under shoreline development benefits. We believe the factors, including navigation, which make the Tellico industrial sites more desirable than land not adjacent to a reservoir would be reflected in the increased market value price that industry would be willing to pay for the land. In essence, TVA's position is that developed land with navigational access would be sold at the same market price as similarly developed land without navigational access.

Comment:

(c) TVA states that shoreline development benefits do not include values resulting from (1) development investment by the purchaser or (2) the effects of inflation.

Response:

Price increases anticipated after TVA sells the land are attributable, at least in part, to other factors; such as inflation, improvements made by the buyer, or increased demand for land in general. After eliminating the increase in land value attributable to inflation and buyer improvements, TVA claimed the remaining price increases as a result of the project. We believe that some of this increase is due to the general demand for land, rather than specific demand for reservoir access land. This increment should be identified and only those benefits directly attributable to the project should be claimed.

Flood control

Comment:

TVA believes the systems approach for calculating flood control benefits is appropriate for Tellico because (1) the Little Tennessee River is considered part of a 1936 flood control plan, (2) Tellico will provide needed flood protection for Chattanooga, and (3) the canal connecting Tellico to Fort Loudoun provides systems flexibility in cases of uneven runoff. TVA stated that Tellico would have averted $15 million of the $35 million flood damages incurred at Chattanooga in March 1973.

Response:

TVA's "systems" approach for calculating flood control benefits is weak because it assumes that each additional acre-foot of storage provides as much flood protection as existing storage. Because downstream property values vary by type of land, zoning, improvements, accessibility, size, and market conditions, we believe the average amount of protection provided per acre-foot in the TVA system would not be a valid indicator of the flood control benefits for a given reservoir. Under this method, flood control benefits could

be claimed for protecting land of a higher value than it actually protects. Further criticisms of the approach are contained in our prior report "Improvements Needed in Making Benefit-Cost Analyses for Federal Water Resources Projects" (B-167941, September 20, 1974).

TVA estimated that the Tellico project would have reduced the March 1973 flood damages in Chattanooga by $15 million. Although the amount of flood protection that Tellico would have averted at Chattonoga in 1973 has been questioned by others, we did not verify the accuracy of this estimate. However, we do believe that this type of procedure--comparing damages with and without the project--is preferable to the systems approach used in 1968 and should be applied if another analysis is prepared.

Comment:

TVA states that the systems approach is consistent with Senate document No. 97, which contains allowances for intangibles and a higher degree of flood protection than is feasible on the basis of tangible benefits alone.

Response:

As mentioned in the report, we believe that the systems approach is not consistent with Senate Document 97's definition of a benefit--the net increase in value with the project compared to the value without the project. Only the value of incremental flood protection provided should be projected as flood control benefits.

Navigation

Comment:

TVA states that including all 44 firms in the 1968 analysis of navigation benefits is justified because each of the firms either used or had access to barge transportation. TVA states that this method results in underestimated navigation savings per acre because some of the firms included in the average had no savings; they took advantage of water competitive rail rates rather than shipping by barge.

Response:

Using the average of 44 firms is weak because of the tremendous variations in savings per acre--27 firms

with no savings at all and 17 with savings ranging from $26 to $19,894 per acre. In our opinion, a case-by-case analysis should be made rather than using a purely statistical average because of this wide variation.

We do not agree that TVA underestimated navigation savings because, in our opinion, no navigation benefits are created unless shippers actually use the waterway. Considering the abundant availability of unused competitive industrial sites with barge navigation, both at Melton Hill Reservoir and at various locations on the Tennessee River, TVA's projections, in our opinion, are optimistic rather than understated.

TESC also questions the claimed navigation benefits. According to TESC, TVA used similar justifications for three reservoirs near Tellico but the estimated savings have not been realized. One project realized only 1 percent of claimed annual benefits in its first 10 years of operation and the other two reservoirs have experienced tonnage decreases of 48 and 45 percent over the past 20 years. We did not verify these figures.

Comment:

TVA states that our concerns about the methods used to estimate navigation benefits in 1968 are moot because TVA performed a specific industry analysis in 1971 which substantiated the reasonableness of the earlier estimates.

Response:

We did not verify the accuracy of TVA's estimates but we believe the basic procedure of identifying specific industries and related shipments is preferable to the methods used in 1968 and should be used if another analysis is prepared. Since this data is at least 6 years old, however, we believe a new analysis is needed.

Comment:

TVA again stated that navigation is not counted the second time in the shoreline development benefit. TVA believes that if the market value of the land reflected navigational access, such an advance payment would nullify the location advantage.

Response:

As mentioned earlier, navigation benefits are at least partially counted the second time under shoreline development benefits because the access to a reservoir for navigation and other purposes would be reflected in the market value of the land.

Power

Comment:

TVA states that we concede the power benefit and that the 200 million kilowatt hours of energy that would be provided by Tellico has a current annual value of $3.5 million.

Response:

While we did not raise major objections to the methods used to calculate power benefits, we cannot "concede the power benefit" because we did not examine the data bases used for this or any other benefit.

Other groups have questioned the data bases used by TVA and specifically challenge TVA's estimates of the amount of electrical generating capacity needed to handle demand in 1985.

TVA found it useful to update its estimate of power benefits for Tellico. We believe it would be even more useful to perform a complete analysis of all benefits for both the project and its comprehensive alternatives.

Fish and Wildlife

Comment:

TVA states that assignment of the lowest permissable value to trout fishing is justified considering (1) the criteria and examples given in Senate Document 97, (2) the variation in river flow in the Little Tennessee River, (3) the cost of stocking trout, and (4) a fishing survey conducted 12 years ago which supported the assigned value.

Response:

TVA's assignment of the lowest permissable value to trout fishing is questionable considering that (1) the Little Tennessee River is considered by the Tennessee Wildlife Resources Agency as the best trout-holding river in Tennessee and by TESC as the finest trout river in the Southeastern United States; (2) State and Federal planners forecast a 33-fold increase in stream fishing by 1990 in the Smoky Mountains Region; (3) the Little Tennessee River Valley offers many of the same visitor activities, including stream fishing, that are causing overcrowding at the Great Smoky Mountains National Park; and (4) TVA used the midrange values for all calculations (including cold water fishing under the interim guidelines) except trout fishing, which would be greatly reduced with a reservoir. Consistent application by TVA of using the midrange value would have reduced the value of annual benefits claimed for reservoir fishing by about 25 percent.

Considering the number of fishing trips that might be drawn from other reservoirs would further reduce the claimed benefits.

Water Supply

Comment:

TVA states that we apparently acknowledge that land-use planning will assure adequate industrial acreage is available to realize the claimed water supply benefits. TVA states that we misused the values in TVA's 1971 analysis, which, according to TVA, confirms the reasonableness of the 1968 benefits. TVA states that the range of water supply annual benefits can range from $24,000 to $80,000 depending on the assumption of industrial water needs.

Response:

Our position has not changed. We still believe that the TVA analysis did not consider the amount of industrial acreage at Tellico and that the firms currently occupy twice the industrial acreage which would be available. We merely pointed out TVA's position for balance because we did not evaluate whether TVA would be able to realize the claimed benefits by limiting industries to one-half the space which they now occupy.

With regard to the values used, TVA admits that, on the basis of the 70-million gallon per day rate used in 1968, benefits were overstated by $46,000 annually. Only by assuming usage rates in the 1971 study of over twice that used in 1968, was TVA able to approximate the original annual estimates.

Secondary benefits

Comment:

TVA believes that we did not discuss secondary benefits adequately. TVA also notes the job potential of a developed industrial area adjacent to Tellico reservoir and compares it to the number of families which made a living in the area by farming in the early 1960s. TVA further states that TVA consultants have supported its estimates of industrial development.

Response:

Pursuant to our agreement with the House Committee on Merchant Marine and Fisheries, our review was limited to direct Tellico project benefits. However, several points are worthy of mention.

We believe that today's land use priorities may be quite different from that of the early 1960's and that the agricultural and industrial job potential of a developed comprehensive river valley still needs to be evaluated before a comparison can be made with the number of jobs estimated for the Tellico project.

We believe TVA's projection of the number of industries willing to locate along the reservoir is optimistic considering the large availablity of industrial sites with barge navigation both at Melton Hill Reservoir and at various locations on the Tennessee River.

APPENDIX IX

PRINCIPAL OFFICIALS OF THE TENNESSEE VALLEY AUTHORITY RESPONSIBLE FOR ADMINISTERING ACTIVITIES DISCUSSED IN THIS REPORT

	Tenure of Office From	To
BOARD OF DIRECTORS:		
Aubrey J. Wagner	Mar. 1961	Present
William L. Jenkins	Sept. 1972	Present
S. David Freeman	Aug. 1977	Present
Don McBride	May 1966	May 1975
Frank E. Smith	Nov. 1962	May 1972
GENERAL MANAGER:		
Lynn Seeber	Mar. 1970	Present
Louis J. VanMol	Mar. 1961	Mar. 1970
GENERAL COUNSEL:		
Herbert S. Sanger, Jr.	Aug. 1975	Present
Robert H. Marquis	Sept. 1967	Aug. 1975
Charles J. McCarthy	Feb. 1958	Sept. 1967
DIVISION OF PROPERTY AND SERVICES:		
John S. Rozek	Sept. 1976	Present
J. Porter Taylor	Jan. 1976	Aug. 1976
DIVISION OF PROPERTY AND SUPPLY (note a):		
Ashford Todd	June 1954	Dec. 1975
DIRECTOR OF RESERVOIR PROPERTIES (note a):		
J. Porter Taylor	Sept. 1967	Dec. 1975
Lynn Seeber	July 1967	Sept. 1967
Claude W. Nash	June 1964	July 1967
DIVISION OF WATER MANAGEMENT:		
E. H. Lesesne	Jan. 1974	Present
Reed A. Elliot	April 1955	Dec. 1973

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a/ On January 1, 1976, the Divisions of Property and Supply and Reservoir Properties were consolidated into the Division of Property and Services.

APPENDIX IX

	Tenure of Office From	To
DIVISION OF NAVIGATION DEVELOPMENT AND REGIONAL STUDIES:		
M. I. Foster	Sept. 1967	Present
J. Porter Taylor	Feb. 1960	Sept. 1967
MANAGER OF ENGINEERING DESIGN AND CONSTRUCTION:		
George H. Kimmons	July 1969	Present
George P. Palo	Aug. 1959	June 1969
MANAGER OF POWER:		
Godwin Williams, Jr.	Feb. 1976	Present
James E. Watson	Jan. 1970	Feb. 1976
Gabriel O. Wessenauer	May 1944	Jan. 1970
DIRECTOR OF FORESTRY, FISHERIES, AND WILDLIFE DEVELOPMENT:		
Thomas H. Ripley	April 1970	Present
Kenneth J. Seigworth	April 1961	April 1970

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