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REPORT BY THE

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Comptroller General

OF THE UNITED STATES

To Continue Or Halt The Tenn-Tom Waterway? Information To Help The Congress Resolve The Controversy

The Tennessee-Tombigbee Waterway continues to generate controversy. Ten years and $1.1 billion have been spent on construction of the project, which will link the inland waterway system with the Gulf of Mexico. Project costs are estimated to total about $2 billion when the project is completed in 1988.

GAO believes two key issues in the decision to halt or complete Tenn-Tom are:

--Although more than $600 million would be saved by halting Tenn-Tom, that saving must be weighed against the loss of about $125 million in average annual benefits expected from the completed project. Average annual benefits achieved to date are roughly $12 million.

--Completing Tenn-Tom will create a bottleneck on the waterway south of Demopolis, Alabama. Eliminating the bottleneck would cost about $960 million--$323 million for construction (Oct. 1979 dollars) and $637 million for inflation to the end of the estimated construction period in 1997. Continuing Tenn-Tom may be sowing the seed for this additional project.

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

B-167941

The Honorable Mark O. Hatfield
Chairman, Subcommittee on Energy
and Water Development
Committee on Appropriations
United States Senate

Dear Mr. Chairman:

The former Chairman, Subcommittee on Energy and Water Development, asked us on October 2, 1980, to review certain aspects of the Tennessee-Tombigbee Waterway Project. Several other Members of Congress also raised questions concerning the project. This report responds to these requests and contains information for the Congress to use in considering the project's future.

We are sending copies of this report to the requestors, Senators Johnston, Levin, Percy, and Proxmire and Representatives Edgar and Pritchard. We are also sending copies to other Members of the Senate and House of Representatives who have expressed interest in our review; they are Senators Moynihan and Stennis and Representatives Bevill and Whitten. Unless you or one of the other recipients publicly announce its contents earlier, no further distribution of this report will be made until 30 days from the date of the report. At that time we will send copies to interested parties and make copies available to others upon request.

Sincerely yours,

Milton J. Socolar

Acting Comptroller General
of the United States

COMPTROLLER GENERAL'S
REPORT TO THE CHAIRMAN
SUBCOMMITTEE ON ENERGY
AND WATER DEVELOPMENT
COMMITTEE ON APPROPRIATIONS
UNITED STATES SENATE

TO CONTINUE OR HALT THE TENN-TOM WATERWAY? INFORMATION TO HELP THE CONGRESS RESOLVE THE CONTROVERSY

D I G E S T

The Tennessee-Tombigbee Waterway (Tenn-Tom) has had a long, troubled history. The Congress authorized the project in 1946, but construction did not start until 1971. The approved project consists of a 232-mile waterway--the largest currently under construction by the Corps of Engineers--connecting the Tennessee River with the existing Black Warrior-Tombigbee Waterway (BWTW) near Demopolis, Alabama. From Demopolis the combined waterways will share BWTW for the 217 miles south to Mobile Bay. (See pp. 1 to 4.)

The navigation portion of Tenn-Tom is scheduled for completion in 1986 and the overall project in 1988 at an estimated cost of $1.96 billion ($1.78 billion in Corps funds). Approximately $981 million in Corps funds have been obligated as of March 1981. A 114-mile section of the waterway was opened for limited traffic in December 1979. (See pp. 1 to 6.)

Controversy over Tenn-Tom abounds. Proponents claim that it will benefit the entire Nation by providing a more efficient and economical transportation route from the midcontinent and Eastern United States to the Gulf of Mexico. But opponents claim that the project is not economically and environmentally viable. Considerable attention--both pro and con--has been focused on the project by the news media and the Congress. Two lawsuits to halt construction have been brought against the Government; the Federal Court for the Northern District of Mississippi ruled against the plaintiffs in both cases. The latest lawsuit is under appeal to the Fifth Circuit Court of Appeals. (See pp. 1 to 6.)

In 1981--10 years after construction started--the waterway is 53 percent complete and expenditures continue at approximately $20 million

per month. Given this situation, issues considered critical in the past do not have the same importance that they might have had 5 years ago. GAO believes only two major issues remain:

--Is the approximately $600 million to be saved by halting the project worth the almost total loss of the approximately $1.1 billion invested in the project? Average annual benefits achieved as of March 1981 amount to roughly $12 million, and achieving the full estimated average annual benefits of $136.9 million would require completing the project.

--Is the Congress, in approving Tenn-Tom, sowing the seeds for a future project? Completion of Tenn-Tom will result in traffic constraints south of Demopolis. To eliminate this bottleneck, the Congress would have to authorize major improvements to the existing BWTW, estimated to cost $960 million--$323 million for construction (Oct. 1979 dollars) and $637 million for inflation to the end of the estimated construction period in 1997. While Tenn-Tom has been economically justified by the Corps without the improvements, neither waterway can reach Corps traffic projections without the improvements. Of course, if Tenn-Tom is halted, these improvements will not be needed. (See pp. 85 to 89.)

The question may not be only one of whether the project should be halted or completed. If Federal expenditures are the concern, the Congress may wish to explore alternative financing. (See pp. 85 and 88.)

The former Chairman, Subcommittee on Energy and Water Development, Senate Committee on Appropriations, and several Senators and Congressmen asked GAO to answer specific questions about Tenn-Tom. The principal issues raised are discussed below.

BENEFIT CALCULATIONS

Perhaps the most important factor in deciding whether to build a navigational project is the benefit-cost ratio. The Corps has had a long history of recommending for congressional approval only projects for which benefits exceed costs. In 1971, when the Congress approved construction of Tenn-Tom, the Corps determined the project's benefit-cost ratio to be 1.6 to 1.

However, shortly thereafter rapidly escalating construction costs and other factors converged to bring into question the project's economic viability. As a result the Corps restudied project benefits and costs. The Corps' restudy, completed in 1976, showed a benefit-cost ratio of 1.08 to 1, which the Chief of Engineers described as "marginal, but yet certainly satisfactory." (See pp. 1 and 2.)

A key issue is whether the restudy accurately projected benefits. The Corps' study identified 121 movements that potentially could realize a savings by using Tenn-Tom and the benefits that would accrue to these movements by using the waterway. Benefits accrue from the estimated savings that result from the differences in cost between shipping on the Tenn-Tom versus another route. A "movement" was defined as the annual tonnage of a specific commodity moving between a given origin and destination. (One movement could actually be comprised of dozens of shipments.)

GAO reviewed 17 of the largest movements, which represented $77.5 million, or 63 percent, of navigation benefits included in the Corps' 1982 budget request. Each of the 17 movements was identified as either already moving on an alternate transportation mode in 1975 or as expected to start moving on an alternate mode by 1980. It was anticipated that all 17 of these movements would utilize Tenn-Tom when it opens.

Of the 17 movements, GAO found that:

--Six movements ($14.9 million in benefits) were occurring.

--One movement ($843,000 in benefits) is occurring but expected to stop before Tenn-Tom opens.

--Nine have not occurred ($59.6 million in benefits), though four of the shippers said they may use Tenn-Tom when it opens.

--One shipper could not be located ($2.2 million in benefits).

The movements did not occur for a variety of reasons, including (1) changes in business conditions, (2) bankruptcy, and (3) governmental

regulation which restricted the use of high sulphur coal. The Corps considers the Tenn-Tom navigation benefit study (completed by A.T. Kearney, Inc., Chicago, Illinois, in 1976) to be a "snapshot in time" and fully expects that over a 5-year period some firms will go out of business, some will come in, and specific plans and opinions may change. While the "snapshot in time" is an acceptable framework for measuring navigation benefits, one cannot assume that the movements that do not materialize will be exactly offset by new movements. This becomes especially critical when a few movements account for a large percentage of the benefits and they do not occur as projected, as was the case in the Kearney study.

GAO has reservations about some of the movements because some movements were either more tenuous than the Kearney study indicated or the tonnage amounts could not be verified to Kearney workpapers. However, the evidence is not strong enough to conclude that these movements were not properly included in 1976 when the Kearney navigation benefit estimate was made. GAO believes, however, that since over 50 percent of these movements have not occurred as projected by Kearney, the estimating practices may have been too liberal.

Since the 1976 study was made, the Nation's coal exports have increased. Because Tenn-Tom will service many of the Nation's major coal-producing regions, GAO believes that the waterway could be expected to handle coal shipments that were not included in the Kearney study. GAO did identify several companies, primarily coal shippers, that were not included in the benefit study that have said they plan to use Tenn-Tom when it is completed. (See pp. 11 to 31.)

Against this background of the benefits developed in earlier Tenn-Tom benefit-cost studies, an important factor to be considered is the comparison of the remaining benefit to remaining cost. The Corps currently estimates Tenn-Tom's remaining benefit to remaining cost at 3 to 1. (See p. 7.)

PROJECT CAPACITY

Potential traffic on both Tenn-Tom and BWTW will be constrained by the physical characteristics of the river and limited lock capacity

south of Demopolis. Recognizing this situation, the Corps determined that 44 million tons was the annual capacity of the combined waterway and assumed that this capacity would be reached in 1991. In determining Tenn-Tom benefits, the Corps allocated 29 million tons to Tenn-Tom and 15 million tons to BWTW.

Corps studies show that if the traffic constraints did not exist south of Demopolis, the two waterways could be expected to handle 60.4 million tons in the year 2000 and 80.1 million tons by 2010. After that, lock constraints on both waterways will prevent traffic from reaching the Corps' estimate of 143.3 million tons in 2035. Further complicating the capacity problem is the rapid growth of traffic using BWTW; in 1980 BWTW carried 15 million tons, the amount the Corps projected for 1991.

The Corps is studying an improvement project to eliminate the bottleneck south of Demopolis. This project is estimated to cost $960 million--$323 million (Oct. 1979 dollars) for construction and $637 million for inflation through the construction period in 1997. While Corps officials have stated that the improvement project is not needed to economically justify Tenn-Tom, GAO believes that if Tenn-Tom is completed and Corps projections are accurate, the Corps ultimately will have to propose this project to the Congress, because without the improvements, neither waterway can reach its potential. (See pp. 32 to 48.)

COST ESTIMATES

GAO believes the Corps' budget estimate of $1.78 billion for fiscal year 1982 is reasonably accurate. Most of this estimate ($1.4 billion) is made up of funds already obligated and/or expended as of March 1981 and the remaining future fiscal year balances of awarded contracts. Since fiscal year 1981, the Corps has included future inflation costs in its estimate. Inflation has been one of the primary reasons for cost escalation on this project. (See pp. 50 to 52.)

Considerable controversy arose over the fiscal year 1976 cost estimate reported by the Corps to the Congress in January 1975. The Corps reported that Tenn-Tom would cost $815 million; others have claimed the Corps should have reported costs of more than $1 billion. (See p. 50.)

The Army Audit Agency in a September 1976 report concluded that $344 million in costs were not included in the Corps' $815 million estimate. The Chief of Engineers in July 1980 testimony before the Subcommittee on Water Resources, Senate Committee on Environment and Public Works, gave a number of reasons for reporting $815 million instead of the higher estimate of $1.159 billion. Even though the higher estimate had surfaced as early as December 4, 1974, in the Corps South Atlantic Division and was provided to Corps headquarters in late December 1974, GAO cannot conclude that the Corps was wrong in reporting the $815 million in January 1975. However, GAO believes that the Corps could have alerted the Congress at that time that project costs could increase substantially. (See pp. 50 to 56.)

During the first 6 months of 1975, the Corps developed a number of cost estimates ranging from $1.23 to $1.4 billion. GAO believes that the Corps had ample opportunity after January 1975 to advise the Congress that costs would be higher than $1 billion. But in three different congressional hearings from February to July 1975, the Corps continued to report $815 million. Finally, in August 1975 the Corps advised the Chief Clerk of the Subcommittee on Public Works, Senate Committee on Appropriations, that costs would be $1.4 billion. The first time the Congress was formally provided a cost estimate greater than $1 billion was in January 1976, when the Corps reported a cost estimate of $1.36 billion. (See pp. 56 and 57.)

FISH AND WILDLIFE COORDINATION ACT

The Fish and Wildlife Coordination Act, as amended, requires that wildlife conservation receive equal consideration and be coordinated with other features of federally funded water resource projects.

The Fish and Wildlife Service made a study of the Tenn-Tom project and submitted its report to the Corps in March 1981. The report recommended, among other things, the acquisition of 97,000 acres--estimated to cost $31.5 million in Federal funds--to mitigate loss of wildlife habitats. While the Corps does not have to accept the Service's recommendations, it is required to consult with the Service and report to the Congress on those measures it finds justified.

However, the land purchases recommended in the report would require congressional approval. (See pp. 58 to 62.)

LOCAL SPONSORS' OBLIGATIONS

Public Law 79-525 requires that local sponsors--Alabama and Mississippi--perform, at their own expense, certain tasks needed as part of project construction, primarily highway bridge and highway relocations. Both States have completed or are in the process of accomplishing the required work and expect to complete it well before the waterway opens.

As of January 1981, the Corps reported local sponsors' costs at $170 million. However, the two States have not borne the entire cost. Pursuant to an amendment to the Federal Highway Act of 1976 (section 132 of Public Law 94-280), the Secretary of Transportation provided Mississippi $69.5 million and Alabama $20 million for highway and bridge relocations in connection with Tenn-Tom. (See pp. 63 to 68.)

TERMINATION COSTS

In August 1980 testimony before the Subcommittee on Energy and Water Development, Senate Committee on Appropriations, the Corps estimated the project termination cost to be $130.75 million as of September 30, 1980. This estimate provided for (1) settling existing contracts and claims as well as completing certain contracts, (2) restoring the site to an environmentally acceptable condition, and (3) settling real estate and deficiency judgments. (See pp. 69 to 74.)

GAO found that much of the termination estimate was based on the Corps' professional judgment and experience but little documentation. If the Corps had used historical experience, albeit limited, on contract termination, the termination estimate of $130.75 million could have been $13 to $18 million less. (See pp. 69 to 71.)

GAO estimates that if the project were terminated in March 1981, the Corps would save more than $600 million. However, expenditures are currently running about $20 million per month and the ultimate savings would depend on the

actual termination date and the specific decision about final disposition of the project property. (See pp. 69 and 81.)

Tenn-Tom's average annual operation and maintenance expense is estimated at $11.2 million. While a considerable amount of this cost would be saved if the project were terminated, funds would still be needed for upkeep, fire prevention, etc., of the remaining project. (See p. 78.)

GAO believes that the Congress, in weighing savings to be gained by terminating Tenn-Tom, should consider the investments States and local governments have made in anticipation of the waterway being completed. For example, the Port of Mobile has a $140 million expansion program underway, in part to handle anticipated Tenn-Tom traffic. (See p. 86.)

AGENCY COMMENTS AND GAO's EVALUATION

The Department of the Army commented that the relevant issue is not whether projected waterway movements actually materialize, but rather, whether the Corps used the appropriate economic estimating procedures. The Army concluded that the Corps used procedures accepted by knowledgeable navigation economists--the concept of "a snapshot in time"--and that the navigation benefits survey is without significant flaw. While GAO agrees that the "snapshot in time" is an acceptable framework for measuring navigation benefits, GAO is concerned with the number of movements that have not materialized. GAO believes that this issue is especially critical when a few movements account for a large percentage of benefits and they do not occur as anticipated. GAO believes this suggests the estimating practices may have been too liberal. (See pp. 29 and 30.)

The Army and the Office of Management and Budget both believe that completion of Tenn-Tom does not force completion of a project south of Demopolis, Alabama. They stated that such a project would be based on its own merit and could not be accomplished without congressional approval. GAO agrees that congressional approval would be required.

GAO believes, however, that it is important to recognize that based on Corps projections neither Tenn-Tom nor BWTW can reach their projected traffic levels unless the bottleneck south of Demopolis is eliminated. The Corps has stated in congressional testimony that the capacity of BWTW south of Demopolis was expected to be reached in 1991 and improvements would be needed to increase capacity. If Tenn-Tom is halted, these improvements would not be needed. (See pp. 88 and 89.)

The Army concluded that the economic justification in favor of project completion no longer can be fairly challenged, when justification is considered on a basis of remaining benefits to remaining costs, and that the project should be completed. Further, the Army said that GAO's review and report certainly leads to no other conclusion. GAO does not agree that its report leads to any conclusion one way or the other. GAO answered specific questions which were not designed to reach an overall conclusion on whether the project should or should not be completed. (See pp. 88 and 89.)

These and other comments from the Departments of the Interior and Transportation; the Appalachian Regional Commission; and A.T. Kearney, Inc., are summarized as appropriate at the end of each chapter and are included in their entirety with GAO's responses in appendixes II to VII.

Contents

ABBREVIATIONS

BWTW	Black Warrior-Tombigbee Waterway
GAO	General Accounting Office
mph	miles per hour
OMB	Office of Management and Budget
Tenn-Tom	Tennessee-Tombigbee Waterway

CHAPTER 1

INTRODUCTION

The Tennessee-Tombigbee (Tenn-Tom) Waterway has had a long and troubled history. The concept of a waterway to connect the Tennessee River with Mobile Bay was first proposed in the 1700s; the project was authorized by the Congress in 1946; and construction started in 1971. If the $1.96 billion ($1.78 billion in Corps of Engineers funds) project is completed in 1988, as anticipated, proponents claim that it will benefit the entire Nation by providing a more efficient and economical transportation route from the midcontinent and Eastern United States to the Gulf of Mexico. But the project has been clouded with controversy. Considerable attention--both pro and con--has been focused on the project by the news media and the Congress. It has been the subject of two lawsuits, the most recent of which is still in litigation. Opponents want the project stopped and claim it is not economically or environmentally viable. With approximately 53 percent of the waterway complete in March 1981, proponents argue that little benefit would be realized if the project were abandoned at this point.

HISTORY OF THE TENN-TOM PROJECT

Plans for establishing a waterway connecting the Tennessee River with Mobile Bay date back to the 1700s, and numerous attempts were made over the next two centuries to gain approval for the project. Finally, in 1946 the Congress authorized construction of a waterway that would permit barge traffic to move between the Tennessee and Tombigbee Rivers.

Problems surfaced in 1951 in a report by the House Appropriations Committee which concluded that Tenn-Tom was not economically sound. As a result, the project was placed in a "deferred" category and remained dormant until 1957 when the Congress directed a restudy of Tenn-Tom's economic viability.

A restudy was made by the Chief of Engineers and submitted to the Congress in 1962, showing a favorable benefit-cost ratio. In 1965 the Congress directed that planning resume with a reanalysis of project economics. In 1967 the Congress approved resumption of preconstruction planning and design and appropriated construction funds for fiscal year 1971. At this point, the Corps of Engineers determined the benefit-cost ratio to be 1.6 to 1. Construction was started in 1971.

In calculating this benefit-cost ratio, the Corps assumed that it would be able to make improvements to an existing waterway--the Black Warrior-Tombigbee Waterway (BWTW). Tenn-Tom traffic will flow into BWTW near Demopolis, Alabama, and traffic from the two waterways will share the 217-mile stretch from Demopolis to Mobile, Alabama. Because physical features of BWTW constrain waterway traffic, the Corps originally expected to enlarge the waterway and increase lock capacity south of Demopolis.

In 1974 the Corps decided to look again at the benefit-cost ratio of building Tenn-Tom, because climbing oil prices and rising inflation were pushing construction costs higher than anticipated. In March 1975 the Corps contracted with A.T. Kearney, Inc., a Chicago, Illinois, consulting firm, to reevaluate navigational benefits.

Before the Kearney study was completed, a court decision (Atchison, Topeka and Santa Fe Ry. Co. v. Callaway, 382 F. Supp. 610, 617 (D.C.D.C. 1974)) (also referred to as the Locks and Dam 26 decision) changed the Corps' assumption about improving BWTW south of Demopolis. The court ruled that the Corps may not rebuild a structure merely to meet expected future increases in traffic without congressional approval.

In view of the court's decision, the Corps directed Kearney to compute navigational benefits expected from the completed Tenn-Tom project excluding improvements to the waterway south of Demopolis. Kearney completed its study in 1976. Kearney's calculation of navigational benefits was provided to the Corps and, when combined with other benefits and with the Corps' updated cost estimates, resulted in a benefit-cost ratio of 1.08 to 1. The ratio was described by the Chief of Engineers as being "marginal, but yet certainly satisfactory."

DESCRIPTION OF THE PROJECT

The Tenn-Tom project--the largest currently underway by the Corps--involves construction of a 232-mile waterway joining the Tennessee River in northeastern Mississippi to BWTW at Demopolis, Alabama. The project includes a system of 10 locks and 5 dams to accommodate the 341-foot change in elevation between the Tennessee River and Demopolis. At Demopolis, barge traffic would follow BWTW to the Mobile River and then south to the harbor at Mobile Bay. Using a 4.3-miles-per-hour (mph) average tow speed, it would take about 104 hours to travel from Pickwick Pool on the Tennessee River to Mobile Harbor. (See map on p. 8.)

Tenn-Tom has three distinct parts--a divide section, canal section, and a river section. The following pages sketch a typical trip down the waterway.

Divide section

The barge trip begins at the 40-mile divide section, covering the area from Pickwick Pool of the Tennessee River to the Bay Springs Lock and Dam. The 27-mile divide cut is probably the most spectacular feature of the project. The Corps dug a channel directly through the hills separating the Tennessee and Tombigbee River Basins. More earth will be removed in completing the project (approximately 48 percent of the earth to be removed is in the divide cut) than was removed for the Panama Canal. The earth removed from the divide cut is enough to build a two-lane highway

from the Earth to the Moon. (See illustration on p. 9.) The maximum cut is about 175 feet deep, 1,500 feet wide at the top, and about 280 feet wide at the bottom, with a 12-foot channel depth. Water elevation in this channel will be the same as at Pickwick Lake.

Leaving the divide cut, a barge would move into Bay Springs Lake, a manmade lake formed by pooling waters behind the Bay Springs Lock and Dam. After passing through the lake, the barge would encounter the Bay Springs Lock--the waterway's first lock and the one with the largest change in elevation--84 feet. Next the barge would move into the canal section.

Canal section

This section stretches 44 miles from Bay Springs Lock and Dam to near Amory, Mississippi. Moving down this section, the barge would descend through five locks (Locks E, D, C, B, and A) dropping in elevation (or lifting on a northbound trip) from 25 to 30 feet at each lock. The channel in this section will be 12 feet deep and 300 feet wide. The channel will lie east of the Tombigbee River, not actually overlaying the snakelike river, but running parallel to it.

An interesting feature of this section is the "chain of lakes" concept, which the Corps adopted to enhance the environment. (See map on p. 10.) A levee will be constructed along the western side of the channel, extending along the 44-mile length, to protect the waterway against flooding from the Tombigbee River and provide an impounding surface for the pools formed by the five locks. On the eastern side of the channel and upstream of each lock, a lake will be allowed to form and rise to the high ground. A "chain" of irregular-shaped bodies of water will result, which should be esthetically pleasing and favorable to fish and wildlife.

Clearing Lock A, the barge would traverse a 4.5-mile section of the canal and then enter the river section.

River section

This section runs for 148 miles from just south of Amory, Mississippi, to just north of Demopolis, Alabama. The channel is 9 to 12 feet deep and 300 feet wide and generally follows the course of the Tombigbee River, except where the Corps has constructed cutoffs to avoid extreme bends in the river.

Moving south from Lock A, the barge would descend through four locks and dams, dropping from 27 to 36 feet at each lock, at Aberdeen and Columbus, Mississippi, and Aliceville and Gainesville, Alabama. A 114-mile stretch of channel from just south of Columbus Lock and Dam to Demopolis was opened to limited traffic in December 1979.

Black Warrior-Tombigbee Waterway

At Demopolis, the barge would enter the existing BWTW, which extends 217 miles south from Demopolis to Mobile Harbor. The channel in this section follows the course of the Tombigbee River --a twisting river with numerous bends. The barge would lock through two locks and dams at Demopolis and Coffeeville, Alabama. The authorized channel in this section is 200 feet wide, but the natural river provides a wider channel in most places. The Corps is studying the feasibility of improving BWTW by increasing lock capacity, widening channels, eliminating some bends and curves, and widening the span between bridge supports. These improvements, if authorized and funded by the Congress, are expected to cost approximately $960 million--$323 million (Oct. 1979 dollars) for construction and $637 million for inflation to the end of the estimated construction period in 1997.

Approximately 50 miles north of Mobile, the Tombigbee River joins the Alabama River to form the Mobile River. The barge would encounter a less convoluted stream from this point to Mobile Harbor, the end of the waterway.

LAWSUITS AGAINST TENN-TOM

Two lawsuits have been brought against Tenn-Tom. In 1971 a group of environmentalists challenged the validity of the project and asked that it be stopped. The plaintiffs asserted that the Corps had violated the National Environmental Policy Act and various other statutes. This complaint was dismissed with prejudice 1/ by the District Court for Northern Mississippi. (EDF v. Corps of Engineers, 348 F. Supp. 916 (N.D. Miss. 1972)). On appeal, the Fifth Circuit Court of Appeals affirmed the lower court decision (492 F.2d 1123 (1974)).

On November 30, 1976, the Environmental Defense Fund, the Committee for Leaving the Environment of America Natural, and others brought suit against the Corps seeking an injunction to halt project construction. These plaintiffs were joined by the Louisville and Nashville Railroad and by the National Audubon Society, Birmingham Audubon Society, and the Alabama Conservancy, as plaintiff-intervenors, in a consolidated action against the Corps. The complaint alleged that the Tenn-Tom Waterway was not properly authorized by the Congress and that the Government, in financing the waterway, discriminated against alternative modes of transportation, primarily the railroad. The plaintiffs further alleged that economic improprieties and violations of the National Environmental Policy Act, other environmental statutes, and water resources laws had occurred. The plaintiffs also

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1/"With prejudice" means that the district court decision is considered final and subject only to appeal. "Without prejudice" means that the parties may come back to the district court on the issue.

alleged that construction of Tenn-Tom would lead inexorably to plans to expand the downstream BWTW system from Demopolis to Mobile.

After a series of legal skirmishes, on October 1, 1980, the District Court for the Northern District of Mississippi issued an order dismissing all remaining counts with prejudice except one, concerning the plaintiffs' right to seek an order requiring the Corps to publish certain regulations. The plaintiffs have appealed the decision to the Court of Appeals for the Fifth Circuit, and oral arguments were heard on April 6, 1981.

WHAT ARE TENN-TOM'S BENEFITS?

The Corps of Engineers estimated that Tenn-Tom will have benefits not only for navigation interests, but also recreation, fish and wildlife, and area redevelopment. As of February 1981, the Corps projects average annual benefits at $136.9 million (1980 dollars), as shown:

	(000 omitted)
Navigation	$116,618
Recreation	7,084
Fish and wildlife	197
Area redevelopment	13,048
Total	$136,947

COST OF THE PROJECT

The Corps estimates the total Federal and State cost of the project--that is, what has been spent and what remains--as of January 1981 to be $1.96 billion. Project participants and their share of budgeted costs are:

	(000 omitted)
Corps of Engineers	$1,780,000
U.S. Coast Guard	600
National Park Service	9,400
States of Alabama and Mississippi (note a)	170,000
Estimated project costs	$1,960,000

a/The Department of Transportation under Public Law 94-280 is providing $89.5 million of the $170 million.

The Corps is responsible for funding most of the project--dams and locks, channels, dredging, recreational facilities, etc. The Coast Guard's $600,000 is to pay for navigational aids on Tenn-Tom, which will not be needed until construction is nearly

complete. The National Park Service has spent, as of March 1981, approximately $5.6 million of the estimated $9.4 million needed to construct a new highway bridge on an extension of the Natchez Trace Parkway in Mississippi.

Local sponsors are required to construct and maintain certain highway bridges, all highway relocations or alterations necessitated by the project, and alterations to sewage and water facilities. Of the estimated $170 million needed to complete this work, however, the Department of Transportation will provide $89.5 million, or approximately 53 percent, and Alabama and Mississippi will provide the rest.

HOW CLOSE IS TENN-TOM TO COMPLETION?

As of March 1981, the Corps estimates the entire project to be about 53 percent complete. The following table shows the percentage of completion for the various project segments. The percentage completion for each segment includes all of the work needed for that segment and the surrounding area. For example, the divide cut's figure of 64-percent completion covers every aspect including procurement of land, relocations, road work, channel and canals, recreation facilities, cultural resources, fish and wildlife enhancement, and buildings and grounds. The segment farthest along--the Gainesville Lock and Dam which went into operation in October 1978--still requires work on roads, the channel and canal, and completion of recreational facilities. The Corps estimates it will be September 1985 before the Gainesville Lock and Dam segment is completed. Based on President Reagan's budget request, the navigation portions of Tenn-Tom are scheduled for completion by September 1986 and the entire project by March 1988.

Segment	Percent completion
Divide cut	64
Bay Springs Lock and Dam	34
Lock E	14
Lock D	23
Lock C	38
Lock B	44
Lock A	47
Aberdeen Lock and Dam	51
Columbus Lock and Dam	42
Aliceville Lock and Dam	58
Gainesville Lock and Dam	86
Demopolis Lake	73

WHAT WILL IT COST TO COMPLETE THE PROJECT?

In early 1981 the Corps was spending about $20 million per month on Tenn-Tom and estimated that as of January 1981 an additional $680.6 million in Federal funds ($201.1 million in fiscal year 1982 and $479.5 million thereafter) would be needed to complete the project. The remaining benefit to remaining cost ratio for Tenn-Tom is 3 to 1. Major work remaining to be done and estimated amounts remaining in the budget are:

	(000 omitted)
Channel and canal work	$271,000
Lock construction	120,516
Relocations (primarily railroads and railroad bridges)	90,809
Recreational facilities	52,618
Dam construction	38,949
Supervision and administration	33,014

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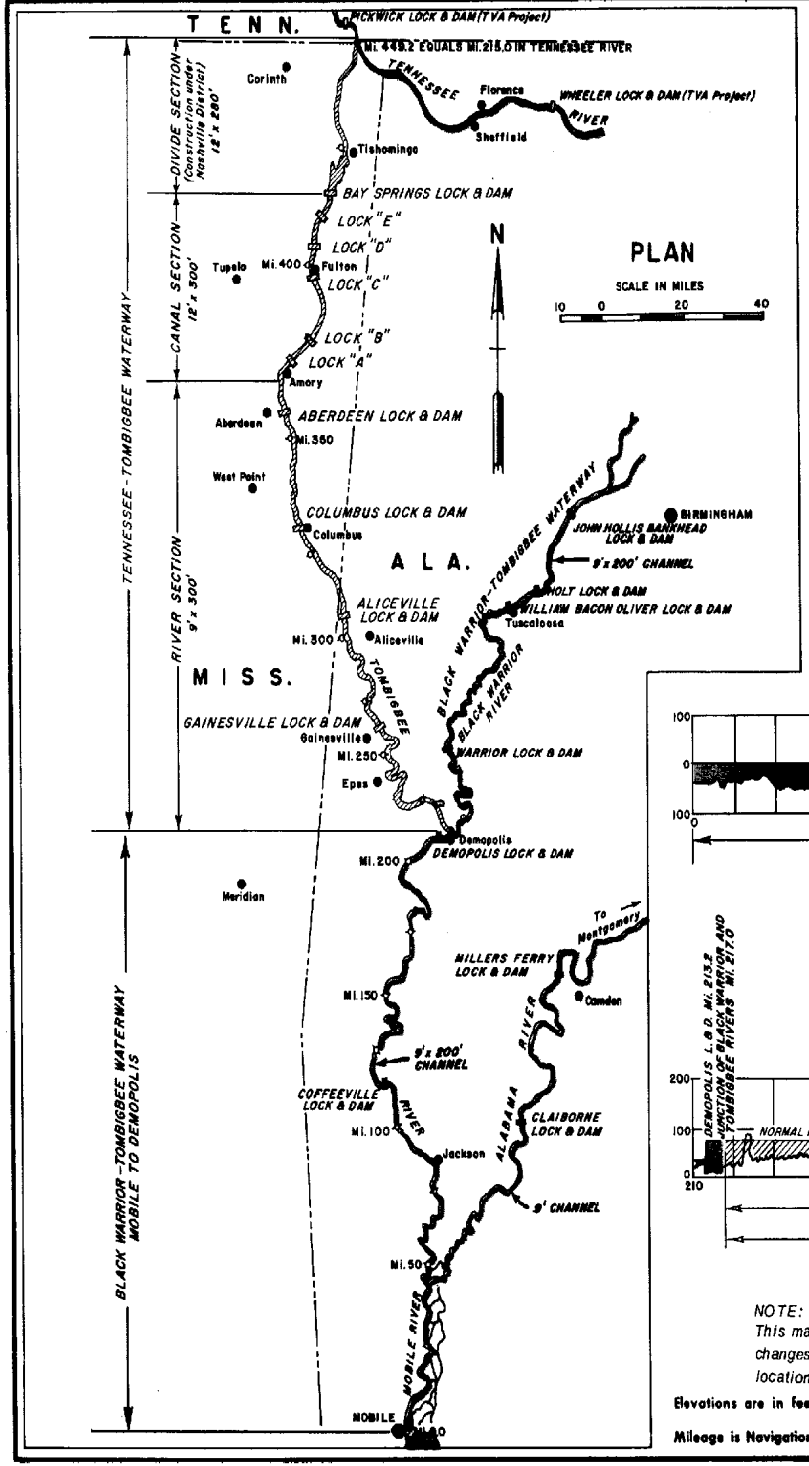
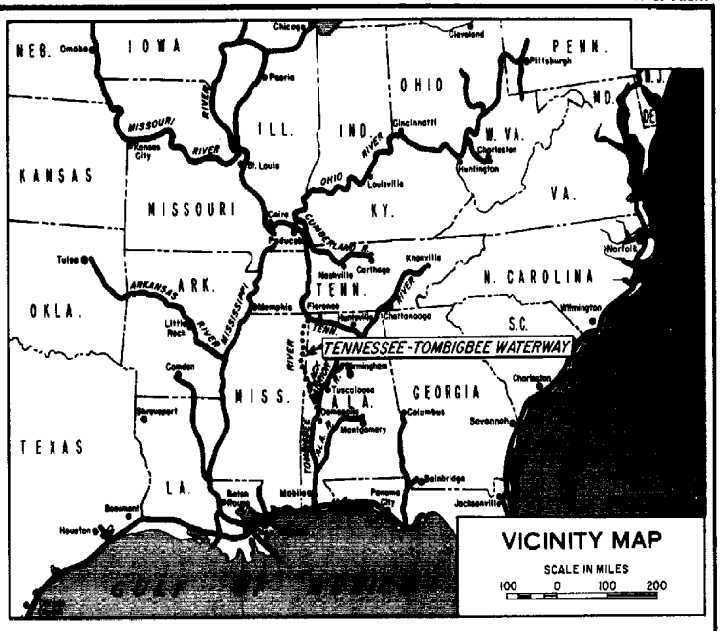
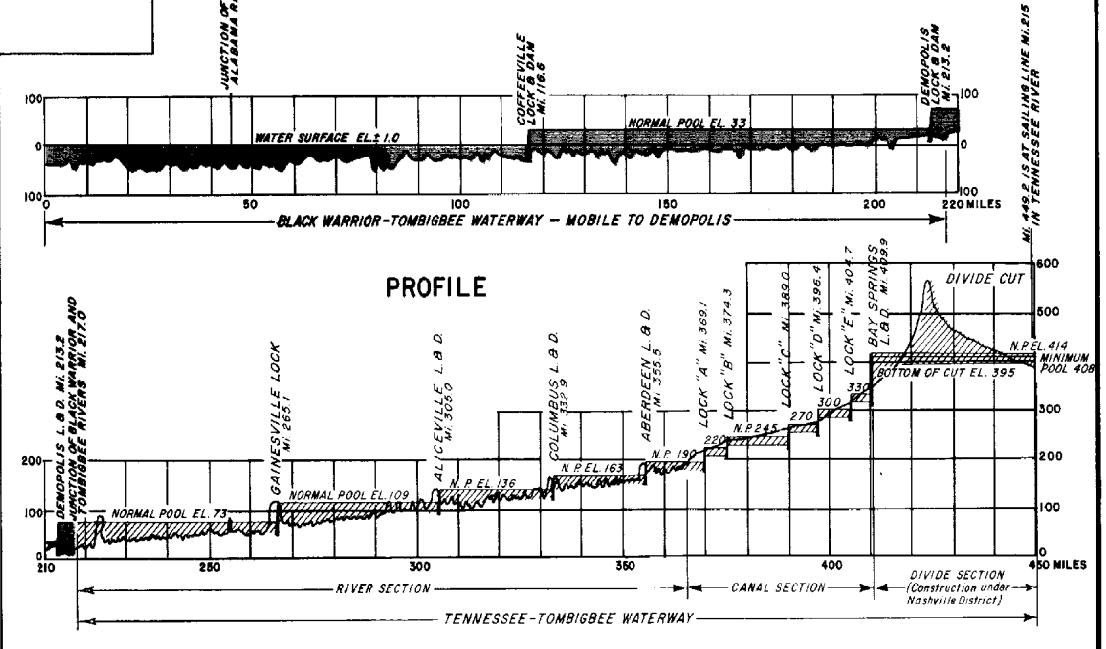
The objective, scope, and methodology of our work are discussed in chapter 9.







NOTE:
This map has not been updated for recent minor changes, such as mileages and lock and dam locations.

Elevations are in feet and refer to National Geodetic Datum.

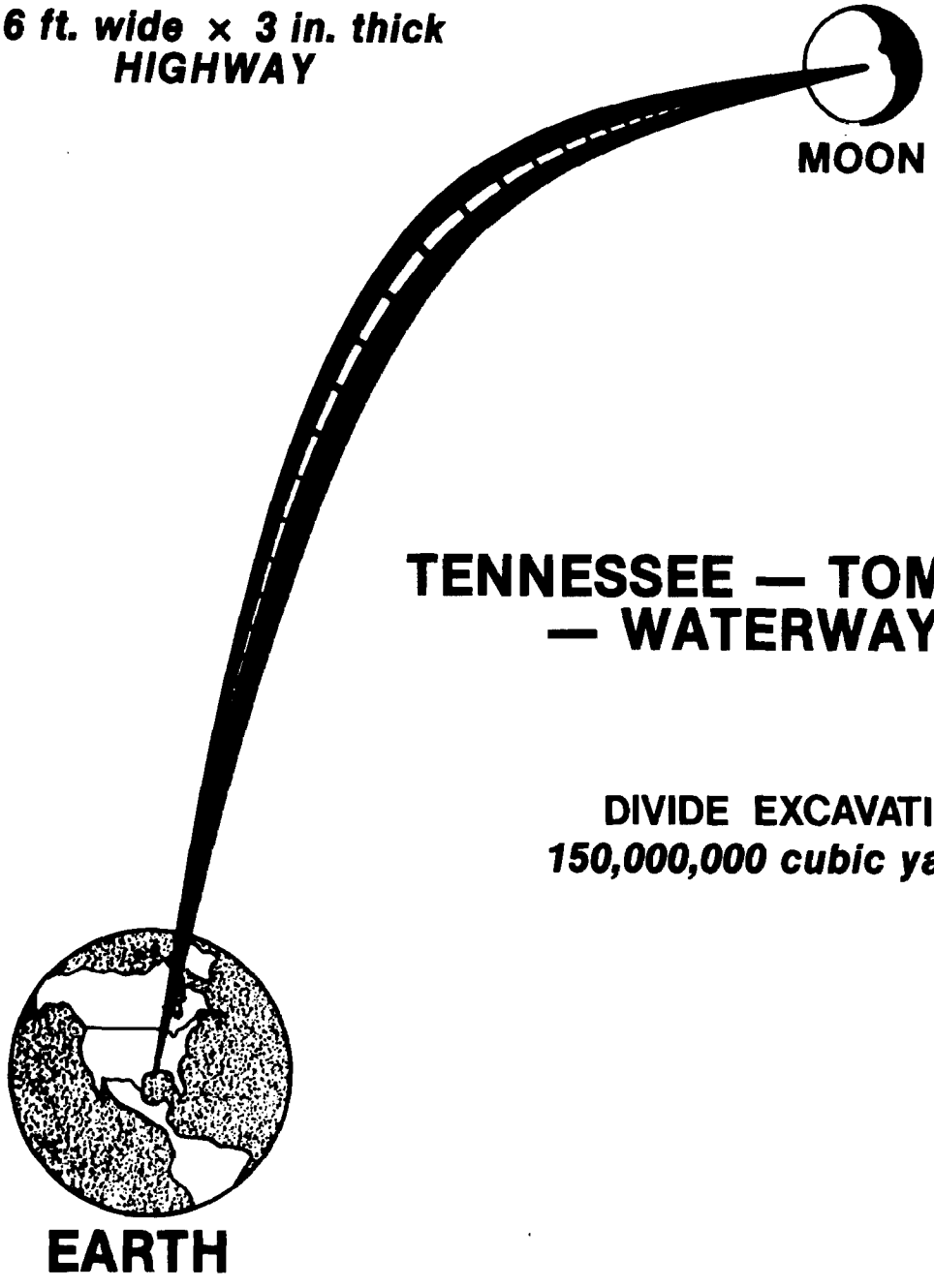
Mileage is Navigation Miles from the foot of Government Street, Mobile, Alabama.

WATERWAY CONNECTING THE TOMBIGBEE AND TENNESSEE RIVERS, ALABAMA AND MISSISSIPPI

REVISED TO 30 SEPTEMBER 1977 *(SEE NOTE)*

OFFICE OF THE DISTRICT ENGINEER
MOBILE, ALABAMA

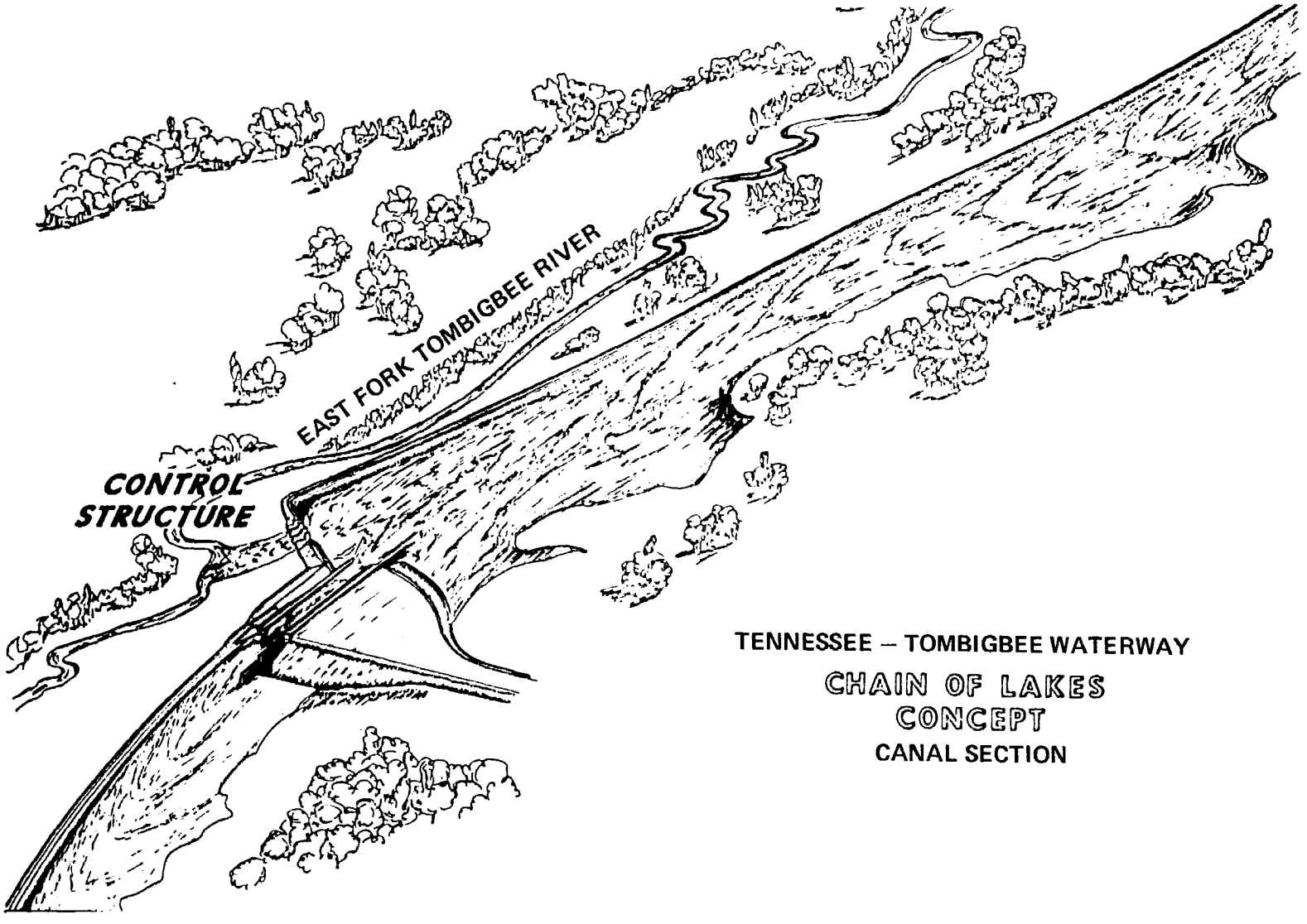
16 ft. wide × 3 in. thick
HIGHWAY



TENNESSEE — TOMBIGBEE — WATERWAY —

DIVIDE EXCAVATION:
150,000,000 cubic yards

SOURCE: CORPS OF ENGINEERS



TENNESSEE – TOMBIGBEE WATERWAY

CHAIN OF LAKES CONCEPT

CANAL SECTION

SOURCE: CORPS OF ENGINEERS

CHAPTER 2

BENEFIT CALCULATIONS

BACKGROUND

The Corps contracted with A. T. Kearney, Inc., Chicago, Illinois, in 1975 to perform an updated navigation benefit analysis for the Tenn-Tom project. According to Kearney's project report, approximately 1,000 shippers/receivers were contacted in an attempt to identify potential traffic. These shippers/receivers were asked to provide preliminary information on their commodities, including

--origin and destination points of shipments,

--volume and frequency of shipments,

--existing transportation rates or charges,

--existing routing of the shipments,

--expansion plans,

--scheduling requirements, and

--extent of the firm's interest in Tenn-Tom.

Based on the information obtained from the shippers/receivers, Kearney developed a potential traffic base of over 500 movements. A movement is defined as the annual tonnage of a specific commodity moved between a given origin and destination and it could consist of numerous actual shipments. For example, shipments of coal totaling 1 million tons per year from a company in Tennessee to Mobile would be considered one movement, while shipments of the same commodity to the same location by a different company would be considered another movement. Kearney eliminated movements which obviously had no potential to use Tenn-Tom, such as a movement with an origin or destination outside the Tenn-Tom service area. Kearney then reviewed the remaining movements to eliminate

--duplicates,

--commodities that were not adaptable to barges, and

--those less than 6,000 annual tons.

After these categories were eliminated, Kearney's traffic base consisted of approximately 250 movements for which a detailed rate analysis was made to determine the per-ton savings, if any, for each movement. Savings were computed by comparing the rate (dollars per ton) to move a particular commodity on the alternative mode or route to the rate to move the commodity on Tenn-Tom. Kearney deleted movements with less than (1) a $.50/ton savings

if the commodity was currently moving via rail or truck and (2) a $.15/ton savings if the commodity was moving on another waterway.

After completing this step, Kearney identified 121 movements which met or exceeded the established per-ton savings criteria. Of these 121 movements, 91 were classified as current and 30 were classified as future movements. Current movements consist of tonnage moving at the time of Kearney's study by alternate routes or modes which could be diverted to Tenn-Tom due to the potential savings. Future movements consist of movements planned for the future from activities such as new facilities, planned expansion into new markets, planned development of new sources of raw materials, and other changes in traffic flows.

For each of these 121 movements, Kearney applied growth factors to project the tonnages for 1986, the first year of Tenn-Tom operation, and for the 50-year economic life of the project. Kearney also added a 10-percent contingency factor to account for unidentified and small-volume traffic. Using these tonnages and the estimated savings per ton, Kearney calculated average annual navigation benefits of $66.4 million.

Although there were only 15 coal movements in the 121 movements, coal comprised the largest source of tonnage and savings--72 percent of the tonnage and 60 percent of the savings.

The Corps has updated the navigation benefit estimate each year since the Kearney study, basically by applying updated transportation rates to the 121 movements. The following table summarizes the increase in navigation benefits since 1975.

Navigation Benefits as Reported to the Congress from 1976 to 1981

Date submitted to the Congress	Fiscal year budget	Average annual navigation benefits (000 omitted)
1-76	1977	a/ $ 67,740
1-77	1978	74,073
1-78	1979	b/ 87,389
1-79	1980	b/ 91,156
1-80	1981	b/ 105,058
1-81	1982	b/ 121,072

a/Prepared before completion of Kearney's study and based on preliminary Kearney figures.

b/According to the Corps, the estimates for fiscal years 1979-82 have been overstated because the Mobile District incorrectly interpreted a capacity study of BWTW. In Feb. 1981 the Corps corrected this error by advising both the Senate and the House Appropriations Committees that navigation benefits for fiscal year 1982 should be $116,618,000 instead of $121,072,000.

QUESTION

Did the Corps comply with Engineering Regulation 1120-2-114?

ANSWER

The Corps generally complied with the regulation in computing navigation benefits. The Department of Transportation Act of 1966 (Public Law 89-670) defines primary direct navigation benefits as the product of the savings to shippers using the waterway and the estimated traffic that would use the waterway. The Corps' Engineering Regulation (ER) 1120-2-114 "Survey Investigations and Reports-Waterway Improvement Studies Navigation Benefits" describes the procedures for developing navigation benefits for water resource projects by describing how to estimate savings and the traffic that will use the waterway.

The Corps based the navigation benefits for Tenn-Tom on the Kearney study. The primary guidance used to do the study was ER 1120-2-114, hereafter referred to as the regulation. Following is a discussion of how specific aspects of the regulation were complied with.

QUESTION

Did the regulation require the Corps to base traffic estimates on existing traffic, and did the Corps comply?

ANSWER

The regulation requires the traffic estimates to be based on existing traffic and also allows the inclusion of estimates for future traffic. The Corps complied with the regulation by including existing and future traffic in the estimate.

Public Law 89-670 requires the traffic estimates to take into account projections of the area's economic growth. The regulation requires that the traffic estimated to move via the proposed waterway be based on a thorough analysis of the existing traffic movements in the tributary area. (Kearney defined the tributary area for Tenn-Tom as that area that could be served at a transportation savings over present modes and/or routes by barge transportation utilizing the waterway. See p. 31 for a map of the tributary area.) The regulation also describes how to compute savings for movements not actually existing at the time of the traffic survey which, according to the Executive Assistant to the Mobile District Engineer (Executive Assistant), 1/ are future

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1/The Executive Assistant is a civil engineer who was formerly the Black Warrior-Tombigbee Waterway Study manager and a member of the Tenn-Tom Litigation Unit. (See p. 39 for description of the litigation unit.)

movements. According to the former Chief Economist, Planning Division, Office of the Chief of Engineers, an analysis of existing movements is only a starting point for benefit analysis and future movements should also be included in the study.

As described earlier, Kearney developed the traffic base by contacting approximately 1,000 shippers/receivers. From this survey Kearney developed traffic estimates that formed the basis for calculating navigation benefits. The traffic base used included 91 existing and 30 future movements. The existing movements represent 48.6 percent of the tonnage included in the study and the future movements represent 51.4 percent. Kearney used this traffic base to determine the navigation benefits of Tenn-Tom.

QUESTION

Does the regulation require the estimates to be based on actual current rates and were they? Does the regulation allow the use of constructed rates?

ANSWER

The regulation requires rate estimates to be based on actual current rates. In certain circumstances the regulation also requires rates to be constructed (that is, estimated) and these rates must also be based on actual current rates. The rates developed by Kearney, including constructed rates, were consistent with the regulation.

The regulation requires rates for the proposed waterway to be based on rates or charges existing elsewhere at the time of the study, which are most nearly applicable to the type and volume of expected traffic on the improved waterway. This requirement also applies to constructed rates. According to the Executive Assistant, since actual rates for proposed waterways usually do not exist, rates for most proposed waterways, such as Tenn-Tom, must be constructed; however, these constructed rates must be based on actual current rates.

According to the regulation, actual current rates must be used for traffic currently moving on alternate modes of transportation when the volume and characteristics of the movements are similar to the proposed waterway movements. When the characteristics are not similar or when rates for alternate modes are not available, the rates must be constructed; but again, they must be based on actual current rates.

According to the Kearney study and workpapers and our discussions with the Kearney Project Manager and the Executive Assistant, the barge rates for Tenn-Tom were constructed and these rates were based on actual current rates. Barge rates for alternative waterways were constructed when actual current rates were not available or when the characteristics of the

movement differed from those on Tenn-Tom. Further, constructed rates were used even if actual rates were available for the alternate waterway to prevent errors in estimating savings which could occur if different approaches were used to estimate the rates for different waterways.

The Kearney study and workpapers and our discussions with the Kearney Project Manager and the Executive Assistant indicated that when rail or truck was the alternate mode, the rates used were either actual current or constructed rates. Rates were constructed when actual current rates were not available or did not reflect the volume or characteristics of the movement; i.e., unit train rates did not exist but were constructed for coal movements in lieu of using existing single or multiple car rates. Kearney based the constructed rates on tariffs, Interstate Commerce Commission cost data, shippers' operating costs, and rates used in other parts of the country.

QUESTION

Did the Corps include inventory, handling, and other logistics costs, and should they have been included?

ANSWER

The regulation requires inventory, handling, and other logistics costs to be included when determining navigation benefits. Kearney included these costs, except for inventory charges, when determining the benefits. Inventory costs 1/ were not included because they were the same or just slightly different for the routes being compared.

The regulation requires that the estimate of savings, which is used to determine navigation benefits, will ordinarily be developed by comparing the full charges for movement from origin to destination via the prevailing mode of transportation with the full charges via the waterway being studied. The charges for each mode will include all applicable handling, switching, and accessorial charges. Net differences in inventory, storage, or other costs that are due to the change in transportation mode will also be recognized.

According to the Kearney study and workpapers and discussions with the Kearney Project Manager and the Executive Assistant, Kearney included the costs associated with each element only if they differed between the Tenn-Tom routing and the alternate mode routing. The Kearney Project Manager and the Executive

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1/In this project, inventory costs generally pertain to those costs associated with commodities in transit or otherwise not available for processing or sale.

Assistant said that when charges were equal on both routings, they were not included. The Kearney Project Manager said equal charges would have no effect on the estimate of savings.

Besides the actual barge, rail, or truck costs, the Kearney study included costs for origin and destination loading and unloading, overland transportation from the origin to the transportation mode and from the transportation mode to the destination, and transloading from one mode to another at or near the origin or destination. Also included were port costs; wharfage fees; and costs of storage, handling, and stevedoring.

The study considered charges related to changes in inventory costs, loading and unloading costs, warehousing costs, materials handling costs, and other similar charges. According to the Kearney study, these charges were included in the point-to-point rate analysis when they contributed to a significant difference in the total point-to-point movement charges. The Executive Assistant did not define "significant" other than to say that if a cost was incurred on one routing but not on another, then the cost was included.

The Kearney workpapers included examples of handling and logistics costs which were included in figuring various movement costs but not inventory costs. According to the Kearney Project Manager, inventory costs were considered for each movement but were not included because they were the same or only slightly different for the routes being compared. He also stated that previous studies have shown that changes in inventory costs are negligible or nonexistent for most movements.

QUESTION

Have any of the predicted 1980 movements materialized?

ANSWER

The majority of the 17 movements we reviewed have not materialized, 1/ although some company officials stated that they could potentially use Tenn-Tom when it is completed. The Corps' position on inclusion of movements in the benefit data base, in essence, is that (1) the purpose of interviews is to establish base year traffic, not to determine future prospects of a specific firm, and (2) some firms, over a period of 5 years, will go out of business but will be replaced by other firms. Further, the Corps considers such benefit studies to be a "snapshot in time."

1/We reviewed only those movements that were moving as of 1975 or expected to be moving by an alternate transportation mode by the end of 1980.

The Corps also pointed out that shippers not included in Kearney's study have expressed interest in the waterway and that new movements not in the traffic base have been identified. We identified several companies not included in the traffic base that could potentially use the waterway, but we did not determine specific commodities or tonnage amounts.

However, since over 50 percent of the movements we reviewed have not occurred as projected by Kearney, their estimating practices may have been too liberal. To accurately determine this would require a thorough analysis of the Kearney study or possibly a new benefit-cost study. Either option would involve lengthy studies--possibly longer than 1 year.

We selected 17 of the largest movements, representing $77.5 million of the $116.6 million in average annual navigation benefits included in the fiscal year 1982 budget request, and 16.1 million tons, or 57 percent, of the projected 1986 tonnage for additional review. Kearney had classified 11 of these movements as current; that is, already moving by an alternate mode at the time of its study in 1975, and 6 as future movements that were expected to materialize by the end of 1980. It was anticipated that all 17 of these movements would utilize Tenn-Tom when it opens.

None of the six future movements had materialized by February 1981. Of the 11 current movements, we could not locate one company to confirm the information contained in the Kearney file and were told by officials of one other company that the movements had not occurred. In a third instance a company official told us that the movement has not occurred since 1975. Finally, one movement, while occurring, is expected to cease before Tenn-Tom opens for full navigation in 1986. We were unable to determine from Kearney's workpapers the basis for classifying the movement which has not occurred as actually moving in 1975.

A summary of these movements is presented below.

Status of movements	Number of movements	Projected 1986 tonnage	Percentage of projected 1986 tonnage	Projected average annual benefits (note a)	Percentage of average annual benefits (note a)	Percentage of total of sample size	
						Number of movements	Dollar value of movements
		(000 omitted)		(000 omitted)			
Occurring	6	4,282	15	$14,895	13	35	19
Occurring but expected to stop before Tenn-Tom opens	1	601	2	843	1	6	1
Have not materialized	9	10,593	38	59,550	51	53	77
Shipper/ receiver could not be located	1	593	2	2,220	2	6	3
Total	17	16,069	57	$77,508	67	100	100

a/Average annual benefits are based on the Corps' fiscal year 1982 budget submission for Tenn-Tom.

Movements which are occurring

In early 1981, 6 of the 17 movements, totaling 4.3 million tons of the projected 1986 tonnage and $14.9 million of the 1982 average annual navigation benefits, are being transported via rail or an alternate waterway. The six movements are described below. (Tonnages shown were amounts used in the Kearney study.)

--Three chemical movements, totaling 124,000 tons each, originate in Louisiana and travel to Mississippi. These movements are being transported via rail.

--Two coal movements in the amount of 1 million tons and 300,000 tons 1/ originate in Illinois and travel to Florida. These movements are transported via barge on the Ohio and Mississippi Rivers.

--One 225,000-ton movement of metal is transported from Louisiana and south Alabama via barge on the Mississippi, Ohio, and Tennessee Rivers to north Alabama.

Movement which is occurring but expected to stop before Tenn-Tom opens

The Kearney study included a 450,000-ton movement of metal from Alabama to Tennessee that is presently occurring at about half the tonnage rate Kearney used and is expected to stop before Tenn-Tom opens in 1986. Kearney's workpapers show that in 1975 a company official initially declined to estimate tonnage or speculate on movements that might move on the waterway because of available alternate supply points and changing supply-demand situations. The official later provided tonnage data but cautioned that the supply point for the Alabama-to-Tennessee movement would change in 10 to 20 years (from 1975) and the movement would cease. The Kearney study included benefits for this movement from Tenn-Tom's opening in 1986 through 1991.

Company officials told GAO in April 1981 that this movement is presently occurring at about half the tonnage rate projected by Kearney in 1975 and that the movement will stop completely within the next 5 years. A company official said the movement to Tennessee will then originate on the east coast. This movement represents 601,000 tons of the projected 1986 tonnage and $843,000 of the 1982 average annual navigation benefits.

1/Contract amendment reduced the tonnage amount for this movement from 900,000 tons to 300,000 tons.

Movements which have not materialized

We identified nine movements which have not materialized, although company officials for four of the movements said they could potentially use Tenn-Tom when it is completed. These nine movements represent 10.6 million tons of the projected 1986 tonnage and $59.6 million of the 1982 average annual navigation benefits. As discussed below, these movements have not materialized for various reasons. (Tonnages shown were amounts used in the Kearney study.)

--A 1.2-million-ton coal movement from Kentucky to various locations in Alabama did not occur. The company recently filed for reorganization under chapter 11 of the Bankruptcy Act. This movement was predicated on the assumption that the company would open a mine in Kentucky, but the mine was not opened.

--Another coal shipment from Illinois to Alabama has not materialized for two reasons. In 1976 the coal supplier informed the shipper that he could not supply the required contract amount of 1.4 million tons. Also, the receiver could not burn the high sulphur Illinois coal because of air pollution concerns. This company is presently receiving its coal from Alabama mines.

--A 1-million-ton movement of coal was based primarily on the opening of coal reserves in Tennessee. However, a company official said these reserves have not been developed and he would not state whether they will be developed. The official stated that he could not speculate on movements or tonnage that may move on Tenn-Tom; however, the possibility of using Tenn-Tom when completed does exist.

--A 250,000-ton coal movement scheduled to move from Tennessee to Alabama has not taken place due to several business reasons. A company official would not elaborate on these reasons. He stated that the movement is still expected to take place and may be barged via Tenn-Tom, but he could not be specific about the expected date of the movement.

--Kearney's study also included a 100,000-ton movement of chemicals from Alabama to Tennessee. A company official stated that this movement has not materialized due to changes in the company's long-range plans. The company, according to this official, had plans at the time of Kearney's study to build a plant in Alabama which would have provided easy access to Tenn-Tom. The official stated that, due to financial difficulties, the plant will not be built.

--A 50,000-ton movement of a chemical from Minnesota to Mississippi has not occurred and a company official stated that she does not know whether it will. She also said that if Tenn-Tom were available, the company would use the waterway to barge chemicals from Florida to Alabama. Another official stated that the company is extremely optimistic that Tenn-Tom will provide new opportunities for this company. Neither official would attempt to identify specific movements or tonnage that may utilize the waterway.

--A 287,000-ton movement of ore from Tennessee to Alabama did not materialize. A company official stated that movement of ore from Tennessee to Alabama is included in the company's long-range plans and will be barged via Tenn-Tom if the waterway is completed when the movement materializes. However, he would not speculate on the tonnage amount or the anticipated date that this movement could be expected to start.

--A 100,000-ton coal movement and a 2.4-million-ton coal movement which originate in Tennessee and move to Alabama and/or Louisiana were included in Kearney's traffic base. These movements will not occur as the companies are no longer in business.

Information on the remaining movement was not obtained because the shipper/receiver involved could not be located to confirm the information contained in the Kearney file. The directory assistance and chamber of commerce in the city did not have a record of this company. This movement represents 593,000 tons of the projected 1986 tonnage and $2.2 million of the average annual navigation benefits in the 1982 budget request.

Corps position on movements in Kearney study

The Corps' navigation benefit estimate submitted to the Congress each year since 1976 has been based on the 121 movements identified by Kearney. In providing the Congress with the annual estimate of project benefits, the Corps uses the 121 movements without analyzing the current status of these movements. The Corps deletes only those movements, seven in the latest estimate, 1/ which no longer show the minimum savings after transportation rates are updated--whether a movement has or has not materialized is not a factor in these calculations. The Corps also does not add any new movements that have been identified. The Corps' position on including movements in the benefit base was presented

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1/The deleted movements can vary from year to year depending on changes in transportation rates. A movement could be deleted one year and reappear the next year.

in a September 1980 report by the Subcommittee on Energy and Water Development, Senate Committee on Appropriations:

> "The purpose of interviews is to establish base year traffic which might use the Tenn-Tom. It is not a marketing study of the future prospects for a specific, given firm. It is fully to be expected that some firms, over a period of 5 years, will go out of business, and some will come in; and that specific plans and opinions may change."

The report also pointed out that shippers not included in the Kearney study have expressed interest in Tenn-Tom and new movements not in the traffic base have been identified.

The Department of Transportation in a June 1980 study predicted substantial growth in both the Nation's export coal market and in the amount of export coal handled by the Port of Mobile. Since Tenn-Tom will service some of the Nation's leading coal producing areas, it would be reasonable to assume that some of this increase would impact on Tenn-Tom. We identified potential Tenn-Tom users that were not included in the Kearney base, particularly coal shippers. However, we did not attempt to determine the quantities and potential savings for these shippers, since to accurately do this would require a lengthy and extensive effort.

While the "snapshot in time" is an acceptable framework for measuring navigation benefits, one cannot assume that the movements that do not materialize will be exactly offset by new movements. This becomes especially critical when a few movements account for a large percentage of the benefits and they do not occur as projected, as was the case in the Kearney study. GAO believes when this happens the estimating practices may have been too liberal. Consequently, the study on movements would have to be completely updated to have a more recent and accurate picture of movements.

QUESTION

> Did the Corps include movements in the benefit base when data indicated such movements would never materialize?

ANSWER

While we have some questions about six of the movements, we do not have sufficient basis to say conclusively they should not have been included in the benefit base. One of the basic criteria established by Kearney was that a movement would be included only if there were definite plans to move a particular commodity tonnage from a specific origin to a specific destination. We reviewed Kearney's supporting workpapers to determine the basis for including 18 of the largest movements--the 17 previously mentioned and 1 scheduled to start in 1981--in the benefit base. Our review indicated that inclusion of six of the movements was questionable for the following reasons:

--Some movements were not based on "definite" company plans to move a particular commodity from a specific origin to a specific destination.

--Tonnage amounts for some movements could not be verified against Kearney's supporting workpapers.

Kearney included movements in the projected traffic base on the basis of information provided by shippers/receivers in questionnaires and interviews and Kearney's analysis of these movements. The Kearney Project Manager said the decision to include current movements in the base was based on whether the shipper/receiver would realize a savings by shipping on Tenn-Tom, not whether the shipper/receiver said it would use Tenn-Tom. Future movements, according to Kearney's Project Manager, were included when the company (1) had definite plans to move the commodity before Tenn-Tom opened and (2) would realize a savings by using the waterway. The rationale, according to this official, was that a shipper/receiver will always use the cheapest method to move commodities. Therefore, even if shippers/receivers did not state that they would use Tenn-Tom when it is completed, Kearney felt that if they would realize a savings, they would undoubtedly use the waterway.

These six movements are discussed below:

--Kearney workpapers show that a 1-million-ton coal movement from Tennessee to Alabama scheduled to start in 1977 was contingent on the opening of coal reserves in Tennessee. Kearney's workpapers also show that this company had not decided to develop these reserves and did not have customers for the coal. In an interview with us a company official stated that the reserves have not been developed and that the company does not have active plans to develop them. He added that if these reserves are developed, it will be approximately 5 to 8 years before a movement will materialize. He said the company is currently moving coal to Florida via the Mississippi River and the Gulf Intracoastal Waterway. Although the company presently does not have plans to use Tenn-Tom, the possibility does exist. This movement represents about $3.8 million of the average annual benefits included in the Corps' 1982 budget submission for Tenn-Tom.

--The Kearney study also included a current movement of 450,000 tons of metal from Alabama to Tennessee although a company official cautioned that the movement might stop before Tenn-Tom opened. Kearney workpapers show that in 1975 a company official initially declined to estimate tonnage or movements, citing availability of alternate supply points and the company's changing supply-demand situation. In an interview with Kearney later in 1975 this official provided tonnage data but noted that the supply point for the Alabama-to-Tennessee movement was

expected to change in 15 to 20 years (from 1975). However, in another interview 1 month later this official said that in 10 to 15 years the Alabama-to-Tennessee movement would cease. The tonnage amount for this movement could not be verified from Kearney's workpapers.

Kearney included the benefits for this movement from Tenn-Tom's opening in 1986 through 1991. The same company official told GAO in April 1981 that the Alabama-to-Tennessee movement is scheduled to stop within the next 5 years--before Tenn-Tom's scheduled opening in 1986.

Projected average annual benefits for this movement are approximately $843,000 of the Corps' 1982 budget submission for Tenn-Tom.

--Kearney included data on three coal movements totaling 3.3 million tons. These movements were based on a 2.6-million-ton contract which was to be shared by two utility companies. Benefit calculations were based on two movements totaling 1.9 million and another movement of 1.4 million tons--a total of 3.3 million tons, or 700,000 tons more than the contracted amount. Kearney's Project Manager said that these two companies indicated a need for the additional 700,000 tons and Kearney assumed the companies would obtain the coal from another supplier, using Tenn-Tom to move the coal. These three movements represent approximately $25.3 million of the average annual benefits in the Corps' 1982 budget submission for Tenn-Tom. The portion of the benefits represented by 700,000 tons would depend upon which of the three movements would be reduced for this amount.

--Another movement of 1.5 million tons of coal scheduled to begin in 1981 was included in the traffic base. Although the shipper, when contacted by Kearney in 1975, refused to provide a definite tonnage and point of origin, he told Kearney that he would "like" to ship 2 million tons to Mobile. Kearney decided to use 1.5 million tons and two possible origins for benefit calculation purposes. When recently contacted, a company official told us that this movement will not materialize and that the company has no plans to utilize Tenn-Tom. This movement represents approximately $5.1 million of the average annual benefits in the Corps' 1982 budget submission for Tenn-Tom.

QUESTION

In an analysis of Corps assumptions, examine the basis of the assumptions and determine whether they were reasonable at the time.

ANSWER

Although there were many assumptions that were made during the benefit study, we were asked to review only three assumptions. They are:

--Barge tow speeds on Tenn-Tom.

--Spot rate coefficient.

--The use of a 10-percent contingency factor.

Barge tow speeds would be 4.3 mph rather than 4.0 mph

The methodology used and factors considered by the Corps to estimate 4.3 mph as the barge tow speed seem reasonable. This speed was derived from a mathematical calculation by assuming that a trip on the entire waterway would take 104 hours. We believe that the assumptions used to determine the 104 hours were reasonable, and we have no basis on which to disagree with the validity of the estimate.

Kearney initially developed its study on project benefits using average tow speeds of 4.0 mph. According to the Kearney Project Manager, this determination was based on the review of tow speeds on other waterways and on professional judgment. He commented, however, that the 4.0 mph was a preliminary figure. We also noted that Kearney's initial benefit calculations were based on a waterway length of 470 miles from the Tennessee River at Pickwick Pool to Mobile.

The Kearney Project Manager said that subsequently the Corps advised him that the total waterway mileage would be about 21 miles less, primarily because the Corps planned to eliminate some river bends and use cutoffs to shorten the distance. He noted that as a result of the reduction of miles and based on more detailed professional review, Kearney decided to use average tow speeds of 4.3 mph instead of 4.0 mph.

In discussing the rationale for the change in average tow speeds, the Executive Assistant said the change in speeds resulted from a discussion lasting several days between the Corps and Kearney. He commented that the average tow speed is based on a mathematical calculation using the allowable trip time of 104 hours and a waterway length of 449 miles. The 104 hours represents the time it takes to move through the waterway and was estimated by taking into account locking time at each lock, a 2-hour delay at each lock, and waterway travel time. Locking times were determined by estimating approach time, entrance time, and departure time. To derive the 4.3 mph speed, the waterway length of 449 was divided by the allowable trip time of 104 hours. The Executive Assistant emphasized that the Corps did not dictate to Kearney that it use 4.3 mph as the average tow speed in its study.

Both the Kearney Project Manager and the Corps' former Chief, Economics Branch, Planning Division, Mobile District, stated that the higher average tow speed did not significantly affect the navigation benefits. The Corps official also stated that the Corps has not performed any calculations to determine the impact of the higher average tow speed on benefits.

To determine the impact of average tow speeds on benefits, we calculated the benefits, using 4.0 mph average tow speeds, for 16 of the 17 movements reviewed. Kearney did not use the average tow speed in calculating benefits for the remaining movement. Using Kearney's formula, except for substituting 4.0 mph for 4.3 mph, we found navigation benefits for these 16 movements to be $30.3 million in 1986. The Kearney study showed navigation benefits for these same 16 movements to be $32.3 million in 1986.

Spot rate coefficient for unregulated barge rates was reduced from .040 to .034

Kearney used professional judgment in deciding on .034 as the spot rate coefficient for the Tenn-Tom Waterway. Part of the change can be attributed to a reduction in waterway mileage after the .040 was calculated. Such a change would lower the spot rate coefficient. We have no reason to question the .034 rate Kearney used. Further, only about 2 percent of projected 1986 navigation benefits were affected by the spot rate coefficient and our calculation showed that the change from .040 to .034 would have only minor impact on the projected benefits.

Spot rate coefficient is a waterway adjustment factor and is stated in terms of the estimated cost per ton-mile to barge on a particular waterway. For example, it is made up of a number of factors and essentially is used to account for anticipated differences, such as river current speed, density of traffic, etc., between barge operating conditions on Tenn-Tom and other waterways. Our analysis of the Kearney study showed that the spot rate coefficient for unregulated barge rates was used in calculating benefits for 36 of the 121 movements. These movements represent about 1 million, or approximately 4 percent, of the 1986 tonnage and about $2.4 million, or approximately 2 percent, of the projected 1986 navigation benefits.

The Kearney Project Manager told us that the .040 spot rate coefficient was a preliminary figure and that the final .034 spot rate coefficient is the best rate based on Kearney's professional judgment. He commented that the Corps' reduction of the waterway's length by 21 miles was one of the reasons the spot rate coefficient was changed.

According to the Kearney Project Manager, the reduction in the spot rate coefficient from .040 to .034 did not significantly change the navigation benefits.

Only 1 of the 17 movements we reviewed used the spot rate coefficient for unregulated barge rates. We calculated the impact of the change by substituting .040 for Kearney's .034 but keeping all other factors the same. Our calculation showed that 1986 navigation benefits for this one shipment would be $477,855 using a .040 spot rate coefficient. Using a .034 spot rate coefficient, Kearney calculated 1986 navigation benefits for this same shipment to be $492,285.

A 10-percent contingency factor was added to traffic and savings

Kearney included a 10-percent contingency factor to account for unidentified shippers and small movements. Past Corps practice has been to add a contingency factor when the Corps considers a navigation study as not being extensive. Considering the large geographical area of potential Tenn-Tom users, it seems reasonable that a study such as Kearney's would not identify all potential shippers. Although a 10-percent factor was used on other waterways, we do not know if it is the appropriate percentage for Tenn-Tom. The determination of the percentage is strictly judgmental.

After determining the total tonnage and savings for the 121 movements, Kearney added a 10-percent contingency factor. The contingency factor added approximately $5 million to 1986 projected navigational benefits. According to the Kearney Project Manager and the former Chief, Economics Planning Branch, Mobile District, contingency factors are commonly used to account for unidentified traffic and small movements. Both officials said the decision to use a contingency factor and the exact percentage was based on professional judgment.

The Corps' ER 1120-2-114, which covers the calculation of benefits, is silent on the use of a contingency factor. In reviewing other waterway studies, we noted that a 10-percent contingency factor was used in calculating navigational benefits for projects on the Trinity River in 1968, the Red River in 1968, and the Coosa River in 1977.

We noted, however, that the Corps did not include a contingency factor in the Cross Florida Barge Canal Study. The reason it was included in Tenn-Tom but not in Cross Florida was pointed out to the Subcommittee on Water Resources, Senate Committee on Environment and Public Works, in July 1980. The Chief, Economics Section, Planning Division, Office of the Chief of Engineers, stated, in essence, that because the traffic analysis in the Cross Florida Barge Canal study was extensive, a 10-percent contingency for undisclosed traffic was not appropriate.

QUESTION

Are project benefits based on operating 24 hours per day, 365 days per year? Were provisions included for maintenance downtime?

ANSWER

The Corps did not base project benefits on operating 24 hours per day, 365 days per year. A provision for maintenance downtime was included in the capacity calculation, although the exact amount was not shown. (See p. 32 for definition of "capacity.")

The consultant responsible for determining project capacity said that he reduced the capacity determination for the waterway to account for the times when the locks would be unavailable. He said no specific factor for lock downtime was used in the capacity calculation. He explained that reducing the capacity determination allows for provisions such as maintenance downtime for locks, repairs to locks due to accidents, and refleeting barges. He said he was deliberately conservative in his capacity estimate to allow for such provisions.

According to the Executive Assistant to the Mobile District Engineer, because this conservative capacity estimate was used, the navigation benefits were not based on operating 24 hours per day, 365 days per year. Our review of Corps data showed that it was not assumed that the locks would be available 24 hours per day, 365 days per year and that provisions were allowed for maintenance downtime.

QUESTION

Are benefits based on eight-barge tows or has a mix of tow sizes been included? If not, what would be the result of mixing tow sizes?

ANSWER

In determining project benefits, Kearney made an economic assumption that all movements on Tenn-Tom north of Demopolis would be eight-barge tows and south of Demopolis they would consist of six-barge tows. 1/ Neither the Corps nor Kearney have studied in detail the impact of mixing tow sizes on project benefits.

1/Since this is an economic assumption (which was made for ease of calculation), it does not mean that Kearney expected all movements to be either eight- or six-barge tows. The Corps expects tow sizes to vary from eight downward.

Kearney originally considered using 15 barges as the typical tow size from the Tennessee River to Demopolis. The Kearney Project Manager said that this tow size was based on knowledge of the inland waterway system and discussions with waterway industry personnel. A 15-barge configuration was then discussed with the Corps. According to the Kearney Project Manager, Corps personnel stated that eight barges would be the optimum tow configuration since the locks above Demopolis are designed for eight barges plus one towboat. The Kearney Project Manager stated that, based on Kearney's experience with waterway operations and discussions with waterway industry and Corps officials, Kearney made a professional judgment that eight barges would be the typical tow size--not the minimum or maximum tow size, but the typical tow size.

Kearney then developed navigation benefits based on eight barges for all movements from the Tennessee River to Mobile. According to the Kearney Project Manager, benefits were based on the assumption that certain improvements would be made below Demopolis. When Kearney was told by the Corps that the authorized waterway would not include improvements below Demopolis, Kearney recomputed the navigation benefits based on the configuration of eight barges north of Demopolis and six barges south.

Neither the Corps nor Kearney have studied in detail the effect on project benefits of mixing tow sizes. For example, they do not know what the ultimate result would be if the 121 movements were each based on varying tow configurations instead of one specific size. The Executive Assistant pointed out that if less than eight barges were used from the Tennessee River to Demopolis, one could not assume the benefits would automatically decrease. He noted that with six or less barges it might be possible to use smaller tow boats and avoid refleeting at Demopolis, thus increasing savings and benefits.

AGENCY COMMENTS AND OUR EVALUATION

In this section we have summarized the major points made on benefit calculations by the Army and A. T. Kearney, Inc., in their comments on our draft report. Their complete comments along with our response are contained in appendixes II and VII.

The Army takes the position that the relevant issue in navigation benefits is not whether projected waterway movements actually materialize, but rather whether the Corps used the appropriate economic estimating procedures. The Army noted that, in estimating navigation benefits, the Corps used procedures accepted by knowledgeable navigation economists in making user surveys; that is, the concept of a "snapshot in time." The Army concluded that the Kearney survey is without significant flaw.

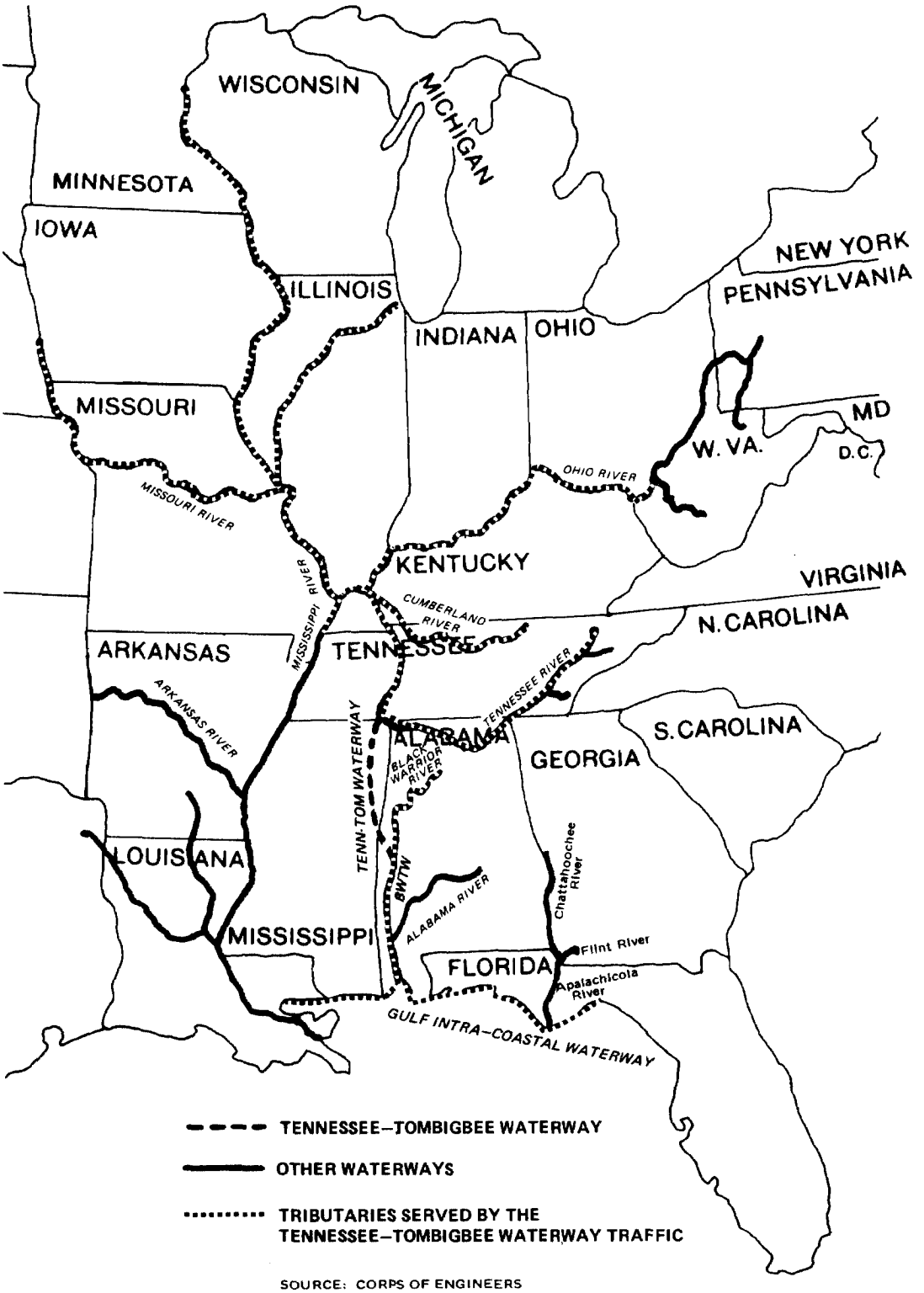
In commenting on our report, A. T. Kearney, Inc., said that its study dealt exclusively with estimating navigation benefits and that the Corps accepted its work as fully professional in meeting all requirements of their contract. Kearney expressed concern that a number of the questions imply that results of its work can be interpreted in a manner which is inconsistent with the methodology required under Corps regulations. For example, while several key questions deal with "predicted" movements, Kearney did not predict any specific movements that would materialize. Rather, Kearney based benefits on information provided by survey respondents and updated this information to the project's starting year (1986). Thereafter, Kearney projected benefits for the life of the project.

Kearney also reiterated the position expressed by the Army; that is, that the fundamental question is whether the Corps' methods provide reasonable total project benefit estimates for the Congress to consider when making its decision to approve and fund investments for navigable waterways. In Kearney's view the question is not whether specific movements occur or not but that many changes in specific movements can be anticipated since both the project planning phase and the project life extend over decades.

While we agree that the "snapshot in time" is an acceptable framework for measuring navigation benefits, we are concerned with the number of movements that have not materialized. The issue of movements that have not materialized is especially critical when a few movements account for a large percentage of benefits and they do not occur as anticipated by Kearney. We believe that when this happens the estimating practices may have been too liberal.

We do not agree that the questions raised by the congressional requestors imply that the results of Kearney's work can be interpreted in a manner inconsistent with the work methodology. The questions were raised to obtain information on how the study was conducted and what has happened. Both are valid concerns.

POTENTIAL TENNESSEE-TOMBIGBEE SERVICE AREA



SOURCE: CORPS OF ENGINEERS

CHAPTER 3

PROJECT CAPACITY

BACKGROUND

The term "capacity" as used by the Corps in waterway navigation studies does not represent the largest tonnage that can possibly move through a system. Rather, it represents the amount of tonnage expected to move under a certain set of assumptions --usually called the anticipated operational pattern. Components of the operational pattern which influence the capacity can include the following:

--Average locking time.
--Average tow size/configurations.
--Average tons per tow.
--Percent of empty return tows.
--Average lock downtime per year.
--Availability of lockage water.
--Seasonal traffic flows.
--Waterway operating policies.

Within certain physical, practical, or economic constraints, capacity can be altered by modifying the assumptions or the "data" upon which its determination was based. An example would be to assume that some of the barges projected to return empty actually returned full. On this basis the capacity would be increased without changing the number of lockages (trips through locks). The sensitivity of capacity to the various assumptions and/or methods of computation depends upon (1) the influence that a particular assumption has on the computational method and (2) the range within which the assumption can be expected to vary. Obviously, physical and practical limits exist, but the variables can greatly alter the determination of capacity even within these limits.

QUESTION

What will be the impact of Tenn-Tom traffic on Black Warrior-Tombigbee Waterway (BWTW) traffic growth? Were projected increases in BWTW traffic taken into consideration in benefit calculations?

ANSWER

The Tenn-Tom traffic will have a definite impact on BWTW traffic growth. The Corps had projected that, without Tenn-Tom, unconstrained BWTW traffic south of Demopolis would reach 42.3 million tons in 2035. (BWTW traffic is limited to 25 to 30 million tons by the Bacon Oliver Lock capacity north of Demopolis. The Corps is studying the possibility of expanding this lock.) In calculating Tenn-Tom benefits, the Corps limited BWTW traffic to a maximum of 15 million tons.

BWTW consists of the Black Warrior River from the Birmingham, Alabama, area to Demopolis, Alabama, and the Tombigbee River from Demopolis to Mobile, Alabama. Tenn-Tom traffic will enter BWTW near Demopolis--about 217 miles north of Mobile--and thus the two waterways share a common route south to Mobile.

Geographical features of the waterway south of Demopolis, along with the locks at Demopolis and Coffeeville, Alabama, limit waterway traffic. Corps studies of the waterway south of Demopolis show a capacity of 44 million tons unless further improvements are made. Improvements to the waterway and to increase lock capacity are estimated to cost $960 million--$323 million (Oct. 1979 dollars) for construction and $637 million for inflation to the end of the estimated construction period in 1997. The Congress has not authorized these improvements. According to the Corps, the waterway south of Demopolis will reach capacity in 1991--29 million tons from Tenn-Tom and 15 million tons from BWTW.

The navigation benefits computed by Kearney reflect the capacity limitations by assuming that Tenn-Tom and BWTW traffic will remain constant at 29 and 15 million tons, respectively, from 1991 through 2035. The Corps has also considered this limitation in its annual update of navigation benefits submitted to the Congress. However, for the last three annual updates the Corps further limited BWTW traffic due to an incorrect interpretation of a capacity study. The Corps updates have limited BWTW traffic to 12 million tons, in lieu of the 15 million tons used by Kearney, and accordingly have assumed Tenn-Tom traffic to be 32 million tons. This assumption has overstated the traffic allocated to Tenn-Tom and its resulting benefits. Correction of this error in the fiscal year 1982 budget submission reduced Tenn-Tom navigation benefits by about $4.5 million.

Projected BWTW traffic

A Corps study, made in 1973 and provided to Kearney for use in its study, projected unconstrained BWTW traffic at

--13.7 million tons in 1986, the year Tenn-Tom is scheduled to open;

--15 million tons in 1991, the year the waterway south of Demopolis is expected to reach capacity;

--20 million tons in 2000;

--26.3 million tons in 2010;

--32.7 million tons in 2020; and

--42.3 million tons in 2035, the end of Tenn-Tom's 50-year economic life.

The Bacon Oliver Lock and Dam on the Black Warrior River north of Demopolis has an estimated capacity of 25 to 30 million tons, and BWTW traffic will be restricted at that level unless additional lock capacity is added. The Corps is currently studying the possibility of expanding the Bacon Oliver Lock, and its draft report on this study is expected to be completed about February 1982.

Recent data shows that traffic growth on BWTW is exceeding projections. BWTW traffic south of Demopolis reached 15 million tons in 1980, the amount the Corps projected for 1991, and the Warrior Tombigbee Development Association projects increases of 2 million tons per year for 1981 and 1982. The Corps recently completed a traffic survey of BWTW and is in the process of preparing new BWTW traffic projections. A draft report, including these projections, is expected to be completed by the Corps' Mobile District around February 1982.

Impact of Tenn-Tom on BWTW

The Corps' Tenn-Tom navigation benefit calculations do not show the specific impact of Tenn-Tom traffic on BWTW. For example, when the 44-million-ton capacity of the waterway south of Demopolis is reached, there is no indication whether additional BWTW traffic will be directed to an alternate mode or will displace projected Tenn-Tom traffic.

If BWTW traffic were allowed to increase as projected by the 1973 study and if Tenn-Tom benefits were limited to remaining capacity not used by BWTW, the 1.08 to 1 benefit-cost ratio reported to the Congress in 1976 would have been reduced. Similarly, benefit-cost ratios in subsequent years also would have been reduced. The amount of reduction depends upon whether one uses average per-ton savings for the tonnage that would remain on Tenn-Tom or attempts to identify the specific movements that remain.

Conversely, if BWTW traffic is limited to 15 million tons, as assumed in the Corps' benefits calculations, substantial portions of the projected BWTW traffic would be diverted to another mode. Using the Corps' 1973 BWTW traffic projections, BWTW traffic would be diverted as follows:

Year	Total projected traffic	Traffic assumed in benefit calculations	Traffic diverted
	(millions of tons)		
1980	11.3	-	-
1990	15.0	15.0	0
2000	20.0	15.0	5.0
2010	26.3	15.0	11.3
2020	a/ 32.7	15.0	a/ 15.0
2030	a/ 39.1	15.0	a/ 15.0
2035	a/ 42.3	15.0	a/ 15.0

a/The Bacon Oliver Lock and Dam on the Black Warrior River north of Demopolis has a capacity of about 25 to 30 million tons. We used 30 million because the Corps, in calculating the impact of Tenn-Tom on BWTW, used the larger amount. Therefore, BWTW traffic above this dam is limited to this amount unless the lock capacity is expanded.

The impact of this traffic diversion to an alternate mode has not been calculated by the Corps; however, the Corps is currently making a rate analysis of the cost of transportation modes between various points on BWTW.

The Executive Assistant said that, theoretically, when capacity on a waterway is reached, the shipments with the smallest per-ton navigation savings would be the ones diverted to an alternate mode. He said this tendency suggests that potential traffic from both Tenn-Tom and BWTW would be diverted.

Unconstrained traffic estimates

The following table illustrates the tonnage on the two waterways the Corps estimates would move south of Demopolis if the constraints did not exist:

Year	Tenn-Tom	BWTW	Total
	(million of tons)		
1990	29.1	15.0	44.1
2000	40.4	20.0	60.4
2010	53.8	26.3	80.1
2020	b/ 70.5	a/ 32.7	103.2
2035	b/ 101.0	a/ 42.3	143.3

a/The Bacon Oliver Lock north of Demopolis limits BWTW traffic to 25 to 30 million tons. The Corps is studying a project to eliminate this constraint.

b/The Bay Springs Lock limits Tenn-Tom traffic to 55 million tons.

QUESTION

Will refleeting be required at Demopolis because of restrictions imposed by capacity of the river south of Demopolis?

ANSWER

No. Refleeting will not be mandatory because the Demopolis and Coffeeville Locks have eight-barge capacity and eight-barge tows have moved on BWTW. Whether refleeting occurs or not will apparently depend upon the tow companies.

Corps reports have stated that six-barge is the most efficient tow size 1/ that can operate on the river south of Demopolis; however, Corps reports have also shown that eight-barge tows have traveled on BWTW. The Kearney report assumed that refleeting from an eight-barge to a six-barge tow would be necessary at Demopolis. However, this was an economic assumption for rate analysis and does not mean that Kearney felt that only six-barge tows would move south of Demopolis. The Executive Assistant said that refleeting from an eight-barge to a six-barge tow will be a matter of how barge companies choose to operate.

1/The tow size that can operate best on the river from an engineering and design standpoint, considering the physical characteristics of the river such as bends.

We discussed refleeting with two barge companies that are primary operators on the waterway. The president of one company and the manager of another told us that their companies would not refleet from an eight-barge to a six-barge tow at Demopolis, even though six-barge tows are the most efficient. These officials said that their companies have moved eight-barge tows on the waterway.

Corps traffic statistics show that from October 1979 through May 1980, some tows larger than six-barge have moved south of Demopolis, but they represented less than 1 percent of the tows. (See table on p. 38.)

QUESTION

What size barge tow can operate efficiently on BWTW?

ANSWER

Disagreement exists about the most efficient tow size that can operate south of Demopolis. A six-barge tow is the maximum size that can efficiently operate on BWTW, according to Corps reports and officials of the two barge companies mentioned previously. However, the vice president of another barge company, also a large user of the waterway, told us that a four-barge tow is the most efficient size that can operate on the river. He said problems exist when six-barge, two-way traffic tries to pass because of the width of the barge tows and the river. As shown in the table on page 38, actual tow sizes operating on the waterway vary from one barge to more than eight, with a four-barge tow being the one most frequently used. According to the Executive Assistant, most are four-barge tows because of the physical characteristics of both the Bacon Oliver Lock on the Black Warrior River and the waterway between Demopolis and Birmingham. He said that barge companies' operating patterns have tended to be dictated by these constraints.

The Executive Assistant and the current study manager on the improvements study of the waterway south of Demopolis said that no formal studies have been done on the most efficient tow size for the waterway. The Executive Assistant said that the Corps' determination that a six-barge tow was the most efficient was based on its own experience, considering the operational pattern in effect in 1975, and discussions with towboat operators, firm owners, and managers.

QUESTION

What is the makeup of current traffic on BWTW?

ANSWER

During the period from October 1979 to May 1980 (the latest data available), barge tow sizes on BWTW ranged from one to more than eight. However, four-barge tows accounted for about 50

percent or more of the tow sizes and six-barge or less accounted for more than 99 percent. The following table shows the distribution of barge tow sizes moving on BWTW:

Barge tow size	Coffeeville Lock		Demopolis Lock	
	Number	Percent	Number	Percent
1	178	7.6	145	6.7
2	505	21.6	380	17.5
3	99	4.2	98	4.5
4	1,168	49.9	1,163	53.4
5-6	375	16.0	376	17.3
7-8	5	0.2	7	0.3
More than 8	10	0.4	7	0.3

More than 15 million tons of commerce moved through the Coffeeville Lock on BWTW in 1980. Available data on the distribution of commerce moving on the river during January-May 1980 showed that most of the traffic consisted of downbound coal and upbound iron ore. 1/ The following table shows the amount and percent of the primary commodities that moved through the Coffeeville Lock for that period.

Commodity	Tons	Percent
	(000 omitted)	
Downbound:		
Coal	3,439	55
Nonmetallic minerals	138	2
Crude petroleum	120	2
Other (note a)	449	7
Upbound:		
Iron ore	1,687	27
Crude petroleum	202	3
Other (note a)	224	4
Total	6,259	100

a/ Other traffic includes such commodities as farm products, forest products, waste and scrap materials, chemical products, primary iron and steel products, and manufactured equipment.

1/The Corps did not have the breakdown of the commodities for the total 15 million tons. We used the most recent Corps data available.

QUESTION

The Corps is studying improvements on BWTW. What is the estimated cost of these improvements, and why are they required if Tenn-Tom traffic can be accommodated by BWTW?

ANSWER

In January 1981 the Corps estimated the cost of the improvements on BWTW south of Demopolis at approximately $960 million--$323 million (Oct. 1979 dollars) for construction plus $637 million for inflation to the end of the estimated construction period in 1997. The Corps' Mobile District plans to complete the study in September 1983 and forward it to the South Atlantic Division. Improvements the Corps is studying include bend and channel widening at 27 locations, possible cutoffs to eliminate bends at 15 locations, replacement of four bridges, and construction of duplicate locks at Demopolis and Coffeeville. The Corps study manager said that if the plan he currently envisions is approved, based on the present schedule, construction could be completed by the end of fiscal year 1997. However, he cautioned that there are several "ifs" which could affect approval and possible funding, such as whether the benefit-cost ratio is above unity, whether the environmental impact statement is acceptable, and whether funds will be made available by the Congress. The improvements are required to prevent constraints on the traffic anticipated from both Tenn-Tom and BWTW.

An expansion of an ongoing study of BWTW to include the study of downstream improvements was authorized and funded by the Public Works Subcommittees of the House and Senate Committees on Appropriations in 1976. According to the Chief of the Tenn-Tom Litigation Unit, 1/ the improvement study was initially funded in part with Tenn-Tom construction general funds; however it is now being funded entirely with Corps general investigation funds. He said $419,458 in Tenn-Tom construction funds has been spent on the study. Through fiscal year 1981 an estimated $1.5 million in general investigation funds have been allocated to the study with approximately $1.2 million needed after fiscal year 1981 to complete it.

According to the Corps' 1976 reanalysis of the Tenn-Tom project benefits and costs, the improvements are required to mitigate a constraint on project capacity early in the project's useful life. The Tenn-Tom economic reanalysis showed that the waterway would reach a capacity of 44 million tons in 1991, because the physical characteristics of the waterway south of

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1/A temporary special unit established in 1977 at the Corps' Mobile District to provide technical support to the Department of Justice for ongoing litigation concerning Tenn-Tom and to coordinate litigation matters with other organizations.

Demopolis would constrain traffic to that level. The economic reanalysis showed that the physical characteristics of BWTW would constrain traffic because of

--limited lock capacity at Demopolis and Coffeeville,

--narrow channel widths,

--bends and curves that hamper efficient traffic flow, and

--narrow widths between bridge supports that limit two-way traffic.

The Executive Assistant told us in February 1981 that the 44-million-ton carrying capacity was based on an assumed operating pattern for both BWTW and Tenn-Tom. He said the operating pattern on BWTW now is different than that assumed in 1975 and that a "current" operational pattern will have to be evaluated as part of the ongoing feasibility study. He guessed that with the operating changes that have occurred since 1975, the capacity may now be greater than 44 million tons; how much greater will depend on the study results. He also said that current operating patterns will undoubtedly influence any recommendation for the congressional authorization for navigational improvements on the waterway south of Demopolis.

QUESTION

Would these improvements be necessary if Tenn-Tom were not put in operation?

ANSWER

No. The projected $960 million project for improvements on the waterway south of Demopolis would not be necessary if Tenn-Tom were not put into operation. The Corps projects that the waterway south of Demopolis without Tenn-Tom would not reach the projected capacity of 44 million tons until after 2035, and then only if the Bacon Oliver Lock on BWTW north of Demopolis is expanded from its current capacity of 25 to 30 million tons. If the Tenn-Tom traffic is included, the Corps estimates projected capacity would be reached in 1991.

QUESTION

How does the Corps intend to fund these improvements? Would it be possible to fund them with operation and maintenance funds?

ANSWER

The Executive Assistant and the Chief of the Tenn-Tom Litigation Unit said the BWTW improvements will be funded through the normal congressional authorization and appropriation processes.

If the BWTW improvement study is found to be economically feasible and environmentally sound, improvements on the waterway would require review and approval by the Congress, both for authorization and funding.

The Executive Assistant stated that operation and maintenance funds cannot be used to fund major modifications to BWTW because they would increase the waterway capacity. He explained that the basis for this requirement is contained in the language of the Locks and Dam 26 court decision (Atchison, Topeka and Santa Fe Ry. Co. v. Callaway, 382 F. Supp. 610 (D.C.D.C. 1974)). In that decision the court held that the Corps may not rebuild a structure merely to meet expected future increases in traffic without congressional approval. According to the Executive Assistant, the Locks and Dam 26 decision applies to the BWTW improvements because the improvements are based on expected increases in traffic. We agree with the Corps' position.

QUESTION

Is the Port of Mobile capable of handling projected Tenn-Tom Waterway traffic? What is the estimated cost of any envisioned improvements?

ANSWER

According to the director of the Alabama State Docks Department, 1/ Port of Mobile facilities are inadequate at this time to handle any of the projected traffic that will result from Tenn-Tom. He noted that the port facilities were already strained to the limit with exports of coal and grain, and several coal shippers have requested additional capacity when it becomes available. A major expansion program is underway to enable the port to handle projected Tenn-Tom traffic.

Tenn-Tom is expected to bring an additional 11.8 million tons of commerce to the Port of Mobile when it opens in 1986 and about 15.2 million tons by 1993 (approximately 42 percent of the total Tenn-Tom traffic). About 70 percent of this traffic is expected to be coal. The director said that the State Docks Department is basing its expansion projections relating to Tenn-Tom on the Kearney study and information provided by the Corps and that these improvements to the port facilities will be financed by State of Alabama bond issues. He emphasized that no Federal funds are involved in the port expansion, although the Corps is studying a project to deepen and widen the navigation channel. This project, which is under review by the Chief of Engineers, is estimated to cost about $360 million. (See p. 44.)

1/The Alabama State Docks are wholly owned by the State.

What are the expansion plans?

The Alabama State Docks Department's expansion program is expected to cost about $140 million. This program will increase coal handling facilities, grain elevator capacity, and dock storage area and improve facilities at the bulk materials handling plant in anticipation of traffic increases, some of which will result from the opening of Tenn-Tom.

Coal handling facilities

The State Docks Department is expanding its coal handling facilities in Mobile Harbor from its present capacity of about 5 million tons per year to 15 to 18 million tons by 1986 when Tenn-Tom is expected to open to traffic. The director said this is the most practical capacity; however, under ideal operating conditions it could reach as much as 23.5 million tons. The present coal facility at McDuffie Island was built in 1975 as part of a phase one expansion at a cost of $16.5 million. 1/

As of February 1981, a phase two expansion is underway at a cost of $15 million. This phase is expected to raise coal handling capacity to 7 to 8 million tons per year and will be completed in late 1981. This expansion includes purchase and installation of loading and discharge equipment, installation of a loop track for handling unit trains of coal, and an increase in coal storage capacity from 450,000 tons to 1.1 million tons.

An additional $40 million expansion of coal handling facilities is planned as part of phase three. It is scheduled to begin early in 1981 and will take about 2 years to complete. This expansion will consist of a second dock and ship berth, high-speed loading and discharge equipment, additional storage pads, a second railcar dump for unloading unit trains, and possibly rail and barge loading machinery to give the McDuffie plant the flexibility to import as well as export coal. The director told us that phase three expansion will increase coal handling capacity to 15 to 18 million tons per year. He added that an average of 84 percent (95 percent in December 1980) of the State Docks' annual throughput of coal is moved by river barge and the State is committed to maintaining a modern and competitive port facility capable of handling any increase in traffic.

Grain elevator

The Alabama State Docks Department's public grain elevator has a construction program underway at cost of $15 million which should increase storage capacity to about 3.1 billion bushels. Planned expansion, at an additional cost of $20 million, will double the storage capacity and provide for loading ships twice

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1/Not included in the $140 million total.

as fast as is now possible by adding a new river berth, high-speed ship loading equipment, and a dust control device. The grain elevator expansion is expected to be completed by late 1983 or early 1984, well before the opening of Tenn-Tom.

Bulk materials handling plant

The bulk materials handling plant, which handles an average of 6 million tons of imported ores per year, including iron ore and bauxite, has been under renovation and refurbishment for the last 3 years. Improvements include the purchase and construction of two unloading towers, with a capacity of 1,500 tons per hour, and other work to repair and upgrade the facility. These improvements are expected to be completed by July 1981 at a total cost of $22 million.

Wharves and warehouse area

Renovation and expansion programs in the general cargo area are underway to improve the State Docks Department's general cargo handling capabilities. These improvements include:

	(000 omitted)
A new lumber warehouse	$ 600
New roll-on/roll-off berth	500
Container crane--pier #2	2,600
Expansion project--pier #2	2,100
Expansion project--pier North C	3,283
Purchase of 143 acres of prime waterfront property	11,000
Additional miscellaneous cost (not specified)	7,917
Total	$28,000

Costs being financed by bond issue

When the Alabama State Docks Department completes its expansion and renovation projects for handling coal, grain, and other bulk commodities, the total cost is estimated to be about $140 million. The expansion costs are being financed by bond issues and State Docks Department general revenue funds.

The director said that continued planning is underway and additional waterfront property has been purchased in case further expansion is needed to handle increased traffic.

Harbor channel modifications

The Corps conducted a feasibility study to consider the need for deepening and widening the existing navigation channel in Mobile Harbor to accommodate larger deep-draft vessels now seeking entry to the port. The Corps' recommendations, which were approved by the Board of Engineers for Rivers and Harbors in February 1981, 1/ provided for enlarging the main navigation channel from its present size of 40 feet deep by 400 feet wide to 55 feet deep by 550 feet wide. As of May 6, 1981, this recommendation is with the Chief of Engineers. The cost of these channel modificatio is estimated at $360 million. The director said this project is not needed as a result of Tenn-Tom traffic but, if approved, would enhance the port's ability to service larger deep-draft vessels.

QUESTION

If improvements are needed, should they have been included in the benefit-cost calculations, and were they?

ANSWER

We believe that the port improvements are an integral part of the waterway and that Tenn-Tom would be ineffective without them. Theoretically, the best method of handling improvements would be to evaluate the entire system as a whole, including port improvements. The best way would be to try to estimate all the costs and benefits and allocate them among the Federal, State, local, and private sectors. The Corps did not follow this approach. However, even though the Corps did not include either costs or benefits of port improvements in its analysis, we feel this was acceptable, since the State Docks Department is a self-sustaining entity.

The Executive Assistant and a supervisory economist, Office of the Chief of Engineers, Washington, D.C., said that the cost of the improvements being made by Alabama at the Port of Mobile was not included in the Tenn-Tom benefit-cost calculation. The officials said that Corps regulations for benefit-cost determination do not require such port improvement costs to be included. The supervisory economist told us that it is a generally accepted practice in navigation and transportation economics not to include such costs. The official further explained that including port improvement costs and resultant benefits would have favored the project because those benefits would have exceeded their costs.

1/The Board of Engineers for Rivers and Harbors was established by the Congress in 1902 and performs an independent review function for the Chief of Engineers on Corps of Engineers civil works projects and programs.

He noted that the Corps assumes that if the State is willing to spend its money to improve the port, then the State must feel that benefits equal or exceed costs.

QUESTION

Are there adequate supplies of recoverable coal reserves available to meet projected shipments over the 50-year life of the Tenn-Tom Waterway?

ANSWER

An estimated 58 billion tons of recoverable coal reserves are located in those States adjacent to the inland waterway system with a potential for movement on the Tenn-Tom. This amount is more than 48 times the coal estimated to move on Tenn-Tom during its 50-year economic life.

According to Kearney's navigation benefit projections, 1.2 billion tons of coal would be shipped on Tenn-Tom over its 50 year economic life--an average of about 23.8 million tons yearly. This 1.2 billion tons is about 2 percent of the 58 billion tons of recoverable coal reserves shown in the U.S. Bureau of Mines' 1976 report for States in proximity to Tenn-Tom. The Kearney benefit projections were predicated on reaching the waterway capacity in 1991 and maintaining that level for the remaining economic life of the project; however, Kearney's projections for coal shipments on the waterway with no constraints would constitute only 3.7 percent of recoverable reserves.

When the Kearney study results showed that a large volume of coal was expected to move on Tenn-Tom, the Corps hired the 3R Corporation of Denver, Colorado, to evaluate the availability of coal reserves in the Tenn-Tom area and the potential demands or markets. That study, completed in October 1978, indicated that adequate coal reserves were available and that a large demand for steam coal was projected for the market area served by Tenn-Tom. The Corps identified eight States as the primary coal supply area, because of their proximity to the inland waterway system, that could provide coal to be transported on Tenn-Tom. (See map on p. 48.) The following table summarizes U.S. Bureau of Mines-estimated coal reserves for these States.

	Demonstrated reserves (note a)	Underground recoverable	Surface recoverable	Total recoverable (note b)
	(millions of tons as of Jan. 76)			
Alabama	2,709	500	477	978
Illinois	67,975	14,831	7,239	22,070
Indiana	10,714	2,013	776	2,789
Kentucky	26,001	4,613	4,321	8,934
Ohio	19,230	3,757	3,084	6,841
Western Pennsylvania	23,297	5,071	678	5,748
Tennessee	965	204	205	409
West Virginia	38,607	7,757	2,631	10,388
Total	189,498	38,745	19,411	58,156

Note: Totals may not add due to rounding.

a/The portion of identified coal reserves to a depth of 1,000 feet and seam thickness similar to those from which coal is currently being mined, generally 28 inches or greater. Total demonstrated U.S. reserves are about 400 billion tons, or about 10 percent of all estimated U.S. coal resources.

b/The portion of demonstrated reserves that can be economically and legally extracted at current prices using current technology.

During hearings before the Subcommittee on Water Resources, Senate Committee on Environment and Public Works (July 1980), it was said that Kearney had projected shipments of Tennessee coal in excess of recoverable reserves. Kearney's benefit calculations show movements originating in Tennessee of about 477 million tons of coal over the life of the project. Bureau of Mines figures show that Tennessee has 409 million tons of recoverable coal reserves. However, a number of the movements from Tennessee originate in the southern counties close to the border of Alabama, a State with 978 million tons of recoverable coal reserves. The Corps pointed out that the Kearney study did not project specific shipments into the future; rather, these shipments comprised base year figures which were used to project waterway movements of coal from the primary coal supply area. The Corps also noted that the primary coal supply area contains recoverable resources many times the projected shipments on Tenn-Tom.

AGENCY COMMENTS AND OUR EVALUATION

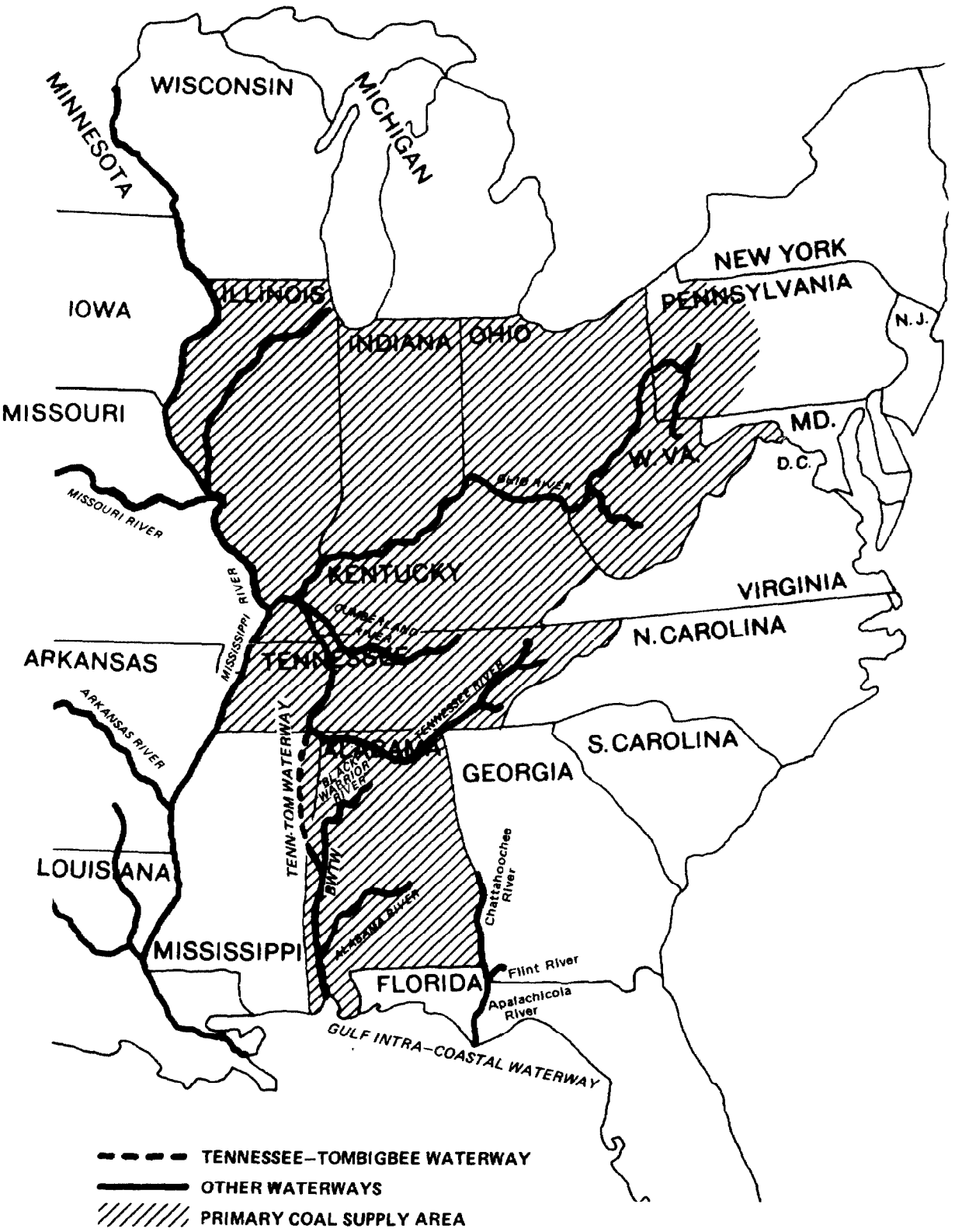
In this section we have summarized the major points made on project capacity by the Army in its comments on our draft report. The Army's complete comments along with our response is contained in appendix II.

The Corps points out that waterway capacity is not a finite limitation but rather is based on a series of assumptions. Modifying the assumptions can change a waterway's capacity. The Corps believes that any discussion of the 44-million-ton capacity should be reviewed in light of changes in operational patterns on BWTW. For example, the 44-million-ton capacity was based on average barge loadings of 2,500 tons per tow, whereas in 1979 and 1980 average loadings were 4,000 tons per tow. According to the Corps this pattern would indicate that BWTW capacity could increase 9 million tons, though the actual increase would be less because of other factors. The Corps is currently preparing a feasibility report that will provide more information on the capacity question.

The Corps also noted that Tenn-Tom is justified on its own merits without any improvements downstream of Demopolis. Further, the ultimate determination of the public interest and the need for Federal investments in downstream modifications rests with the Congress.

As explained on page 32 we recognize that capacity is based on a set of assumptions, and later in the chapter we note that capacity may now be greater than 44 million tons. We also note that the new capacity estimate will not be known until the Corps' current study is completed. We would like to point out that in extensive testimony in July 1980 before the Subcommittee on Water Resources, Senate Committee on Environment and Public Works, the Corps discussed capacity as if it were a finite limitation. For example, the Director of Civil Works commented, "Sir, 1991, is the current projection, that is when the capacity of the waterway below Demopolis will be reached."

PRIMARY COAL SUPPLY AREA



SOURCE: CORPS OF ENGINEERS

CHAPTER 4

COST ESTIMATES

QUESTION

Has the Corps reported estimated cost increases to the Congress fairly and timely? For each cost estimate included in the Corps budget for Tenn-Tom from fiscal year 1973 through fiscal year 1981, determine the date and origin of the estimate.

ANSWER

The Corps annually furnishes budget and project cost information to the Congress for the appropriation process. The budget request submitted for each project is developed during a process of review and adjustment by the Corps, the Secretary of the Army, and the Office of Management and Budget (OMB). Budget data is originally developed by the District, reviewed by the Division, and then at the Office of the Chief of Engineers. The estimated project cost, which accompanies the budget request, is prepared by the District and reviewed and approved by the Division.

The Corps' cost estimate for the Tenn-Tom project has increased from the fiscal year 1973 estimate of $386 million to $1.78 billion for the fiscal year 1982 estimate. 1/ The following table shows the annual amount reported to the Congress and the date the cost figure was developed in the District.

Fiscal year	Amount	Date prepared
	(000,000 omitted)	
1973	$ 386	7-23-71
1974	465	6-22-72
1975	623	12-05-73
1976	815	12-26-74
1977	1,360	12-15-75
1978	1,410	3-01-77
1979	1,410	1-13-78
1980	1,530	6-01-78
1981	1,750	12-19-79
1982	1,780	9-10-80

1/The Corps' estimate refers only to costs that will be financed through the Corps' budget. Additional costs include other Federal, State, and local contributions. These additional costs, approximately $180 million as of January 1981, resulted in the fiscal year 1982 project cost estimate of $1.96 billion.

The following questions and answers concern the fairness and timeliness of the Corps' fiscal year 1976 and 1982 cost estimates.

QUESTION

Evaluate and comment on allegations included in the Army Audit Agency report that the Corps purposely withheld knowledge of cost increases in fiscal year 1975.

ANSWER

Considerable controversy has arisen over the fiscal year 1976 cost estimate. Opponents have claimed that the Corps should have reported costs of more than $1 billion in fiscal year 1976 instead of the $815 million it reported.

At the request of the Assistant Secretary of the Army (Civil Works), the Army Audit Agency reviewed the Tenn-Tom Project and reported its findings on September 17, 1976. While concluding that $344 million of costs was not included in the Corps' fiscal year 1975 budget cost estimate of $815 million, 1/ the Army Audit Agency did not allege that the Corps "purposely withheld knowledge of cost increases."

We agree with the Army Audit Agency's conclusion that the Corps' $1.159 billion estimate was more accurate than the $815 million budget estimate it reported to the Congress. (The source and accuracy of these figures are discussed in detail on pp. 52 to 57.)

QUESTION

Evaluate the latest cost estimate to determine whether there is any reason to suspect it may not be accurate.

ANSWER

The Corps' fiscal year 1982 budget cost estimate for the Tenn-Tom project is $1.78 billion. We believe that this cost is reasonably accurate because (1) a substantial portion of the estimate ($1.4 billion) is committed cost and therefore relatively firm and (2) the Corps now includes allowances for future inflation, which accounted for some large increases in the past. However, the estimate could change if the (1) actual inflation rate differs from the Corps' estimate, (2) the project is modified

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1/The Army Audit Agency erred in reporting this understatement for fiscal year 1975; the Corps reported the $815 million estimate for fiscal year 1976.

or stretched out, (3) fish and wildlife mitigation measures are required by the Congress, and (4) planned future recreation development, not included in current project cost estimates, becomes a reality.

The $1.78 billion estimate was developed by the Corps' Nashville and Mobile District Offices, guided by engineering regulations and annual engineering circulars promulgated by the Department of the Army and by annual instructional letters from Corps Division Offices to each of its District Offices. In developing cost estimates on construction features (locks, dams, recreation facilities, etc.), the Corps prepares detailed plans and specifications which set forth the quantities of necessary construction materials, apply current unit prices to develop a total cost estimate, and add an estimate for future inflation. For items to be purchased (real estate, permanent operating equipment, etc.), the Corps uses current prevailing prices. For overhead costs (supervision and administration, engineering and design), the Corps uses historical cost data (from similar work) prepared at the Office of the Chief of Engineers.

The $1.78 billion estimate consists of committed costs and uncommitted costs. Committed costs represent a relatively firm portion of the estimate and consist of all funds obligated and/or expended to date plus the remaining balance of awarded contracts which may extend into future fiscal years. Uncommitted costs consist of the estimated value of contracts yet to be awarded, plus an estimate of other costs to be incurred such as supervision and administration. As of March 1981, the Corps reported committed costs of $1.4 billion and estimated uncommitted costs to be about $380 million.

Beginning with fiscal year 1981, the Corps included future years' inflation in the Tenn-Tom project cost estimate. This change was made to substantially reduce the annual increases in the cost estimate and to provide a more realistic estimate of the project's cost. From fiscal year 1971 to 1981, the project cost escalated by $1.327 billion (from $323 million to $1.65 billion). According to Corps records, inflation accounted for about $882 million of the $1.327 billion, with design changes (about $361 million) making up most of the remainder. A September 13, 1979, memorandum from the Corps' Directorate of Civil Works required that allowances for future years' inflation be included in the cost estimate. This requirement added $100 million to the fiscal year 1981 estimate, resulting in the $1.75 billion estimate reported to the Congress.

Other potential costs to the authorized project

The Corps' $1.78 billion fiscal year 1982 estimate does not reflect possible fish and wildlife mitigation costs. As discussed in chapter 5, these costs may be added to the project and included in the benefit-cost analysis if the Congress authorizes fish and

wildlife mitigation measures as part of the project. The U.S. Fish and Wildlife Service's report, dated March 17, 1981, recommends the acquisition of 97,000 acres for mitigation purposes and estimates acquisition costs at about $31.5 million (1979 dollars). The Department of the Interior, in commenting on our report, estimated management of existing and additional acres would cost about $625,000 annually.

According to the Corps Project Manager, the Corps' estimate also does not reflect the possible cost of future recreational developments. He said that sites have been reserved on project lands for future recreational development and, if developed, the Corps will bear 50 percent of the construction costs. The Corps has estimated these costs to be $48 million (1980 dollars).

QUESTION

Do Corps regulations stipulate how cost estimates are to be updated each year? Did the Corps comply in the fiscal year 1976 estimate?

ANSWER

Corps regulations specify how cost estimates are to be updated each year. In developing the $815 million fiscal year 1976 budget cost estimate, the Corps generally followed the regulations. However, there were two significant exceptions, apparently based upon the Mobile District's misinterpretation of the regulations.

How the Corps figured the $815 million cost estimate

Project cost estimates are developed by Corps District Offices, using the guidance mentioned on page 51. While the Mobile District Office developed Tenn-Tom's fiscal year 1976 budget cost estimate of $815 million in accordance with then-existing Corps procedures, evidence indicates that those procedures were based on an incorrect interpretation of cost-estimating regulations. On November 17, 1975, the Director of Civil Works notified the South Atlantic Division (which includes the Mobile District) that it had been incorrectly interpreting cost-estimating regulations.

First, the Mobile District Office included the cost estimate from the most recent feature design memorandum 1/ for an individual project feature (not under construction contract) only

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1/A feature design memorandum is a report on an individual project feature (such as a lock or a spillway) which includes construction and cost data based upon recent design, survey, and engineering studies.

if the feature design memorandum had been approved by the South Atlantic Division, unless the feature was scheduled for construction during the upcoming budget period. Corps regulations, however, do not specify Division approval as a prerequisite for including the cost estimate from the feature design memorandum. Approval is required only if the feature design memorandum incorporates a change in the project's authorized scope.

Second, the Mobile District Office used construction price indexes to escalate the cost of features for which there was no recent design memorandum. While allowing the use of indexes, Corps regulations state that the preferred alternative is to escalate costs based on actual prevailing prices.

The Mobile District Office updated Tenn-Tom's total cost estimate several times during 1974. The following table briefly summarizes the development of the $815 million estimate for fiscal year 1976.

Basis of 1976 Fiscal Year Estimate Reported to the Congress

Estimate	Basis of estimate
(000,000 omitted)	
$623	Cost estimate reported to the Congress in Feb. 1974 for fiscal year 1975.
$732	This estimate, submitted to OMB in Sept. 1974, updated prior costs by including current year inflation and cost changes from recently approved feature design memoranda.
$759	This estimate, developed in early Dec. 1974, updated the Sept. estimate by including cost changes from feature design memoranda approved between Sept. and Dec. 1974.
$815	This estimate was reported to the Congress for fiscal year 1976. It was developed on Dec. 26, 1974, adding cost changes from a proposed but unapproved feature design memorandum for the Illinois Central Gulf Railroad relocation scheduled for start of construction during the fiscal year 1976 transition quarter. a/

a/Fiscal year 1976 consisted of 15 months, including July, Aug., and Sept. 1976, which comprised the transition quarter.

According to the Director of Civil Works, the Corps had no reason to question the Mobile District's interpretation of regulations until its effects on the Tenn-Tom project became apparent. The Corps then realized that the cost estimate needed to be reanalyzed because construction costs were escalating more rapidly than previously had been experienced. On June 17, 1975, the Director of Civil Works notified all Corps Division Offices that improvement was necessary in updating and reporting project costs.

QUESTION

At the time the Corps submitted the fiscal year 1976 budget to the Congress, what was its best estimate of the cost, or was the $815 million an accurate estimate?

ANSWER

For fiscal year 1976 the Corps reported to the Congress an estimated project cost of $815 million. In the process of preparing the estimate, the Mobile District Office developed an estimate of $1.159 billion which incorporated actual current prices (as evidenced by recent bid experiences). While the $1.159 billion estimate has proven to be more accurate, the Chief of Engineers has given a number of reasons for reporting the $815 million estimate for fiscal year 1976. We cannot conclude that the Corps should have reported the higher amount. However, when reporting the $815 million to the Congress in January 1975 the Corps could have footnoted the amount to show that it suspected the figure to be low.

The $1.159 billion estimate

During the process of developing the $815 million estimate, the Mobile District experienced higher than anticipated bids for construction (42 percent over the Corps' estimate) and dredging (69 percent over the Corps' estimate). In recognition of these cost increases, the District prepared two additional cost estimates. The District forwarded these estimates to the South Atlantic Division on December 4, 1974.

The first estimate, $1.004 billion, resulted by applying the construction and dredging prices from recent bids to project features scheduled for start of construction during the fiscal year 1976 budget period. The estimate also included the latest estimated cost of one feature (Illinois Central Gulf Railroad relocation) based upon a recently completed, though unapproved, design memorandum.

The second estimate, $1.159 billion, resulted from applying the construction and dredging prices from recent bids to all remaining project features, regardless of scheduled start of construction. As mentioned previously, the $1.159 billion estimate

conformed to criteria in Corps regulations. This estimating process, though further refined, has been used to prepare cost estimates for all subsequent fiscal years beginning with 1977.

Why the Corps reported the $815 million estimate

According to Corps officials, the Corps rejected the $1.004 billion and $1.159 billion estimates and reported the $815 million estimate to the Congress because

- --the $815 million estimate was developed substantially in accordance with past practices;
- --insufficient time was left before budget submission to evaluate the higher estimates;
- --there was an inconsistency in reporting updated costs, based on current price levels, without also reevaluating project benefits; and
- --the higher figures were rejected as unrealistic by the Chief of Engineers.

The Chief, Civil Works Programs Development and Management Branch, Engineering Division, Mobile District, said that the $815 million estimate was reported because it was consistent with past cost-estimating practice.

The Chief, Programs Division, Directorate of Civil Works, Office of the Chief of Engineers, said that the Corps had very little time to adequately evaluate the new estimates. On December 4, 1974, the Mobile District Office forwarded the two higher estimates to the Division. Records indicate that the Division communicated the estimates to the Directorate of Civil Works within the Office of the Chief of Engineers on December 20, 1974. Since January 8, 1975, was the deadline for submitting changes to the fiscal year 1976 budget, officials in the Office of the Chief of Engineers stated that there was not enough time to make an adequate evaluation.

The Chief, Programs Division, Directorate of Civil Works, Office of the Chief of Engineers, has stated that the Corps did not want to report a higher cost estimate based on current price levels without a comparable evaluation of project benefits. Without updating benefits and costs based on current prices, the resulting benefit-cost ratio would have been inaccurate. In early January 1975, during the fiscal year 1976 appropriation hearings, the Corps notified the Congress that it had initiated an economic reanalysis, including studies of both costs and benefits, which would be available in January 1976. However, the Corps did not disclose that the $815 million cost estimate may have been understated.

Based on his knowledge of general price escalation nationwide the Chief of Engineers stated in a deposition that in his opinion the higher estimates were unrealistic. Specifically, he said:

> "* * * I wasn't going to go with the billion or the billion-159, because in my judgment SAD was overemphasizing the importance of the Aliceville bidding. * * * But, I am sitting up here looking at the entire United States and I don't believe we can afford to adopt as a principal /sic/ the unusually high bids at Aliceville."

The Director of Civil Works stated that, while all of the above factors probably influenced the decision to report the $815 million cost estimate, other factors were involved. In addition, the Chief of Engineers has stated that he was personally responsible for making the final decision to report the $815 million cost estimate.

QUESTION

> Did the Corps update the estimate prior to appropriation hearings? Was the updated estimate accurate? When did the Corps report this increase to the Congress and was it early enough to receive full consideration by the appropriate subcommittees of the House and Senate?

ANSWER

After the Corps reported the fiscal year 1976 budget cost estimate of $815 million to the Congress in January 1975, but before appropriation hearings, the Corps had the opportunity to verify the $1.159 billion estimate. In addition, the Project Manager, Mobile District Office, prepared several other cost estimates. Each estimate, prepared by applying actual prevailing costs, exceeded $1 billion. Although the Corps had ample opportunity to report these estimates during congressional hearings in February, March, and July 1975, it did not do so until August 1975 and then the Corps informally advised the Chief Clerk, Subcommittee on Public Works, Senate Committee on Appropriations, 1/ that estimated costs would be $1.4 billion. We believe the Corps should have advised the Congress sooner about the escalating project cost, preferably during hearings or in writing.

The Mobile District Office prepared at least two cost estimates after the fiscal year 1976 budget cost estimate of $815 million was reported to the Congress: $1.23 billion in April 1975 and $1.40 billion in July 1975. These estimates, like the

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1/Currently called the Subcommittee on Energy and Water Development.

$1.159 billion, incorporated current costs and thus conformed to criteria in Corps regulations. According to the Project Manager, records show that the $1.23 billion estimate was discussed in the Office of the Director of Civil Works in May 1975. The $1.4 billion estimate, reported informally by the Chief of Engineers, was later reduced through refinements and became the basis for the $1.36 billion fiscal year 1977 budget cost estimate reported to the Congress. The fiscal year 1977 estimate, submitted in January 1976, was the first formal notice to the Congress that Tenn-Tom's estimated cost would exceed $1 billion.

We believe the Corps had sufficient opportunity to formally notify the Congress of the higher cost estimates during appropriation hearings. The Subcommittee on Public Works, House Committee on Appropriations, conducted hearings for the Corps' fiscal year 1976 budget in late February 1975. The Subcommittee on Public Works, Senate Committee on Appropriations, conducted similar hearings in early March 1975 and held a recall hearing on July 29, 1975. We found no evidence that the Corps gave any indication at those hearings that it had estimates showing costs well over $1 billion.

In August 1975, the Corps notified a congressional staff member that the project's cost would increase to $1.4 billion. The Chief of Engineers stated that he told the Chief Clerk, Subcommittee on Public Works, Senate Committee on Appropriations, that the most recent project cost estimate was $1.4 billion. We found no evidence that the Corps reported that estimate to the Subcommittee on Public Works, House Committee on Appropriations before passage of the Corps' fiscal year 1976 appropriations bill. Although the House passed the appropriations bill in June 1975, the resulting compromise bill was not passed by both the House and Senate until December 1975.

AGENCY COMMENTS AND OUR EVALUATION

In this section we have summarized the major points made on cost estimates by the Army in its comments on our draft report. The Army's complete comments along with our response are contained in appendix II.

The Army stated that its actions in reporting costs were appropriate. The Corps' rationale for reporting the $815 million estimate and not the $1.159 billion estimate is presented on pages 55 and 56. While the $1.159 billion estimate has proven to be more accurate, we cannot conclude that the Corps should have reported it in January 1975. However, we believe that it would have been proper for the Corps to have told the Congress that it suspected the $815 million estimate to be low. Further, we believe that the Corps had ample opportunity to report, during congressional hearings in February, March, and July 1975, that project costs would exceed $1 billion.

CHAPTER 5

FISH AND WILDLIFE COORDINATION ACT

BACKGROUND

The Fish and Wildlife Coordination Act, as amended (16 U.S.C. 661, et seq.), provides that wildlife conservation is to receive equal consideration and be coordinated with other features of federally funded water resources projects. Section 2 generally provides that (1) Federal development agencies consult with Federal and State wildlife agencies at the earliest stages of planning for or involvement in water resource developments, (2) wildlife agencies study the effects of proposed developments and make recommendations for protecting and improving wildlife resources, and (3) in the case of federally funded projects, development agencies include in any report to the Congress at the time of project authorization those measures they believe are justified for wildlife conservation.

QUESTION

What is the status of the Fish and Wildlife Service study of the Tenn-Tom?

ANSWER

Under the act, the Fish and Wildlife Service, Department of the Interior, issued its mitigation report on Tenn-Tom to the Corps on March 17, 1981. This report contains the results of the Service's study of fish and wildlife losses resulting from the project and the measures it proposes to mitigate those losses. The report concluded that the Federal Government is obligated to pursue measures to offset project-incurred damages to fish and wildlife populations and their habitats. The Service recommended that the Government fulfill this obligation by:

--Acquiring and managing 97,000 acres of floodplain forested wetland.

--Managing existing project lands in the river and canal sections (23,080 acres) and lands in the divide section (19,530 acres).

--Establishing and maintaining 5,000 acres of marsh within the navigation pools.

--Recognizing as a project cost the costs of wildlife management, including initial development, and operation and maintenance over existing lands and on the 97,000 acres of additional land.

--Conducting followup studies not later than 5 to 7 years after project completion.

--Taking appropriate steps to perpetuate the associated fauna, including three species of freshwater fish and five bivalve mollusks currently under status review for possible listing as endangered or threatened species.

The Mobile District plans to review the Service's report and decide which of the proposed measures are justifiable. The District then plans to send its evaluation and recommendation to the South Atlantic Division by December 1981. According to the Chief, Environmental Resources Branch, Office of the Chief of Engineers, the report could be transmitted to the Secretary of the Army by the summer of 1982.

The Corps can accept or reject the Service's recommendations or come up with its own measures. If the measures require congressional authorization, the Corps will have to submit a report to the Congress requesting approval. According to the act, the Fish and Wildlife Service's mitigation report is to be included as an integral part of any mitigation report the Corps transmits to the Congress. However, this requirement is complicated by the fact that Executive Order #12113 (dated Jan. 4, 1979) requires the Secretary of the Army to send the Corps' mitigation report to the Water Resources Council for review before sending it to the Congress. The Tenn-Tom Liaison, Planning Division, Office of the Chief of Engineers, advised us that, since the independent water project review function has not been funded by the Congress, reports sent to the Council have not been reviewed or forwarded to the Congress.

QUESTION

Does the Fish and Wildlife Coordination Act require mitigation studies when the Federal Government constructs a project similar to Tenn-Tom, and does the act apply to Tenn-Tom?

ANSWER

Whenever water resources development projects are proposed or authorized, section 2(a) of the Fish and Wildlife Coordination Act requires the construction agency (in this case the Corps) to consult with the Fish and Wildlife Service, with a view to conserving wildlife resources. Section 2(b) requires that the reports and recommendations of the Secretary of the Interior be made an integral part of any report submitted by the Corps to the Congress when requesting authorization of project construction or, in the case of previously authorized projects, when seeking approval of modification or supplementation of project plans. In reporting to the Congress, the Corps must fully consider the Secretary of the Interior's recommendations.

The Fish and Wildlife Coordination Act is generally applicable to Tenn-Tom. According to section 2(g), the act applies to all authorized water projects if they were not substantially completed. Substantially completed means that 60 percent or more of estimated construction cost has been obligated for expenditure at the date of enactment of the 1958 amendment to the act. Since Tenn-Tom was not substantially complete as defined in 1958, the act generally applies.

The Corps generally agrees with the applicability of section 2 and is currently seeking to fulfill its requirements. However, the Corps' Chief Counsel stated that the terms of section 2(b) relating to the preauthorization reporting requirement do not apply to Tenn-Tom.

We have no basis to question this position because Tenn-Tom construction was authorized by the Congress in 1946, 12 years before enactment of the act's relevant provisions. Consequently, the terms of the act relating to preauthorization reports to the Congress are not applicable to Tenn-Tom since its preauthorization reports had been submitted to and approved by the Congress 12 years before this language was enacted as law. Nor has the Corps submitted to the Congress postauthorization reports seeking approval of project modifications or supplementations that would, under section 2(b), require inclusion of fish and wildlife mitigation reports. Other than these provisions, no part of the act provides any particular timetable or time constraint mandating when the act's consultation and reporting requirements must take place or by what date they must be completed for Tenn-Tom. That is, the language of section 2(b), which implies a mandatory report by a certain date, refers to the project reports which Federal agencies, including the Corps, normally submit to the Congress before project authorization or postauthorization project reports seeking congressional approval of project modifications or supplementations. Nevertheless, the Corps claims it is complying with the letter and spirit of the act in the same manner as other projects authorized before 1958.

QUESTION

Should mitigation costs show up in the benefit-cost study?

ANSWER

Mitigation costs that are an authorized part of the project should be reflected in the benefit-cost study. However, costs associated with the possible future acquisition of wildlife mitigation land should not be included until authorized by the Congress. (See p. 61 for a discussion of these costs.)

The act requires that the cost of modifying project structures or operations on a previously authorized project (such as Tenn-Tom) are to be considered as part of the overall costs of constructing the project. Hence, to the extent the Corps has

modified project structures to mitigate loss or damage to wildlife resources, the cost of such action would be included within the overall construction cost, and therefore would appear on the cost side of the project's benefit-cost ratio.

The act also directs that the cost of land acquired to mitigate loss or damage to wildlife resources due to project construction is to be treated as an integral part of project costs. However, the act specifically precludes the Corps from acquiring land until authorized by the Congress.

QUESTION

What are the latest estimates of mitigation cost on Tenn-Tom?

ANSWER

The Fish and Wildlife Service report of March 17, 1981, recommended the management of certain existing lands to enhance their wildlife habitat value and the acquisition and management of 97,000 additional acres. The Fish and Wildlife Service's report estimated, in 1979 dollars, acquisition costs of about $31.5 million. The Department of the Interior, in commenting on our report, estimated management of existing and additional acres would cost about $625,000 annually.

The estimate does not include the cost of mitigation actions the Corps has taken or plans to take. For example, the Mobile District Engineer reported in a letter, dated November 26, 1980, to the Area Manager, Fish and Wildlife Service, that as a result:

> "* * * of information gained from the continuing environmental studies, several measures and innovative features have been added to the project to minimize erosion, stimulate revegetation of construction areas and disposal sites, and maintain or improve water quality. Several actions also taken as the result of the continuing environmental studies will provide opportunity for the enhancement of habitat for fish, mussels and other fauna that inhabit gravel substrate."

According to the Chief, Tenn-Tom Litigation Unit, the Corps has no way of determining the amount of funds spent on these actions.

QUESTION

Were they reflected in the benefit-cost ratio?

ANSWER

The cost of the Fish and Wildlife Service's recommended mitigation plan is not included in the benefit-cost ratio because it is not an authorized feature of the project. The Chief, Tenn-Tom Litigation Unit, stated that these costs with the related benefits

would be included in the ratio if the Congress authorizes them as part of the project. However, the mitigation measures already incorporated into the project are included in the total project cost and reflected in the ratio. An example of these measures was the changing of the location of a spoil disposal area during the construction phase to enhance fish and wildlife habitat.

AGENCY COMMENTS AND OUR EVALUATION

In this section we have summarized the major points made on the Fish and Wildlife Coordination Act by the Departments of the Interior and the Army in their comments on our draft report. Their complete comments along with our response are contained in appendixes II and IV.

Interior stated that the material contained in this chapter was accurate. The additional information it provided on the latest estimate of mitigation costs has been incorporated.

The Army suggested that the chapter should include a listing of the numerous environmental protection and enhancement measures that have been incorporated into this project. The Army's list can be found in appendix II.

CHAPTER 6

LOCAL SPONSORS' OBLIGATIONS

QUESTION

Are local sponsors meeting their obligations with respect to Tenn-Tom? What share of the cost of this project is to be paid by local sponsors?

ANSWER

The Rivers and Harbors Act of 1945 (Public Law 79-525) authorized the Tenn-Tom project in accordance with the recommendations in House Document 486 (79th Cong., 2d sess.). Rather than expressing the obligations of local sponsors as a percent of project cost, the document requires them to perform, at their own expense, certain tasks incident to construction of the waterway. Specifically, the document states:

> "The non-Federal agencies should bear the construction cost of all highway bridges and highway relocations, the cost of new transfer facilities, reconstruction or alteration of sewers, drainage, and water supply works, and maintain and operate all bridges and utility crossings except new railroad bridges across the divide cut."

As of January 1981, the Corps estimated local sponsors' share of Tenn-Tom at $170 million, or 8.7 percent of the fiscal year 1982 estimated project cost of $1.96 billion.

QUESTION

To what extent have they met this obligation, and when are they required to complete their share of the project?

ANSWER

As of February 1981, the States are meeting their project obligations. The work is on schedule and is expected to be completed by the time the waterway opens. The first step in carrying out local responsibilities for the project was the establishment of local sponsor organizations. The Mississippi Legislature in 1962 authorized formation of the Tombigbee River Valley Water Management District, and in 1967 the Alabama Legislature authorized formation of the Tombigbee Valley Development Authority.

Although these authorities were created as local sponsors, actual responsibility for the bridge construction and highway relocations made necessary by the waterway lies with the Alabama and Mississippi State Highway Departments. Current plans require construction of 10 new bridges and modifications to local roads in Mississippi and construction of three new bridges and modifications to one bridge and one local road in Alabama.

The act does not impose a schedule for local sponsors to complete their share of the project. When asked how the Corps ensures that State and local projects will be completed by the time the waterway opens, the Director of Civil Works stated that:

--The Corps is unaware of a legal authority under which schedules can be imposed on local interests. It can insist that local work be done in a timely manner and that it not interfere with Federal construction.

--The Corps can insist on some final deadline for construction since local interests are obligated to complete their work in a timely manner.

--There are at least two ways the Corps might "force" local interests to complete their work. One would be to withhold completion or operation of the Federal project. However, reason would have to prevail; it would not be rational to stop a major project for a small road relocation problem. The second method would be to bring suit in Federal court demanding specific performance. Neither of these actions should ever be needed on this project.

We did not review the status of other local requirements because new bridge construction and/or modification and highway alterations comprise $167 million, or 98 percent, of the project's $170 million local sponsor costs. The table on the following page lists individual bridge construction and highway alteration projects with their actual or estimated dates of completion.

Project	Actual or estimated completion date
Alabama:	
Greene County Road	Nov. 1974
Bridge, Sumter County Road	Sept. 1976
Bridge, State Highway 39	Mar. 1977
Bridge, State Highway 17	Dec. 1980
Bridge, U.S. Highway 11	Nov. 1981
Pickens Ferry Road	(a)
Mississippi:	
Bridge, U.S. Highway 72	Sept. 1979
Bridge, State Highway 25	Oct. 1979
Bridge, State Highway 30	Feb. 1980
Bridge, U.S. Highway 278	Dec. 1980
Bridge, State Highway 6	June 1981
Bridge, State Highway 50	July 1981
Bridge, State Highway 4	June 1982
Bridge, U.S. Highway 82	June 1982
Bridge, U.S. Highway 45	Sept. 1982
Bridge, U.S. Highway 78	Dec. 1983
Clay County Road	June 1978
Palestine Road	Apr. 1979
Monroe County Roads	Oct. 1979
Lowndes County Roads	Dec. 1980
Old Macon Road	July 1983
Itawamba County Roads	Dec. 1984

a/Work has yet to begin and there are indications that the ferry may never be replaced, thus negating the need for road construction.

QUESTION

What was the source of funds used by the local sponsors? If funds were originally received from the Federal Government, is it allowable for them to be used to meet the sponsors' share of Tenn-Tom cost?

ANSWER

Local participants are responsible for projects estimated to cost $170 million. Of this amount the Federal Government has provided $89.5 million in Public Law 94-280 funds; the States of Alabama and Mississippi are expected to provide $74.5 million. The remaining $6 million for Mississippi county roads, inflation, and water and sewer relocations will be provided from Mississippi county funds and other sources. We believe the use of these Federal funds for Tenn-Tom is allowable because their use is consistent with section 132 of Public Law 94-280. In addition to

the $170 million, the Appalachian Regional Commission is funding $11.5 million toward Mississippi county roads for enhancement of economic development in the area.

Mississippi and Alabama have authorized the sale of bonds to finance their share of the bridge construction and highway relocation costs and for other related purposes. As of January 27, 1981, Mississippi has authorized $70 million worth of bonds and has sold $40 million. Mississippi has spent or plans to spend about $66.5 million for highway relocations and bridge work. Pending receipt of funds or another bond sale, about $26.5 million has been or will be borrowed from highway revenues. Alabama has spent or plans to spend $8 million for highway and bridge work. As of January 1, 1981, Alabama has authorized $35 million worth of bonds, sold $8 million, and obligated about $7.9 million.

Federal funds for bridge construction and highway relocations were authorized by an amendment to the Federal Highway Act of 1976. This amendment (sec. 132 of Public Law 94-280) authorized the Secretary of Transportation to:

> "* * * construct and to reconstruct any public highway or highway bridge across any Federal public works project, notwithstanding any other provision of law, where there has been a substantial change in the requirements and cost of such highway or bridge since the public works project was authorized, and where such increased costs would work an undue hardship upon any one State * * *"

The Congress authorized $100 million for this purpose. The Federal Highway Administration, Department of Transportation, has allocated the $100 million according to criteria in the act and its legislative background, with Mississippi receiving about $69.5 million and Alabama receiving about $20 million (South Dakota received the balance of $10.5 million).

The schedule on the following page shows the source of funding as of January 1, 1981, for each State and U.S. highway, bridge relocation project, and Alabama county roads.

The $170 million estimate includes $3 million for Mississippi county roads. The Corps' Director of Civil Works stated that the access roads included in the Corps estimate are limited to those necessary to restore the local traffic network severed by the project. The Executive Director, Appalachian Regional Commission, stated that the Commission-funded roads serve a broader purpose. While these roads improve the continuity of the traffic network, their primary objective is the facilitation and enhancement of economic development in the Tenn-Tom area.

Under the Regional Development Act of 1965, section 201, the Appalachian Regional Commission granted Federal funds to Mississippi toward the construction of roads relating to Tenn-Tom construction. The Commission has identified 12 county road projects which it feels are related to the project. These roads are estimated to cost $16.5 million of which the Commission will provide $11.5 million. The balance of $5 million is to be provided by matching funds.

State	Public Law 94-280 funds	State funds	Total (note a)
Alabama:			
Greene County Road		$ 311,476	$ 311,476
Sumter County Road		46,412	46,412
State Highway 39		7,070,136	7,070,136
State Highway 17	$10,753,200	390,399	11,143,599
U.S. Highway 11	9,174,700	124,139	9,298,839
Pickens Ferry Road	-	-	(b)
Total	$19,927,900	$ 7,942,562	$ 27,870,462
Mississippi:			
U.S. Highway 72	$11,064,245	$ 367,288	$ 11,431,533
State Highway 25	6,290,867	656,572	6,947,439
State Highway 30	5,248,000	69,935	5,317,935
U.S. Highway 278	3,105,000	6,244,842	9,349,842
State Highway 6	4,525,000	6,558,481	11,083,481
State Highway 50	8,307,887	6,026,215	14,334,102
State Highway 4	12,350,789	58,963	12,409,752
U.S. Highway 82	84,329	19,688,742	19,773,071
U.S. Highway 45	18,219,537	1,699,234	19,918,771
U.S. Highway 78	343,000	25,142,233	25,485,233
Total	$69,538,654	$66,512,505	$136,051,159
Mississippi and Alabama total	$89,466,554	$74,455,067	c/$163,921,621

a/Total cost represents current estimated costs for projects not yet completed and final costs for completed projects.

b/Work has yet to begin and there are indications that the ferry may never be replaced, thus negating the need for road construction.

c/This figure represents highway and bridge relocation costs. The Corps' estimate of $170 million was developed by adding to this figure $3 million for Mississippi county roads, $168,800 for water and sewer relocations, and about $3 million for future inflation.

AGENCY COMMENTS AND OUR EVALUATION

In this section we have summarized the major points made on local sponsors' obligations by the Army, the Appalachian Regional Commission, and the Department of Transportation in their comments on our draft report. Their complete comments along with our response are contained in appendixes II, V, and VII.

The Army and the Appalachian Regional Commission emphasized the purposes of local roads. The Corps includes roads that are necessary to restore the local traffic network, and the Commission funds roads to enhance economic development. We agree that these roads serve different purposes. However, we believe it is important to show that additional Federal funds, have been spent on Tenn-Tom.

Transportation stated that its records correspond to the financial information shown in our report.

CHAPTER 7

TERMINATION COSTS

QUESTION

Review and evaluate the Corps estimate of the cost of terminating the Tenn-Tom project. Is the estimate reasonable? Determine whether the Corps has terminated other civil works projects. What was its experience on those projects; compare with assumptions included in Tenn-Tom estimate.

ANSWER

The Corps' estimate of $130.75 million in termination costs as of September 30, 1980, was hurriedly prepared in response to a congressional request. In making the estimate, the Corps made a number of assumptions based on its experience and judgment. Contract terminations accounted for $50.9 million of the estimate (this includes about $10.9 million to complete 13 contracts over 75 percent complete). If historical experience, albeit limited, 1/ on contract terminations for the convenience of the Government had been used, the estimate would have been reduced by approximately $13 to $18 million. Much of the remaining estimate had little documentation to support the figures; thus, we found it difficult to either confirm or refute the estimate.

The Corps would not take a position on whether the $130.75 million estimate is still considered valid in February 1981; it would state only that no better estimate is available as of February 1981. The Corps felt the September 30, 1980, estimate was creditable given the uncertainties about terminating a project of Tenn-Tom's scope and the time available for preparing the estimate. Termination costs would be offset by Government-owned land that could be sold, which had an estimated resale value of $29.6 million in March 1981.

If the project were terminated as of March 1, 1981, we estimate that Corps savings would be over $600 million, as shown on page 81. However, expenditures are currently running about $20 million per month and the ultimate savings would depend on the actual termination date and the Congress' decision about final disposition of the project.

The Chief of Engineers testified before the Subcommittee on Energy and Water Development, Senate Committee on Appropriations, in August 1980 that if the Tenn-Tom project were terminated as of September 30, 1980, termination costs would be $130.75 million, as follows:

1/Since 1971 only one project and seven contracts have been terminated for convenience of the Government.

Category	Estimated amount
	(000,000 omitted)
Contract termination costs and claims	$ 73.50
Protection of completed works	49.40
Real estate settlements and deficiency judgments	7.85
Total	$130.75

The Chief of Engineers testified that this estimate was based on the value of contracts in force and the Corps' experience in contract terminations.

In preparing the termination estimate, the Corps assumed that all work would be discontinued as of September 30, 1980; settlement of contractors' claims would begin immediately; and partially completed work would be restored to an environmentally acceptable condition. Other assumptions were that:

--Construction contracts over 75 percent complete and all miscellaneous utility relocation contracts would be completed.

--Construction contracts less than 75 percent complete could be terminated for 25 percent of the remaining cost to complete the contract. 1/

--Contractor claims against the Corps would be settled for 50 percent of the amount claimed.

--All real estate commitments and deficiency judgments would be paid.

--Protection of completed works would include fencing project structures, drainage work, slope and stabilization work, seeding of exposed areas, reforestation, and storage of Government materials and equipment. Also, removing portions of dams at Gainesville and Aliceville, Alabama, and Columbus, Mississippi, would be needed to allow future navigation of small boats.

The Chief of the Tenn-Tom Litigation Unit described how these assumptions were derived. He said that:

--The total time available for preparing the termination cost estimate was less than a full day. No preparation had been made and no data had been gathered in anticipation of having to prepare a cost estimate.

1/Applies only to the Mobile District, as the Nashville District calculated termination costs differently. (See p. 71.)

--Based on the circumstances, a group of senior professional employees in the Mobile District was hastily assembled to develop assumptions on which to base the cost estimate. These professionals had many years of experience and considerable expertise in the administration of construction contracts, contractor claims, and terminations. However, the Mobile District and the Corps in general have very limited experience with contract terminations.

--The group jointly developed the assumptions, and in a meeting with the District Engineer the assumptions were reviewed and refined. The assumptions were found to be reasonable in a review by the Office of the Chief of Engineers.

--In general, it is the memory of those involved that the assumptions were based on a consensus of the professionals involved. They individually and collectively relied upon their cumulative experience and professional judgment.

Contract termination costs and claims

The Corps estimated that it would cost $73.5 million to (1) complete those contracts that were more than 75 percent complete, (2) terminate contracts less than 75 percent complete, and (3) settle contractor claims against the Government. The estimate for each element is shown in the following table.

Item	Estimated amount
	(000 omitted)
Complete 13 contracts that were over 75 percent complete	$10,865
Terminate 10 contracts that were less than 75 percent complete, handled by the Mobile District (note a)	18,052
Terminate 3 contracts that were less than 75 percent complete, handled by the Nashville District (note b)	22,000
Settle contractor claims against the Government (note c)	22,502
Total	d/$73,419

a/The Mobile District assumed that termination costs would be 25 percent of the remaining contract balance. The 10 contracts ranged from 22 to 70 percent complete.

b/The Nashville District prepared a detailed, line-by-line estimate in developing the termination costs of $22 million, which averages 10.2 percent of remaining contract balance. The three contracts were 26 to 74 percent complete.

c/The Corps assumed that the $45 million in contractor claims as of Sept. 30, 1980, could be settled for 50 percent.

d/Less than $73.5 million due to Corps' rounding.

As discussed on pages 74 and 75, the Corps' actual experience since 1971, albeit limited, resulted in contracts less than 75 percent complete being terminated for 7.2 percent of remaining value and the one contract that was more than 75 percent complete being terminated for 50 percent of remaining value. Had the Mobile District used historical experience for contracts less than 75 percent complete, the estimate would have been approximately $13 million less. Using the historical experience for the one contract over 75 percent complete would have reduced this estimate by $5.4 million. Further, according to the Chief of the Tenn-Tom Litigation Unit, the assumption that $45 million in claims could be settled for 50 percent was based on the professional judgment of a group of senior employees in the Mobile District. The Mobile District was unable to provide us with any documentation to support this assumption due to lack of historical data for contracts that were terminated for the convenience of the Government. However, the Chief of the Tenn-Tom Litigation Unit noted that the Corps has had much experience in negotiating modifications and claims--665 on Tenn-Tom through March 1980--and this gives it a good basis for estimating the cost of settling outstanding claims.

Protection of completed work

The Corps estimated that, as of September 30, 1980, it would cost $49.4 million primarily to provide for (1) protection of the completed work, (2) public safety, (3) seeding, reforestation, and measures to eliminate bare slopes, and (4) safe navigation for small boats. The Corps' estimate was broken down by the following sections of the project:

Section	Estimated amount
	(000,000 omitted)
River	$14.2
Canal	5.2
Divide cut	30.0
Total	$49.4

Little documentation existed to support the above estimates. The documentation generally consisted of a statement of the work to be done with the total cost shown, rather than a line-by-line estimate, and in some cases the inclusion of unexplained items. Corps officials told us the estimates were hurriedly prepared and were primarily based on their professional experience and judgment. Without documentation or actual experience, it is almost impossible to reach a conclusion concerning the accuracy of this estimate.

River section

The Corps' documentation in support of its river section estimate for protection of completed work was limited, consisting only of a statement of the work required and the total estimate for each of the categories. The estimate showed that 9,932 acres of land needed to be seeded and mulched to prevent erosion. The $13.3 million estimate for this work was based on existing contract prices for seeding and mulching. In addition, the Corps estimated $805,000 for removal of portions of the Gainesville, Aliceville, and Columbus Dams to facilitate navigation of small boats; $34,500 for removal of other obstructions in channels; and $34,500 for fencing of structures for security and safety reasons, amounting to a total cost of $874,000.

Canal section

The Corps' estimate of $5.2 million for protection of completed work on the canal section consisted of

--$105,000 to provide fencing around structures for safety and security,

--$4.9 million to seed and mulch exposed areas to prevent erosion, and

--$276,000 for unexplained items.

The Corps' documentation for these estimates generally consisted of total dollar figures. For example, the estimates did not show the quantity of fencing or the number of acres to be seeded and mulched. The Project Manager, Civil Works Development and Management Branch, Mobile District, in discussing the $276,000, could not provide us with either the basis for this amount or the items that would have been included.

Divide cut

The Corps estimated $30 million for protection of completed work in the divide cut. A civil engineer in the Nashville District, who prepared the estimate and gave it to the Mobile District, said he was given only 2 hours to prepare the estimate. He commented that he used an earlier detailed estimate made in April 1979 for another section of the divide cut to quickly estimate the $30 million needed to adequately protect work completed to date.

Real estate settlements and deficiency judgments

The Assistant Chief, Real Estate Division, Mobile District, said that the Corps will have some additional real estate expenses if the project is terminated. For example, contracts to purchase land would have to be completed; damages to property owners resulting from Corps construction activities would have to be

settled; awards by the courts for property condemnations would have to be made; and Corps administrative costs would have to be paid. As of August 1, 1980, the Corps' estimate of these costs is as shown in the following table:

Category	Amount
	(000 omitted)
Contracts to purchase 48 parcels of land	$4,029
Damages for timber on two parcels of land	64
Deficiency judgments for 68 parcels of land (note a)	3,142
Administrative costs	615
Total	$7,850

a/An amount the courts may award above appraised value of land in a condemnation proceeding.

The Assistant Chief, in explaining the basis for the estimate, said that the amount shown for the

--land purchases was based on outstanding valid contracts as of August 1, 1980;

--timber damages, caused by Corps construction activities on non-Federal land, was based on a Corps appraisal;

--deficiency judgments was based on a Corps attorney's judgment of what courts might award; and

--administrative costs was an estimate of what it will cost the Corps to handle all real estate settlements and/or judgments.

As of February 2, 1981, 14 of the 68 cases of deficiency judgments, involving $134,700 of the $3.1 million, had been decided by the courts for $111,046, or about 17.6 percent less than the Corps' estimate. While experience indicates that the Corps' estimate may be high, the small amounts settled by the court preclude drawing a conclusion on the accuracy of the deficiency judgment estimate.

Other civil works projects terminated

Since January 1971 the Corps has terminated only one project--the Cross Florida Barge Canal--for the convenience of the Government. In January 1971, when the President ordered a halt to further construction of the $179 million Cross Florida Barge Canal, about $50 million of Federal funds had been expended.

Of the six contracts that had been awarded, two were terminated and four were completed. The Congress approved the four contracts for completion due to concern for public safety and the environment. Work performed under these contracts consisted of (1) reconstruction of a dam and spillway to prevent flood damage, (2) bank protection work to prevent erosion and bank caving, (3) relocation of a highway bridge to eliminate constrictions to a river and reduce flood hazards, and (4) completion of a bypass channel to ensure adequate flows to the Lower Withlacoochee River.

In addition to the two Cross Florida contracts that were terminated, the Corps was able to identify only five other civil works project contracts that have been terminated for the convenience of the Government since 1971. Termination costs for these contracts were as follows:

--Six contracts, valued at $47.6 million, were less than 75 percent complete (ranging from 0 to 35 percent). These contracts were terminated for $3.03 million, or about 7.2 percent of the remaining contract balance.

--The other contract, valued at $11.2 million, was over 75 percent complete (92 percent), and it was terminated for 50 percent of the remaining contract balance.

QUESTION

Do completed or partially completed facilities have any economic value? What portion of area redevelopment benefits have been achieved?

ANSWER

Very little--roughly $12 million--of the project's estimated 1982 average annual benefits of $136.9 million had been achieved in March 1981. The majority of the benefits are navigation savings--$116.6 million--most of which cannot be realized until the entire waterway is completed. The section from Columbus, Mississippi, to Demopolis that is open for limited traffic has some economic value; annual benefits in March 1981 would be about $5 million for this section. Some recreational facilities (three lakes and three recreational areas) are substantially complete and are now being used. Total recreation benefits are small, and the completed facilities will provide about $1.2 million of the estimated 1982 average annual recreational benefits of $7.1 million. Partially completed recreational facilities have little economic value since access roads have not been completed, dams are not finished, etc. According to the Corps, approximately $6 million of the area redevelopment benefits have been realized as of March 1981. We did not review fish and wildlife benefits since they represent less than 1 percent of project benefits.

As of February 1981, the Corps projects estimated total project benefits to be $136.9 million, as shown in the following table.

Category	Average annual benefits
	(000 omitted)
Navigation	$116,618
Recreation	7,084
Fish and wildlife	197
Area redevelopment	13,048
Total	$136,947

As of March 1, 1981, Corps records show that the overall project is about 53 percent complete. The portion from Demopolis, Alabama, to Luxapalila Creek at Columbus, Mississippi (involving approximately 114 of the waterway's 232 miles), is usable today, although additional work is needed to bring it up to project navigational specifications. The remaining portions of the waterway above Columbus are in various stages of construction and are not commercially navigable. For example, water is being impounded behind the Columbus Lock and Dam, but commercial traffic cannot use the lock until its expected opening in September 1985.

Navigation benefits

Four-barge tows can now navigate from Demopolis to Columbus. An eight-barge tow will be able to navigate this section of the waterway when completed. Corps records show that from January 1979 through January 1981, 119,601 tons moved through the Gainesville Lock, which opened in October 1978. The Aliceville Lock, which opened in December 1979, handled 15,589 tons during 1980. Corps records show that an additional $20 million would be required to bring the Demopolis-to-Columbus portion of the waterway up to project navigational specifications. Additional work required on this section includes dredging, excavation, and relocation of a railway bridge.

The Chief of the Tenn-Tom Litigation Unit told us that if the project were stopped and the $20 million were not spent, a new study would be required to determine the specific amount of navigation benefits that would accrue for a four-barge tow on this section of the waterway. The Kearney study identified benefits for seven movements that start/end at or below Columbus, Mississippi. Kearney showed the average annual benefits for these movements to be $4.98 million. The Corps' annual maintenance cost for this portion of the waterway was estimated to be $3.5 million as of October 1980. U.S. Coast Guard navigation aid maintenance cost for this same section was estimated at $53,000 annually.

Recreation benefits

The Aliceville, Gainesville, and Columbus Lakes can be used for recreation, and three recreation areas (China Bluff, Gainesville, and Luxapalila Creek) are substantially complete. The Chief of the Tenn-Tom Litigation Unit stated that some of the recreation and fish and wildlife benefits have been realized; however, without a field study it would be difficult to accurately estimate the value of the benefits. However, the Corps estimates recreational benefits as of September 30, 1981, for the portion from Demopolis to Columbus Lock and Dam at $1.2 million. The Chief of the Tenn-Tom Litigation Unit also stated that there were no benefits from partially completed portions of the project above Columbus Lake. According to Corps records, the China Bluff public use facility, the only area in which a count of visitors is being done, had 24,600 visitors during 1980. The Corps anticipates that visitation will increase as more facilities open and better access is provided to the waterway.

Area redevelopment benefits

The Corps' estimated average annual area redevelopment benefits of $13.048 million were derived from estimated wages to be paid construction workers and project operation and maintenance employees. Benefits result from the creation of jobs in the project area and reflect the impact of project construction on local unemployment. According to calculations of an economist in the Mobile District Planning Division, approximately $5 million in average annual area redevelopment benefits have been realized as of October 1980, or about 38 percent of the Corps' total estimate of area redevelopment benefits. Further, the same calculations show that by October 1981 average annual area redevelopment benefits would be $6.5 million, or about 50 percent of the Corps' estimate. Thus, around $6 million in area redevelopment benefits would be realized in March 1981.

Other benefits

According to the Deputy Administrator of the Tenn-Tom Waterway Development Authority, investment is taking place along the waterway but the major impact on regional economic growth will not be felt until the waterway is completed.

An example of private investment cited by the Deputy Administrator was a Weyerhaeuser Corporation paper mill being constructed south of Columbus, Mississippi. He stated that the mill's construction work force will number approximately 3,000 at its peak and the mill will have a permanent work force of approximately 800 after it is completed. He said that the waterway was one of the reasons why Weyerhaeuser chose the mill site.

Another Columbus businessman is developing a private port facility just above Columbus Lock and Dam. He told us that he plans to locate a manufacturing plant at the site and make available approximately 200 acres for industrial development.

QUESTION

What operation and maintenance expenses would be foregone if the project were terminated?

ANSWER

In January 1981, the Corps estimated average annual operation and maintenance expense for Tenn-Tom at $11.2 million. However, if the project were terminated, not all of this amount would be saved. For example, the Corps would incur costs for items such as fire prevention measures, safety measures, and upkeep of security features (gates, fences, locks, barricades, signs, alarms, and boundary line maintenance). Also, there would be some additional Corps and Coast Guard operation and maintenance costs if the Columbus-to-Demopolis portion of the waterway were kept open for navigation. The Chief of the Tenn-Tom Litigation Unit said the amount and extent of these costs would depend on the date of termination and instructions from the Congress as to final disposition of project.

QUESTION

How much land could be resold and what is its estimated value?

ANSWER

As of July 1, 1980, the Corps had acquired about 90,902 acres, or 87 percent of the planned acquisition of 104,590 acres. 1/ The land acquired consisted of about 70,427 acres in fee (Corps has full and absolute ownership) and 20,475 acres of easements (see next page) and is estimated by the Corps to have a resale value of $28.7 million. 2/ The Corps paid about $45 million for this land and easements.

The Corps estimated that 56,390 of the 90,902 acres have been altered by construction of locks, railways, dikes, disposal areas, roads, channels, and public facility developments. According to the Corps, 46,524 of the 56,390 acres have been severely affected by construction and would be worth considerably less than the purchase price. For example, 5,920 acres of the divide cut have been excavated or cleared for disposal areas and are estimated to be worth $150 an acre compared to the average acquisition

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1/As of Feb. 1981, the Corps had acquired an additional 2,849 acres.

2/The Corps recognizes that not all 90,902 acres can be resold since certain structures, i.e., locks, spillways, dams, etc., occupy a small portion of the land. In calculating resale value, this factor was considered by adjusting estimated resale value per acre.

price of $523 an acre. Further, an additional 9,866 acres have been affected by construction, though not as drastically as the 46,525 acres, and could be returned to preproject use with some loss in value. The remaining 34,512 acres, or 38 percent of the land, have not been directly affected by construction and could be returned to preproject use.

Moreover, the Corps' Mobile District estimated the value of 20,269 easement acres as of July 1, 1980, at $1 an acre. The Corps paid about $9 million for these easements, which were of the following three types:

--Flowage easements, which provide the Corps the right to overflow, flood, submerge, and maintain mosquito control and to have title and interest in timber, structures, and improvements.

--Road easements, which provide the Corps the right to locate, construct, operate, maintain, alter, and replace roads and the right to trim, cut, fell, and remove all obstacles within the limits of the right-of-way.

--Channel improvement easements, which provide the Corps the right to construct, operate, and maintain channel improvement. These easements also include the right to dredge, dispose of timber, and deposit spoil material.

Easements obtained by the Corps contain a provision which permits the landowners to use the land if the use does not interfere with the operations of the project. The Assistant Chief, Real Estate Division, Mobile District, said:

> "It is not likely that the flowage easements acquired for the Waterway would have a disposal value in any amount approaching their acquisition price. If the project were to be terminated, the property owner could continue to utilize the lands encumbered with the flowage easements for general agricultural and forestry purposes, but under the terms of the easements no structures could be placed on the encumbered properties without the Corps' permission. We cannot visualize, however, the continued expenditure of Government funds to enforce such restrictions if not required in support of the Waterway operation. The perpetual easements would constitute a cloud on the landowners' titles, and the owners would probably be willing to pay some nominal sum for the removal of this restrictive easement to enhance the future marketability of the property."

An appraiser at the Corps' Nashville District agreed that the value of the easements would be nominal, and said he did not place any value on the 205 acres of easements acquired by that District for Tenn-Tom. He stated that if Tenn-Tom were terminated

and all land acquired for the project were "dumped on the market," land prices in the area would decrease.

The following table shows the Corps' estimated resale value of land acquired as of June 1, 1980: 1/

Location and type of land	Number of acres	Estimated unit price	Estimated resale value
Mobile District:			
Fee:			
Open	9,002	$ 700	$ 6,301,400
Wooded	17,908	500	8,954,000
Clearcut	15,100	250	3,775,000
Easements:			
Open	3,506	1	3,506
Wooded	16,763	1	16,763
Nashville District:			
Fee:			
Open	2,300	700	1,610,000
Pastureland	700	500	350,000
Pastureland	10,821	350	3,787,350
Wooded	8,659	350	3,030,650
Excavated	5,920	150	888,000
Easements	205	0	0
Total a/	90,884		$28,716,669

a/See 1/ below.

As of February 1, 1981, the Corps had acquired 2,867 additional acres at a cost of $2.6 million. According to the Assistant Chief, Real Estate Division, Mobile District, the estimated resale value of these acres is $851,849; therefore, estimated resale value for all lands totals about $29.6 million.

1/Eighteen acres less than 90,902 reported in the Corps summary. The 18 acres were purchased in June 1980.

Potential Corps Savings from Tenn-Tom Termination (note a)

	(000 omitted)		
Total estimated Corps cost for Tenn-Tom			$1,780,000
Total Corps cost to terminate Tenn-Tom:			
Obligations as of Mar. 1, 1981		$ 980,768	
Termination costs:			
Settlement of construction contracts and claims (note b)	$87,351		
Protection of completed work (note c)	49,400		
Real estate settlements (note d)	6,750	143,501	
Total obligations and termination costs		1,124,269	
Less revenue from land sales		29,600	1,094,669
Estimated Corps savings if project were terminated in Mar. 1981			$ 685,331

a/Methodology used to calculate these savings is the same as that described in testimony by the Chief of Engineers before the Subcommittee on Energy and Water Development, Senate Appropriations Committee, on Aug. 21, 1980.

b/GAO update of the Corps estimate to Mar. 1, 1981, using the same assumptions the Corps used in its Sept. 30, 1980, estimate.

c/Represents the amount the Corps believes would have been required to make the area environmentally safe if the project were terminated in Sept. 1980. The Corps would not provide us with a later estimate, stating only that no better estimate exists as of Feb. 1981.

d/GAO update of the Corps estimate to Mar. 1, 1981. Update based on information provided by Corps' Mobile District.

AGENCY COMMENTS AND OUR EVALUATION

In this section we have summarized the major points made on termination costs by the Army in its comments on our draft report. The Army's complete comments along with our response are contained in appendix II.

In commenting on termination costs, the Corps noted that its termination estimate (Sept. 30, 1980) must be placed in proper focus. The Corps reiterated that the estimate was made in a very short period of time and was based on many assumptions. The Corps stated further that it was a good estimate, given the lack of a precedent and the timing. The Corps also noted that it had recently (Mar. 17, 1981) received a congressional request for updated termination costs and a new estimate was developed in an extremely short time. This new estimate also included some different assumptions.

We believe that we have adequately recognized that the September 30, 1980, estimate was hurriedly prepared and was based on a number of assumptions. The Corps' most recent estimate shows termination costs ranging from $211 to $328 million at September 30, 1981, as compared to the $130.75 million figure estimated in September 1980. The reasons for the difference between the two termination estimates and their impact on potential savings if the project is terminated are discussed below.

According to Corps records, a congressional request for updated termination costs was received at 9:00 a.m. on March 17, 1981, with the updated information provided to the requestor at 12:20 p.m. the same day. The Corps, in providing this information, estimated termination costs at $211 to $328 million depending upon which assumption was used concerning restoration of the project. In making this estimate, the Corps also assumed that construction would continue as scheduled through September 30, 1981, and any real estate transactions would be essentially complete.

This data was used in information placed in the March 19, 1981, Congressional Record. According to this information, if the project were terminated, savings would be $353 million. Our report shows savings of $685 million if the project were terminated. Why the difference? There are a number of reasons which are briefly discussed below.

--The $353 million savings was based on terminating the project at September 30, 1981, whereas our savings estimate was based on termination in March 1981. Between March 1981 and September 30, 1981, the Corps anticipates obligating approximately $119 million.

--We estimated contract termination at $87.4 million, whereas the latest estimate shows contract termination at $122 million. The difference is reflected in the time frame used

and the Corps' including a 25-percent contingency in its latest estimate. This contingency was not included in previous estimates.

--The September 30, 1980, estimate showed the cost of protecting completed work at $49.4 million. We were unable to obtain a new estimate from the Corps for this information and used this amount in calculating our $685 million savings. In the latest estimate the Corps provided the requestor with a range from $44 million to $161 million. The difference was based on whether the canal section was restored to its preproject condition as opposed to an environmentally sound and safe condition. The previously mentioned 25-percent contingency was also included in the latest figure though not in the earlier estimate.

--Our estimate included $6.75 million for real estate settlements. The latest estimate assumed that all real estate transactions would be completed by September 30, 1981, and no amount was included.

--We included as an offset revenue from Government-owned land that could be sold if the project were terminated. Based on Corps records, this revenue amounted to $29.6 million. The latest estimate includes no recognition of revenue to be derived from land sales.

--The latest estimate shows $45 million to provide project navigation to areas north of the Columbus Lock and Dam. As of March 1981, limited navigation is available for approximately 114 miles from Demopolis, Alabama, to just south of Columbus, Mississippi. We did not include any amount beyond the 114-mile mark or for improving navigation on the currently open segment. The $45 million extends navigation from just south of Columbus to north of Columbus.

One of the major differences (approximately $112 million) in the two estimates is whether the project is to be restored to an environmentally sound and safe condition. We believe that if the project is terminated, the decision on final disposition of the project should be made by the Congress. Likewise, the decision on spending another $45 million to extend navigation is one that should be made by the Congress.

Further, if the Congress decides to terminate the project, construction may not continue through September 30, 1981. Since Federal expenditures are running approximately $20 million per month, termination before that date would increase the savings by approximately that amount per month.

The Chief of Engineers, in August 1980 testimony before the Subcommittee on Energy and Water Development, Senate Committee on Appropriations, commented that revenue from land sales (estimated

at approximately $30 million) should be subtracted from any termination estimate. Further, as discussed in this chapter, the Corps estimated contract termination and settlement costs higher than experience with past projects would suggest as being realistic. To this estimate, the Corps has now added another 25 percent for contingencies.

We believe the potential savings of terminating the project would be much greater than $353 million. If the project had been terminated in March 1981, we estimated savings of $685 million.

CHAPTER 8

ISSUES FOR RESOLUTION BY THE CONGRESS

The decision on whether to continue funding or whether to stop Tenn-Tom is not easy, given the depth of feeling about this project. If this were 1976, and the project were far less complete, a number of substantive questions and concerns could be raised. However, in March 1981, with the project approximately 53 percent complete, only a couple of major issues remain:

--Is the over $600 million that would be saved by halting Tenn-Tom worth abandoning the $1.1 billion invested in the project? If Tenn-Tom were stopped in March 1981, roughly $12 million in average annual benefits will have been achieved; whereas, if it were completed, the average annual benefits are estimated to be $136.9 million.

--Is the Congress, in approving Tenn-Tom, sowing the seed for a future project? Unless the Congress is willing to accept severe traffic constraints, completion of Tenn-Tom will require major improvements to the existing BWTW south of Demopolis, Alabama. While Corps studies show that Tenn-Tom is economically viable without the improvements, they also show that the two waterways cannot achieve anywhere near their projected traffic levels unless the improvements are made. If Tenn-Tom were halted, these improvements would not be needed. These improvements are estimated to cost $960 million--$323 million for construction (Oct. 1979 dollars) and $637 million for inflation to the end of the estimated construction period in 1997.

We also wish to note that the issue may not be only one of whether the project should be halted or completed. If the Congress' concern with Tenn-Tom is the remaining Federal expenditure, it may wish to explore alternative arrangements to finance the uncompleted segments, thereby permitting the project to be completed and reducing Federal expenditures.

ARE SAVINGS WORTH ABANDONING TENN-TOM?

In March 1981 the Corps estimated Tenn-Tom costs at $1.96 billion ($1.78 billion in Corps funds). Approximately $1.1 billion, mostly Corps funds, have been invested in the project. Since Tenn-Tom is primarily a navigational project--84 percent of the average annual benefits are navigational savings--very little of the benefits will be realized unless the total project is completed. As of March 1981, roughly 9 percent of the projected average annual benefits of $136.9 million have been realized.

If Tenn-Tom were stopped, the Government would not save the difference between the Corps' obligation of approximately $1 billion in March 1981 and the estimated Corps cost of $1.78 billion. Some termination costs, estimated by the Corps at $130.75 million

in September 1980, would be required. Using the Corps' methodolog and assumptions and updating most of the information, we estimate termination costs as of March 1981 at $143.5 million. For one termination item--restoring the site to an environmentally acceptable condition--the Corps would not provide us with a new estimate. The Corps estimated in September 1980 that restoration would account for $49.4 million of its $130.75 million estimate. Assuming the restoration estimate is still within the ballpark, savings if Tenn-Tom were terminated in March 1981 would be approximately $685 million. In addition, a substantial portion of the estimated annual operating and maintenance costs of $11.2 million would be saved if the project were terminated.

Since expenditures in early 1981 were running about $20 million per month, terminating the project later than March 1981 would reduce the savings. Furthermore, estimated savings could be affected by specific decisions on final disposition of the project For example, bringing the completed 114-mile segment up to full navigational standards would cost about $20 million. The cost of restoring the site to an environmentally acceptable condition could also vary considerably by changing the assumptions on what would or would not be required.

Another complicating factor is the substantial State and loca investment being made in anticipation of Tenn-Tom being completed. The Port of Mobile, for example, has a $140 million expansion program underway to enable it to handle anticipated Tenn-Tom traffic. Some of this expansion would not be needed if Tenn-Tom were halted

Thus, the situation as it now exists is as follows. On one hand we have a project that is 53 percent complete with approximately $1.1 billion invested. Unless it is completed, very little benefit--roughly $12 million of the project's estimated 1982 annua benefits of $136.9 million--will be achieved for the investment an the partially completed project would not be esthetically pleasing On the other hand, halting it could save over $600 million.

WILL AN ADDITIONAL PROJECT BE REQUIRED?

Near Demopolis, Alabama, Tenn-Tom will enter the existing BWTW. From this point south for the 217 miles to Mobile Bay the two waterways share the Tombigbee River--a twisting river with numerous bends. Because of the physical characteristics of the river, limited lock capacity, and narrow bridge spans, the Corps recognized that this section would constrain traffic unless major improvements were made. While the improvements are not necessary to economically justify Tenn-Tom, they are important if both waterways are to reach the level of traffic projected to occur around 2010. The Corps estimates that the improvements soutl of Demopolis will cost $960 million--$323 million (Oct. 1979 dolla for construction and $637 million for inflation to the end of the estimated construction period in 1997.

Corps officials in July 1980 testimony before the Subcommittee on Water Resources, Senate Committee on Environment and Public Works, stated that the waterway below Demopolis will limit the growth of the combined waterways and that by 1991 traffic will be constrained. In 1975 the Corps estimated that 44 million tons would be the annual capacity of the combined waterway when capacity is reached in 1991. In determining Tenn-Tom benefits, the Corps allocated the 44 million tons as 29 million tons for Tenn-Tom and 15 million tons for BWTW. Had the capacity not been constrained, the Corps estimated tonnage for the combined waterways south of Demopolis as follows:

Year	Tenn-Tom	BWTW	Total
	(millions of tons)		
1990	29.1	15.0	44.1
2000	40.4	20.0	60.4
2010	53.8	26.3	80.1
2020	b/ 70.5	a/32.7	103.2
2035	b/101.0	a/42.3	143.3

a/The Bacon Oliver Lock north of Demopolis limits BWTW traffic to 25 to 30 million tons. The Corps is studying a project to eliminate this constraint.

b/The Bay Springs Lock limits Tenn-Tom traffic to 55 million tons.

In February 1981 Corps officials told us that, based on changes in operating patterns on BWTW since 1975, the capacity for the combined waterway may now be greater than 44 million tons. How much of an increase will depend upon studies now in process.

Complicating the capacity issue is the fact that BWTW actually carried 15 million tons in 1980--an amount the Corps had projected would not occur until 1991. Further, BWTW is expected to continue to grow up to its 25- to 30-million-ton limit imposed by capacity of the Bacon Oliver Lock. Corps officials have also noted in congressional testimony that waterway traffic frequently exceeds Corps projections.

Given these facts, we believe it is obvious that, unless the improvements are made, the combined waterway will be severely constrained. Even if the current study shows that capacity is greater than 44 million tons, we doubt it will be anywhere near the amount needed to handle anticipated traffic.

Thus, in deciding whether to continue or halt Tenn-Tom, the Congress may, in effect, be deciding on the future of another major project on the Tombigbee River south of Demopolis. If the traffic constraints are unacceptable, then almost $1 billion in improvements will be needed. Conversely, the improvements will

not be needed if Tenn-Tom is halted, as the existing capacity is adequate for BWTW alone.

ALTERNATIVE FINANCING IS A POSSIBILITY

We believe during this period when there is enormous pressure to reduce Federal spending, if the concern of the Congress is the remaining Federal expenditure, exploring alternative arrangements to finance the incomplete segments of Tenn-Tom may be worthwhile. While it was not within the scope of our review to examine alternative financing, we feel this is a possibility. Some methods that come to mind include:

--States or others could borrow funds from the Federal Government and repay through user charges.

--Alabama and Mississippi could issue long-term bonds and repay through user charges.

--Alabama and Mississippi could finance portions of the project through general revenue funds.

AGENCY COMMENTS AND OUR EVALUATION

In this section we have summarized the major comments made by the Army and OMB on the portion of our draft report covering issues for resolution by the Congress. Their complete comments along with our response are contained in appendixes II and III.

The Army stated that completion of Tenn-Tom does not force an additional related project. The Army noted that such a project would be a separate new investment decision based on study and Presidential and congressional action. The Army commented that preliminary indications from ongoing studies show that certain modifications could improve the efficiency of the waterway; however, prediction of a recommendation to the President and the Congress is highly speculative at this time. According to the Army, if this recommendation is ever made, it will be based on the results of completed comprehensive studies demonstrating the merit of further investment. Also, the Army concluded that the economic justification in favor of project completion no longer can be fairly challenged, when justification is considered on a basis of remaining benefits to remaining costs, and that the project should be completed. Further, the Army said that our review and report certainly lead to no other conclusion.

OMB stated that the question of developing a new Federal project to expand the existing waterway from Demopolis to Mobile is unrelated to the question of completing the Tenn-Tom project. OMB noted that if that project were authorized by the Congress, it would be subject to the same policy review and competition for scarce budget resources as any other potential new water resource project.

While we appreciate and understand the Army's and OMB's position on expansion of the waterway from Demopolis to Mobile, we do not agree that it is unrelated to the question of completing Tenn-Tom. OMB and the Army are correct, as we have noted in our report, that such a project must be authorized by the Congress. However, we feel it is critical that the Congress clearly understand that the potential traffic on the Tenn-Tom Waterway now under construction will be severely constrained by the bottleneck south of Demopolis. Eliminating this bottleneck requires a project estimated by the Corps to cost $960 million--$323 million (Oct. 1979 dollars) for construction and $637 million for inflation to the end of the estimated construction period in 1997. We believe that if the decision is made to continue Tenn-Tom, it is likely that the Congress will be urged to approve the waterway improvement project from Demopolis to Mobile. The Corps' Director of Civil Works testified in July 1980 before the Subcommittee on Water Resources, Senate Committee on Environment and Public Works, that in his opinion the improvements are likely to be needed within 10 years and the push is going to be immense. On the other hand, if Tenn-Tom is stopped, the present waterway is considered adequate for BWTW traffic through the year 2035.

We do not agree that our report leads to any conclusion one way or the other. We answered specific questions which were not designed to reach an overall conclusion on whether the project should or should not be completed.

CHAPTER 9

OBJECTIVE, SCOPE, AND METHODOLOGY

Our objective was to respond to a Legislative Reorganizatio Act request dated October 2, 1980, from the Chairman (Senator J. Bennett Johnston), Subcommittee on Energy and Water Developmer Senate Committee on Appropriations, asking us to prepare a report on the Tennessee-Tombigbee Waterway. The chairman acknowledged in his request that we had received requests for a review of the Tennessee-Tombigbee project from a number of Members of Congress-Senators Carl M. Levin, Charles H. Percy, and William Proxmire and Representatives Robert W. Edgar and Joel Pritchard. The chairman asked that we meet with the requestors to agree on the work to be done. Several meetings were held and a list of questions that we were to address was agreed upon. Further, it was agreed that these questions would primarily constitute the scope of our work.

The questions covered issues concerning project benefits, capacity, costs, termination, State and local participation, and fish and wildlife mitigation measures. Because the scope of our work was generally limited to the questions asked, and because the project is currently in litigation, we did not do the work necessary to reach an overall conclusion on the project's merit. We have, though, expressed some conclusions and observations in answers to specific questions.

We conducted our work primarily at the U.S. Army Corps of Engineers Headquarters, Washington, D.C., and the Mobile, Alabama District Office. Work was also done at offices of the Corps of Engineers, South Atlantic Division, Atlanta, Georgia; Alabama and Mississippi State Highway Departments; Alabama and Mississippi State Treasury Departments; selected Mississippi county supervisors; Appalachian Regional Commission, Washington, D.C.; Water Resources Council, Washington, D.C.; Department of the Interior, Fish and Wildlife Service Headquarters, Washington, D.C., and Area Office, Jackson, Mississippi; Alabama State Docks, Mobile, Alabama; Department of Transportation, Washington, D.C.; as well as selected shippers/receivers and barge operators. In addition we met with representatives of A. T. Kearney, Inc., of Chicago, Illinois, in Alexandria, Virginia; Environmental Policy Center, Washington, D.C.; Association of American Railroads, Washington, D.C.; and several project opponents. We also had telephone conversations with Corps of Engineers District Office, Nashville, Tennessee; Tennessee-Tombigbee Waterway Development Authority, Columbus, Mississippi; U.S. Coast Guard, New Orleans, Louisiana; and selected shippers/receivers, barge operators, and private firms, including some moving into the area.

Before beginning our review, to gain a thorough understanding of the issues and the project, we reviewed data we had previously obtained in 1976-77 concerning Tenn-Tom, newspaper and magazine articles, congressional hearings, and records of court proceedings.

Our work was constrained by the fact that the project is currently in litigation. The chairman made his request subject to our working out a satisfactory agreement with the Justice Department. A satisfactory agreement was reached with the Justice Department, which was designed to help protect the reliability of certain potential Government witnesses should the pending litigation ultimately go to trial. Before interviewing certain individuals, we agreed to review any depositions taken in connection with the pending litigation to determine if an answer to any of our inquiries could be obtained there and to avoid repetitive, time-consuming lines of inquiry. If, after reviewing appropriate depositions, we desired to interview an individual, we agreed to give 3-day notice to the Justice Department. At its option, the Justice Department could have an attorney present during the interview. We interviewed six individuals in this category; the Justice Department was present during interviews with four.

During the audit we reviewed pertinent records and held discussions with key officials of the previously mentioned organizations. Some of the more noteworthy discussions were with:

--Members of the Tenn-Tom Litigation Unit. This unit, which was established in 1977 at the Mobile District, contains some of the Corps' most knowledgeable individuals on the Tenn-Tom project.

--Corps Mobile District, Nashville District, and Washington headquarters officials responsible for planning and managing Tenn-Tom. Whenever possible, we reviewed the support for reports and studies. For example, we reviewed the detailed working papers supporting both the benefit and capacity calculations.

--Corps consultants responsible for preparing the benefit and capacity studies.

--Seventeen shippers/receivers that represented about 71 percent of estimated project benefits. Whenever possible, we talked to the same individuals that provided the information used by Corps consultants in determining benefits. If they were not available, we met with responsible officials such as presidents, vice presidents, and shipping directors.

--Representatives of the Association of American Railroads, Environmental Policy Center, and others opposed to Tenn-Tom.

To get a better understanding of the project, each audit team member as well as key headquarters officials toured the entire waterway. In addition, an audit team member took a barge trip from Demopolis, Alabama, to Mobile Bay to get firsthand knowledge of the constraints caused by the physical characteristics of the waterway south of Demopolis.

ARGUMENTS FOR AND AGAINST THE TENNESSEE-TOMBIGBEE PROJECT

This appendix discusses the arguments for and against the Tenn-Tom project and is not intended to be all inclusive. Much of the information presented was not independently developed or verified but was compiled from hearings transcripts, briefing documents, and other public materials. We present this appendix in the context of what both proponents and opponents say about Tenn-Tom, and not as findings of our review.

Proponents envision Tenn-Tom's advantages as covering several broad areas. According to proponents, the project

--provides transportation savings, considered the primary benefit, which are estimated to be over $100 million annually for moving coal and other commodities;

--plays an important role in the Nation's coal export market;

--provides expanded recreational opportunities for the region;

--provides impetus for increased economic growth in the region; and

--provides training and employment for unskilled workers, minorities, and females.

In addition, local participants have made large investments in anticipation of project completion. We also discuss in this segment the benefit-cost computations associated with Tenn-Tom--an important tool for decisionmakers, but ultimately a "best-guess" estimate of future conditions.

In contrast, opponents claim that Tenn-Tom

--restricts traffic on BWTW;

--assumptions, used to compute navigation benefits, are sometimes questionable;

--duplicates existing transportation service, which could particularly hurt the railroad industry;

--alters the region's natural environment, destroying fish and wildlife habitat and removing over 100,000 acres from agricultural, forest, and wetland production;

--causes damage to archeological sites;

--fails to address social factors that would sharply limit expected economic growth;

--diverts Federal funds from projects that would provide more concrete, long-range benefits to the public; and

--causes hydroelectric power losses to the Tennessee Valley Authority.

The Tenn-Tom project has been steeped in controversy since it was authorized about four decades ago, yet it has many supporters. The Congress has continued to fund it; the States of Alabama and Mississippi have contributed funds for highway, bridge, and other relocations; the State of Alabama is expanding the port facilities at Mobile Bay to handle its commerce; private and industrial funds are being spent for developments along its route; and it has much support from area residents.

The project has been the subject of two lawsuits by environmentalists, railroads, and others involving its environmental impact statement, economic analysis, and authorization. While all the issues are not yet resolved, the court rulings have not been adverse to continuing the project. The project was also reexamined when President Carter requested a full-scale investigation of it in early 1977. In a March 1977 hearing on that investigation in Columbus, Mississippi, over 9,000 interested citizens attended with less than 200 expressing opposition to the project. The resulting recommendation from the investigation was that the project continue.

TRANSPORTATION SAVINGS ARE ESTIMATED TO BE OVER $100 MILLION ANNUALLY FOR MOVING COAL AND OTHER COMMODITIES

The Tenn-Tom Waterway's primary purpose is to provide transportation savings--estimated by the Corps to be about $116.6 million annually--for movement of commodities such as coal, chemicals, grain, and metals. Tenn-Tom will link BWTW with the Tennessee River, creating a new transportation artery connecting the industrial centers in mid-America directly with Mobile Bay and the Gulf Coast. Tenn-Tom will shorten the waterway distance from northwest Florida to Pittsburgh, Pennsylvania, by 400 miles; from Huntsville, Alabama, to New Orleans, Louisiana, by 500 miles; from Kansas City, Missouri, to Birmingham, Alabama, by 740 miles; and from Chattanooga, Tennessee, to Mobile, Alabama, by over 800 miles.

Tenn-Tom also provides an alternate water route for users going between the Gulf of Mexico and the Tennessee, Ohio, and upper Mississippi Rivers. An alternate route can be very important when the lower Mississippi River (from the mouth of the Ohio River near Cairo, Illinois, south to New Orleans) is closed or major bottlenecks exist. For example, earlier this year waterway traffic on the Mississippi was reduced about 50 percent when a

drought caused very low river flows. At other times the Mississippi has been closed briefly due to accidents on the waterway. Waterway congestion is also becoming a problem in some areas, especially around New Orleans.

COAL EXPORTS ARE LIKELY TO INCREASE

At the 1979 Tokyo Economic Summit, the United States pledged to increase coal exports and at a May 1979 meeting of the International Energy Agency, joined 19 other industrialized countries in a pledge to increase coal use as a substitute for oil. An interagency task force was formed to determine how best to increase coal exports and to recommend actions needed by the Government and the private sector to achieve them. Further, the Deputy Secretary, Department of Energy, said in April 1980:

> "There can be no argument that we must export more coal to improve the balance of trade, take pressure off the dollar and dampen inflation, as well as lift the burden of oil from the backs of our allies, who are far more dependent on imports than us."

The report on the World Coal Study (1980) 1/ projected that U.S. coal exports could increase from 50 million tons in 1977 to 125 to 200 million tons by the year 2000. In addition, the report indicated exports could potentially increase to as much as 350 million tons by the year 2000. Steam coal is expected to make the largest portion of coal exports--from 11 million tons in 1977 to 65 to 130 million tons by the year 2000. Metallurgical coal will make up the remainder--from 39 million tons in 1977 to 60 to 70 million tons in the year 2000.

The Kearney study (see p. 45) showed that 1.2 billion tons of coal would be shipped on Tenn-Tom over its 50-year economic life--an average of 23.8 million tons yearly. This 1.2 billion tons represents about 2 percent of the 58 billion tons of recoverable reserves that the U.S. Bureau of Mines reported in 1976 for States in proximity to Tenn-Tom. Since completion of the Kearney study, indications are that export coal shipments will be even greater. Much of the export is expected to be steam coal--no steam coal was included in the Kearney study although it is available in the Tenn-Tom area.

1/"Coal Bridge to the Future, Report of the World Coal Study," 1980, prepared by a group of international experts, under Carroll L. Wilson, Project Director, Massachussetts Institute of Technology.

Enough coal reserves exist in the Tenn-Tom area to allow substantially increased coal exports. Also, Tenn-Tom's capability to transport large quantities of coal when coupled with the planned expansion of Mobile port facilities becomes an important factor in helping increase U.S. coal exports.

RECREATIONAL OPPORTUNITIES WILL BE EXPANDED FOR THE REGION

Tenn-Tom will provide a variety of water-related activities in an area where few recreational facilities existed in the past. The chain-of-lakes feature will create 40,000 acres of water for the virtually land-locked area between Demopolis Lake in Alabama and Pickwick Lake in Tennessee. Furthermore, the Corps plans to develop approximately 13,000 acres of land for recreational use, including 49 public use areas, along the waterway. When fully developed, the facilities will include boat-launching ramps, fishing piers, camping areas, hiking and equestrian trails, and beaches and picnic grounds, and the Corps estimates that about 7 million people will visit the area annually.

Tenn-Tom's numerous water impoundments will provide more opportunities for boating, fishing, water skiing, and other water sports. Furthermore, these waters will be deep enough to permit activities to continue throughout the year as opposed to pre-project conditions, when water levels in existing bodies of water would drop during the peak-use summer months. Access roads; boat-launching ramps; and parking, picnic, and beach areas will be provided to encourage public use.

The Corps developed the project's recreational facilities in cooperation with other Federal agencies and Alabama and Mississippi, giving special consideration to the States' comprehensive outdoor recreation plans. Both States have indicated plans to add lodges, cabins, golf courses, and tennis courts to enhance recreational use. The Corps has also indicated that it will lease property to local groups to develop marinas and other recreational facilities.

ECONOMIC GROWTH IS EXPECTED TO OCCUR IN THE REGION

Proponents say the Tenn-Tom project will add to the region's economy. Project construction has resulted in reduced unemployment, local purchase of millions of dollars of construction material and equipment, and expansion or creation of new businesses. Operation and maintenance of the waterway will also add to the region's economy. The completed waterway is expected to lead to further growth through increased industry, commerce, recreation, and tourism. This growth is expected to result in new job opportunities, higher paying jobs, and more private investment in an area that is economically depressed, where unemployment is high, and the economic growth rate has been slow.

TRAINING AND EMPLOYMENT OF UNSKILLED WORKERS, MINORITIES, AND FEMALES HAVE BEEN STRESSED

Because Tenn-Tom is located in a predominantly rural, economically depressed area where there has been little heavy construction in the past, area workers--who make up about 85 percent of the Tenn-Tom work force--were mostly unskilled. The local work force also included large numbers of minorities and females. The Corps set up programs to assure that goals for local hires--including minorities and females--could be met. Affirmative action plans were developed and hiring goals for minorities were established for each craft needed on the project. The Corps also sought help from the Southeastern Federal Regional Council to improve affirmative action in areas beyond the Corps' authority. The Council has established a Tenn-Tom Affirmative Action Committee to address minority needs. By June 1980, about 27 percent of all Tenn-Tom workers were minorities and about 6 percent were females.

The Corps has also worked to increase minority business participation in the project. For example, under a program started about 2 years ago, contractors were given percentage goals of their total subcontracts that were to be awarded to minority firms. The percentage goals generally ranged from about 5 percent to 25 percent of the contract amount depending upon the type of work to be subcontracted and the capabilities of minority contractors in the area. Minority firms have been awarded over $15 million in contracts.

The Corps also developed a program to train unskilled Tenn-Tom area workers. Training classes in basic apprenticeship skills were provided to area workers to help them qualify as skilled personnel in various crafts needed on the project. While over 72 have graduated (March 1981), mostly minorities and females, many others are still being trained. This training has been undertaken with the assistance of the Department of Labor, local unions, vocational-technical schools, and minority groups. While some graduates have been hired by firms not working on the project, the basic objective--assisting minorities--is being achieved and these skills can continue to be applied long after the project is completed.

LOCAL PARTICIPANTS HAVE MADE LARGE INVESTMENTS IN ANTICIPATION OF PROJECT COMPLETION

Proponents say it would be inappropriate for Tenn-Tom construction to be stopped when Alabama and Mississippi have contributed funds for highway, bridge, and other relocations; the State of Alabama is funding the port expansion at Mobile Bay; and other investments are being made by counties, communities, industry, and private citizens.

Tenn-Tom legislation requires local sponsors to share in project costs. The document supporting project authorization states that

> "The non-Federal agencies should bear the construction cost of all highway bridges and highway relocations, the cost of new transfer facilities, reconstruction or alteration of sewers, drainage, and water supply works, and maintain and operate all bridges and utility crossings except new railroad bridges across the divide cut."

The Corps currently estimates local participants' share of project costs at $170 million. Mississippi and Alabama have spent or plan to spend $80.5 million from State sources, while the U.S. Department of Transportation has provided $89.5 million under Public Law 94-280.

The Alabama State Docks Department has begun expanding port facilities at Mobile to handle the increased Tenn-Tom traffic. These improvements are estimated to cost $140 million and, according to the Department Director, will be financed by State of Alabama bond issues. He also told us that land has been purchased in anticipation of future port expansion. (See ch. 3 for details on the Mobile port expansion.)

Numerous other investments are being made by counties, community subdivisions, industry, and private citizens along the waterway where the project is nearing completion. Homes, vacation sites, and recreation facilities are being built with private capital. A local cattle and grain company has built a grain elevator along the Tenn-Tom route and has begun shipping grain. Another local businessman is developing an industrial facility adjacent to the waterway, which may be expanded into a port. Again, these developments are being financed with private capital.

BENEFIT-COST RATIOS TEND TO UNDERESTIMATE ACTUAL PROJECT BENEFITS

The benefit-cost analysis is a major tool, possibly the key factor, that the President, the Congress, and Federal agencies use in making decisions on proposed Federal water resource projects. Because the benefit-cost analysis yields a mathematically derived ratio, the tendency is to consider it as the "final answer," especially in making the decision to approve a project. However, the process of computing the ratio is laden with assumptions and judgments based on unknowns; consequently the ratio is imprecise and open to interpretation. The Corps' experience with other water navigation projects has been that actual benefits generally exceed what was projected.

The Corps does not include all benefits in its benefit-cost analyses. For example, benefits expected to result from the

Tenn-Tom project that were not figured into the calculation include regional growth, new jobs not related to actual project construction, and social aspects such as minority training and hiring.

The Corps estimates the current benefit-cost ratio (remaining benefits to remaining costs) for completing Tenn-Tom to be 3 to 1. The benefit component is large in this computation because navigation savings account for over 80 percent of project benefits. Little of these savings will be realized until the project is completed, while over 50 percent of construction costs have been spent.

The remainder of this segment discusses opponents' views of the project.

RESTRICTS TRAFFIC ON BWTW

Opponents have expressed concern about whether the Congress will be required to appropriate and spend about $3 billion to build what the Corps refers to as the ultimate project--from the Tennessee River to Mobile, Alabama. The ultimate project is made up of two parts--Tenn-Tom and the BWTW improvements south of Demopolis, Alabama. Tenn-Tom is estimated to cost $1.96 billion, and the improvements south of Demopolis are estimated to cost $960 million. Opponents say the portion south of Demopolis needs to be examined very carefully.

In 1975 the increasing costs of Tenn-Tom caused the Corps to reanalyze project benefits. The Corps' reanalysis showed the Tenn-Tom benefit-cost ratio to be favorable. However, the large volume of projected traffic from Tenn-Tom, when combined with the projected BWTW traffic, is considered to be a problem. BWTW south of Demopolis is too winding and channels are too narrow to permit passage of such large traffic volumes. The Corps recognized this problem when developing the Tenn-Tom benefit-cost analysis by constraining traffic on Tenn-Tom and BWTW above Demopolis. The Corps' 1976 reanalysis limited the traffic from Tenn-Tom and the existing BWTW to 29 million tons and 15 million tons, respectively.

Because of the restraints on BWTW capacity south of Demopolis, the Corps developed a plan for improving the channel and expanding the size of the locks to accommodate the combined projected traffic. These improvements are estimated to cost $960 million--$323 million (October 1979 dollars) for construction and $637 million for inflation to the end of the estimated construction period in 1997. Thus, oppnents say that if Tenn-Tom is completed and the projected traffic materializes, the additional $960 million BWTW improvements below Demopolis will be imperative. The opponents point out that the Corps' Deputy Chief of Engineers stated that improvements to this portion of BWTW are "directly attributable to the Tenn-Tom project."

ASSUMPTIONS USED TO COMPUTE NAVIGATION BENEFITS

Opponents claim that the benefits attributed to Tenn-Tom are invalid. They claim the economic justification depends heavily upon coal movements. Some of these movements claimed by Kearney and the Corps have not or will not materialize for the following reasons:

--Rather than being a typical locking river with a series of relatively wide and deep pools connected by a few locks Tenn-Tom is a shallow, narrow, manmade canal with relatively sharp bends and many locks. As a result, tows will have to be relatively small and the rates charged correspondingly high.

--Even though the distance from inland points to the gulf may be greater on the Mississippi River, large and faster tows allow traffic to operate more economically than on Tenn-Tom. In fact, the rates developed by Kearney show shipping on the Mississippi to be cheaper than shipping on Tenn-Tom.

--Corps benefit calculations were made assuming the most ideal conditions. For example, it was assumed that all tows would be of equal size and would move at the same speed. This assumption is not considered realistic because tow sizes will actually be mixed, creating delays and decreasing waterway capacity. The opponents question whether the remaining capacity is adequate to justify Tenn-Tom.

ALTERNATIVE TRANSPORTATION SERVICE IS AVAILABLE

Opponents say Tenn-Tom will duplicate taxpayer-supported transportation service in Alabama, Mississippi, and Tennessee. In addition to 5,500 miles of pipeline and 250,000 miles of municipal and rural highways, 11,500 miles of railroad track already exist and could ship coal to the Gulf Coast for the next 550 years. (Tenn-Tom's economic life is projected at 50 years.)

Taxes pay for construction and subsequent operation and maintenance of the waterway, and users will pay only a nominal fuel tax charge. Rail industry spokesmen have said the Federal Government, by constructing and operating waterways, has in effect provided an unfair taxpayer subsidy to the barge industry; as a result, barge rates are artificially low. They contend that no other form of transportation enjoys such large subsidies. When export coal is transported on the waterway, the U.S. Government is viewed as actually subsidizing the price of coal for a foreign country.

The rail industry views increased coal export traffic diverted to the waterway as a loss to its future business. With the waterway complete, many shippers who otherwise would use the railroad are expected to forsake it and ship by barge on Tenn-Tom. Because the railroad industry has very high fixed costs, a smaller traffic base ensures higher costs to remaining users.

THE REGION'S NATURAL ENVIRONMENT WILL BE RADICALLY ALTERED

Opponents state that Tenn-Tom will alter the surrounding natural environmental system and will have certain detrimental consequences. The Tombigbee River will be altered from a free-flowing stream to a series of impoundments. Fish and wildlife habitat will be lost due to inundation, and agricultural lands, forests, and wetlands will be eliminated by construction and disposal of excavated material.

Opponents say Tenn-Tom construction will affect several threatened species of fish and mussels (over 50 species have been identified in the river). Also, construction would eliminate one of the richest wildlife habitats in North America. In addition, they say that joining the Tennessee and Tombigbee Rivers will assure numerous cross introductions of species, including a parasitic lamprey; short nose gar; and a nuisance plant species, water milfoil.

Tenn-Tom is said to remove or substantially alter over 100,000 acres from agricultural, forest, and wetland production. These lands consist of about 12,000 acres of soybeans, corn, cotton, wheat, and pasture; 65,000 acres of timber, mostly hardwood with some pine; and about 35,000 acres of wetlands. (Included in the above lands are about 18,000 acres to be used by the Corps as disposal sites for excavated material.) (See pp. 58 and 59 for details on mitigating habitat losses.)

ARCHEOLOGICAL SITES ARE AFFECTED

Opponents are concerned about the large number of archeological sites that will be lost due to project construction. Over 800 archeological sites have been identified by cultural resource surveys along Tenn-Tom. Field investigations have determined that about 250 of these sites are potentially eligible for the National Register of Historic Places. Neither the exact number of these sites nor their significance have been determined. If a site is affected by the project, an evaluation involving consultation with the State Historic Preservation Office, the National Park Service, and the Advisory Council on Historic Preservation is performed. If a significant site must be altered by waterway construction, these groups must coordinate and determine the appropriate plan of action. About 20 sites are being or have been

salvaged under memorandums of agreement between the Corps and the Advisory Council on Historic Preservation.

SOCIAL CONDITIONS WILL AFFECT EXPECTED ECONOMIC GROWTH

Tenn-Tom, once justified only as a navigation aid, now is considered as a regional economic development strategy for the Southeast. However, opponents maintain that the project does not address the traditional deterrents to growth in rural Alabama and Mississippi: a poorly educated labor force with low skills and low productivity; an underdeveloped business sector hampered by an inadequate internal highway system; and a dispersed rural population scattered thinly across a large area.

Opponents state that funding for the project does not addres these problems. No funds are earmarked for adult education, to improve the transportation system, and to house the potential influx of workers. No assurance exists that the economic condition of minorities will improve.

Contractors have sponsored training classes to teach special ized skills to construct Tenn-Tom. However, one in every four me between the ages of 20 and 49 have, at most, an eighth grade education. Opponents claim that if manufacturers looking for a location are concerned with the potential labor force's ability to read, write, and cipher, then specialized labor courses are no the answer. The critical shortage of educated workers for the postconstruction period is considered to stifle economic expansio in the area.

Opponents also state that roadways in Tenn-Tom's impact area are in too poor a condition to handle the potential work force. No major highway connects Jackson, Mississippi, and Nashville, Tennessee, and Jackson and Birmingham, Alabama, are not connected by an interstate highway. Opponents believe that without good roads to connect thinly populated areas, industry may be hesitant to locate in the region.

Opponents contend that the waterway's impact on jobs has been exaggerated. A waterway attracts a limited number and type of industry and, if it does not provide hydroelectric power or waste or flood control facilities, tends to employ a relatively small labor force. They add that the commodities shipped on Tenn-Tom (coal, ores, forest products, clay, concrete, and stone) require little or no processing between production and purchaser. These factors also limit potential industry and employment along the waterway.

Finally, opponents say that waterways do not increase the economic growth in their vicinity to the extent that proponents claim. As an example, they point out that the entire eastern border of Greene County, Alabama, is on the Black Warrior Waterway,

which has been navigable since 1915. Yet, Greene County remains the poorest county in Alabama and the fifth poorest in the United States.

ALTERNATE USES FOR TENN-TOM FUNDS

Opponents believe that the large sums being spent on Tenn-Tom could be better spent for activities that would provide more gainful, long-range benefits than those claimed by Tenn-Tom proponents. For example:

--Transport facilities serving U.S. coal needs could be improved by enlarging the locks on the lower Tennessee River, replacing locks on the Monongahela River, or improving east coast port facilities serving the Appalachian coal fields.

--Tax breaks to the American public would increase purchasing power and investment capability, thereby stimulating the economy.

--Municipal waste and waste treatment facilities in most U.S. cities need construction or upgrading.

--Mass transit development is essential in the near future and will require considerable sums.

LOSS OF HYDROELECTRIC POWER

Opponents claim that hydroelectric power would be lost by diverting water from the Tennessee River through the Bay Springs Lock into the Tenn-Tom. This diversion would reduce the power benefits of the Tennessee Valley Authority (TVA) at Pickwick Dam and downstream projects in Kentucky. Tenn-Tom's lockage water requirements are estimated at 11 lock emptyings per day during the initial year of operation in 1986, increasing to 13 lock emptyings per day in 1991 and for the remainder of the project's 50-year economic life. The annual hydroelectric power loss to TVA is estimated to be valued at about $404,000.

DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, D.C. 20310

6 MAY 1981

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

Dear Mr. Eschwege:

This is in reply to your letter of April 6, 1981 to the Secretary of Defense regarding a proposed draft report entitled "Tennessee-Tombigbee Waterway--Some Answers to Help Resolve Difficult Issues." (OSD Case #5684)(GAO Code 080570)

I should point out that, while this written reply was not transmitted to you within the 15-day period requested, we have, as you know, provided GAO with relevant data and comments during the course of two meetings, the first held on April 17, 1981 and the second on April 20, 1981.

My response to your request does three things: (1) it addresses the questions raised in your transmittal letter concerning disclosure of confidential data and on assumptions on termination costs; (2) it articulates our position on the two issues which the GAO report identifies as major ones, namely, evaluation of navigation benefits for the TENN-TOM project and the relationship between that project and the needs for waterway improvements south of Demopolis; and (3) it states the Department of the Army's view that the project should now be completed.

The Disclosure Issues

In your transmittal letter, you asked for comments on whether data in the benefit discussion would disclose confidential data. This is not an easy determination to make, but it appears there is no significant problem of disclosure. You also asked for comments on whether publication of the termination cost assumptions could jeopardize the Federal Government's interest in settling termination claims. These assumptions are so broad that potential claims should not be jeopardized.

GAO note: Page numbers in appendixes II through VII referring to our draft report have been changed to agree with page numbers in the final report.

Mr. Henry Eschwege

GAO Major Remaining Issues

At the heart of GAO's treatment of the navigation benefits issue is a comparison of projected and actual commodity movements on the TENN-TOM Waterway for 1980. The relevant issue is not whether projected waterway movements actually materialize, but rather, whether the Corps of Engineers used the appropriate economic estimating procedures. In estimating navigation benefits, the Corps of Engineers used procedures accepted by knowledgeable navigation economists in making user surveys, that is, they used the concept of a "snapshot in time." Accordingly, we believe that the Kearney survey is without significant flaw. In this regard, we are in full accord with the GAO conclusion on page iii of the report digest that "the evidence is not strong enough to conclude that the 17 movements were not properly included in 1976 when the benefit estimate was made." We believe that it would be appropriate for the GAO report to reflect this conclusion. This would put an end to public concern related to "phantom movements" allegations of project opponents.

[GAO COMMENT: See discussion on pages 29 and 30.]

The second major GAO-identified issue related to the potential improvement to the waterway south of Demopolis. Completion of the Tennessee-Tombigbee Waterway does not force an additional related project. That would be a separate new investment decision based on study and Presidential and Congressional action. Preliminary indications from ongoing studies are that certain modifications could improve the efficiency of the waterway; however, prediction of a recommendation to the President and Congress is highly speculative at this time. If this recommendation is ever made, it will be based on the results of completed comprehensive studies demonstrating the merit of further investment. I should add that the GAO cost estimate of $960 million, sometimes rounded to $1 billion, included in the report for this downstream project is incorrect. This estimate should be corrected to $323 million (October 1979 price levels), since the $960 million estimate includes $637 million for inflation.

[GAO COMMENT: See discussion on page 47.]

Additional comments on the proposed draft GAO report prepared by the Corps of Engineers, are enclosed.

Mr. Henry Eschwege

Army Position on Completion

Whatever may have been this Department's assessment of the economic merit of the TENN-TOM Waterway in the past, that issue, as the GAO report correctly states on page ii of the digest, no longer has the same importance it once did. The economic justification in favor of project completion no longer can fairly be challenged, when justification is considered on a remaining benefits-remaining costs basis. The project should be completed. Your review and report certainly leads to no other conclusion.

[GAO COMMENT: We answered specific questions in our review and did not do the work necessary to reach a conclusion on whether the project should or should not be completed. Therefore, any conclusion about our position being either for or against completion of Tenn-Tom is incorrect.]

Sincerely,

Robert K. Dawson
Deputy Assistant Secretary of the Army
(Civil Works)

Enclosure

APPENDIX II

COVER SUMMARY

1. Project costs should be reported in a consistent manner. If a $2 billion total project cost is to be used that includes non-federal costs, then the reporting of expenditures to date should also reflect non-federal expenditures. Thus, the $1.1 billion expenditure through fiscal year 1981, should be $1.3 billion.

[GAO COMMENT: The correct amount as of March 1981 is $1.1 billion. We believe it would be inappropriate to show $1.3 billion as expenditures since that amount will not be reached until October 1981.]

2. The $1 billion project cost on the last line should be $323 (October 1979 price levels). The $1 billion estimate includes $637 million for inflation.

[GAO COMMENT: Revised to show project cost of about $960 million--$323 million for construction (Oct. 1979 dollars) and $637 million for inflation to the end of the estimated construction period in 1997.]

APPENDIX II

DIGEST

1. Page ii, first paragraph. The total loss should be $1.3 billion rather than $1.1 billion. The $1.3 billion includes the non-federal expenditures.

[GAO COMMENT: We disagree. The $1.1 billion figure is as of March 1981 ($980 million in Corps obligations plus approximately $140 million in local funds.) The investment as of September 1981 is estimated at $1.3 billion.]

2. Page ii, second paragraph. Change $960 million to $323 million, and indicate it is Congress that will have to authorize and fund, rather than: "the Corps will need to make."

[GAO COMMENT: Paragraph has been reworded to show that the $960 million figure is made up of both a construction estimate of $323 million and an inflation estimate of $637 million. Paragraph was also changed to show that the Congress will have to authorize improvements south of Dempolis.]

3. Page iii, first full paragraph. The Corps study did not identify potential users of the waterway. The 121 movements were those that potentially "could realize a savings by using the Tenn-Tom."

[GAO COMMENT: Revised to reflect the wording suggested.]

4. Page iii Substitute a comma for the period at the end of the first sentence and add: "and that several shipments, not predicted by Kearney, have occurred." Replace the second sentence of Insert A with: "This raises the question of the appropriateness of using and marginally adjusting the original Kearney study to arrive at a new estimate of benefits."

[GAO COMMENT: Paragraph has been reworded to more clearly state what we mean.]

5. Page iv, Project Capacity, first paragraph. Change the word maximum to "appropriate."

[GAO COMMENT: We deleted the word "maximum."]

6. Page v, Project Capacity, second paragraph. Modifications to the lower river waterway are estimated to cost $323 million (October 1979 price levels). The $960 million includes an estimate for inflation through the construction period. If this project is ever recommended it will be evaluated by Congress as a new investment decision, and would have to stand on its own merits.

[GAO COMMENT: Paragraph revised to show that the $960 million figure includes both a construction and inflation estimate. We believe the change concerning congressional evaluation is not needed as we note that such a project would have to be proposed to the Congress.]

7. Page v, Project Capacity, second paragraph. This paragraph is inaccurate. Traffic projection south of Demopolis are limited by constraints above. At Oliver lock on the BWT to 25-30 million tons, and at the Bay Springs lock on the TTW at 55 million tons.

[GAO COMMENT: Paragraph changed to more clearly reflect the problem of constraints and traffic limitations.]

8. Page vi, sixth line. Change "enhance" wildlife habitats to: "mitigate loss of wildlife habitats."

[GAO COMMENT: Change made as suggested.]

9. Page vii, first paragraph. The Corps does not estimate local sponsors costs. They make their own estimates and provide them to the Corps.

[GAO COMMENT: Changed to show that the Corps reported local sponsor costs.]

CHAPTER 1

INTRODUCTION

1. Suggested revisions were provided to the GAO on 17 April 1981.

[GAO COMMENT: Suggested minor revisions were made as appropriate.]

2. On pages 4 and 5 the section on "Lawsuits Against the Tenn-Tom," omits significant information on how the plaintiffs' allegations were resolved. The following discussion needs to be included:

The plaintiffs' attorneys conducted extensive discovery proceedings against the Corps and the Army; each side submitted several memoranda of law to the trial court (the U.S. District Court for the Northern District of Mississippi); the Court conducted two evidentiary hearings of one week each. On March 12, 1979, the trial judge ruled that all but one of the numerous features and dimensions of the Tenn-Tom which the plaintiffs had challenged were in fact legally authorized, and that the Corps and the Army had used their discretionary authority to alter project design responsibility and legally.

Only one of the many challenged design features of the project did not receive the court's explicit approval. Concerning that issue--300-foot channel width--the court held that no decision was necessary or possible, because the plaintiffs' challenge to the 300-foot width was barred by the equitable doctrine of laches.

The plaintiffs appealed the trial court's decision, but it was affirmed on appeal by the U.S. Court of Appeals for the Fifth Circuit, which later denied the plaintiffs' request for a rehearing en banc. The plaintiffs then petitioned the U.S. Supreme Court to hear their allegations on the authorization issues. The Supreme Court denied certiorari.

Subsequently, on October 1, 1980, the District Court, having received several additional memoranda of law from all parties on the remaining environmental law and economic counts of the lawsuit, granted summary judgment for the Corps of Engineers, and dismissed with prejudice all but one of those counts. The Court later received additional memoranda of law on that one remaining count (concerning whether or not the Corps should have published certain regulations in the Federal Register); then the Court dismissed that count with prejudice, as well. The plaintiffs have appealed to the Fifth Circuit again. The Court of Appeals denied plaintiffs' request for an injunction pending appeal, and heard oral arguments for the appeal on April 6, 1981.

[GAO COMMENT: The Corps is amplifying our discussion concerning Tenn-Tom litigation. Since we recognized that in both lawsuits the court has ruled against the plaintiff, we do not believe any changes to the report are needed.]

3. Page 7, on the cost to complete the project. The initial appropriation requested for fiscal year 1982 was $204 million. The revised appropriation requested in President Reagan's budget request was $201.1 million.

[GAO COMMENT: Change made, as suggested, to reflect President Reagan's recent budget request.]

4. Page 6, project completion date. The navigation portions of the project are scheduled for completion by September 1986. The entire project, with recreation facilities delayed due to the revised fiscal year 1982 budget request, is now scheduled for completion March 1988.

[GAO COMMENT: Change made, as suggested, to reflect slippage in the project completion date.]

APPENDIX II

CHAPTER 2

BENEFIT CALCULATIONS

1. A. T. Kearney, Inc., is an internationally known management consultant firm, a leader in the transportation field since 1926. Their studies on this project used the proper procedures. It is natural for changes to have occurred in a dynamic market place in six years. That movements have failed to materialize, or that new ones have appeared, is not germane. The 1975-1976 study methodology was correct, in full compliance with professionally accepted standards of economics, and the results led to sound decisions.

2. Questions about the economic study should be addressed to methodology and not to specific movements. The fact that individual movements have not occurred has been used by opponents to discredit the analysis, when, in fact, this only demonstrates the difficulty of making projections in a changing market place. Equal weight should be given to the several companies identified by the GAO as potential users of the waterway, which were not included in the economic base (page 17). While the information on specific movements, that GAO categorizes as not materializing, have been presented in great detail, only a bare mention, with no quantification, is given to the potential movements discovered which are not included in the base. Since these "new" movements were found with only a cursory review by GAO, undoubtably there are additional potential movements which also are not included in the benefit base. While a complete resurvey would certainly require additional time and expense, it does not appear that it would be too difficult to provide additional documentation on the identified movements.

[GAO COMMENT: See discussion on pages 29 and 30.]

3. Other than a casual mention that GAO contacted various officials of companies included in the economic base, it is not apparent from the draft report what methodology was utilized by GAO in attempting to determine whether certain specific movements materialized. It is also difficult to ascertain what GAO uses as a definition of a movement materializing. Does this mean that it never occurred; or that it did not occur precisely as presented in the economic base; or that GAO did not look further to determine if a similar movement was occurring? In any event, from the information presented it appears that a very restrictive view was taken regarding these movements. No apparent consideration was given as to whether similar movements of commodities were occurring but were being accomplished by different companies. Statements by GAO on page 20 seem to indicate that this may be the case. Neither the Corps nor Kearney has been furnished the information obtained by GAO in their evaluation; therefore it is impossible to check the validity of this exercise without an independent survey.

[GAO COMMENT: The question and answer concerning whether a movement had or had not materialized are discussed in detail on pages 16 to 22. We defined materialized as meaning whether the movement had actually occurred. The 17 movements included in our detailed review were listed by Kearney as either already moving on an alternate route at the time of its study in 1975 or would be moving by the end of 1980.]

To verify whether these movements had actually taken place, we talked to key officials of each of the 17 companies--where possible to the same official that supplied Kearney with its information. A movement was shown as not materializing only when these key officials said it was not; further, we discussed why it did not occur. If the official(s) said it was moving, even if the volume was less than Kearney projected, that movement was shown as having occurred. Whether movements similar to the ones that did not occur were occurring by other companies can only be accurately ascertained by a new study.

The Corps in its comments may be referring to the question and answer covered on pages 22 to 24. This question concerned whether the Corps included movements in the benefit base when data indicated that such movements would never materialize. In answering this question, we noted that while we had some questions about six of the movements, we did not have sufficient basis to conclude that they should not have been included. Our concerns were based on the fact that the (1) movements were not based on definite plans or (2) tonnages shown could not be verified by supporting documentation.]

4. Shipments not included in the base, and those "not materializing," only raise questions about the appropriateness of marginally adjusting the original Kearney study to arrive at a new estimate of benefits. Apparently GAO does not challenge the economic theory, but the method utilized by GAO violates the very premises upon which the economic theory is based. While it is recognized that GAO was attempting to answer specific questions, it should also be recognized that, as in this case, the answers do not tell the whole story. Any adjustments to the base must be made with an entirely new survey recognized by GAO on page 22.

[GAO COMMENT: See discussion on pages 29 and 30.]

5. We also have advised GAO that a review of past Corps studies would reveal that the projected mix of movements rarely reflects the actual mix of movements. One documented example of this is the McClellan-Kerr Waterway where specific commodities vary greatly, and specific origins and destinations vary even more. A second example is the L&D 26 projections of 1975, which were done by a mix of interview and non-interview techniques. It should also be noted that generally the overall projections were too low. For a more detailed discussion, see Hearings before the Subcommittee on Water Resources of the Committee on Environment and Public Works, United States Senate, on Transportation Needs of Increased Coal Production and Completion of the Tennessee-Tombigbee Waterway, July 25, 28 and 29, 1980. (Serial No. 96-H56.)

[GAO COMMENT: Our report discusses on pages 98 and 99 that the Corps has stated that its actual experience shows that benefits generally exceed that which the Corps projected. We did not review past Corps benefit-cost studies so we cannot ascertain the correctness of the Corps' comments concerning projected mix of movements.]

CHAPTER 3

PROJECT CAPACITY

1. The table on page 36 represents the potential traffic from the TTW that could pass Demopolis if no constraints existed. Based upon the assumed operational patterns, Bay Springs Lock restricts the Tenn-Tom traffic to 55 million tons. Page 87 should also be revised to reflect this fact.

[GAO COMMENT: The Corps is correct, and appropriate revisions have been made.]

2. Waterway capacity determinations are dependent upon qualifying assumptions such as those shown on page 32. These assumptions describe the anticiapted operational pattern. Although the tonnage expected on a waterway is expressed as the "capacity," this value does not represent a finite limitation. The 44 million tons for Demopolis lock and the 15 million tons for the BWT are projections based upon variable assumptions and not absolute quantities. Capacities can be altered by modifying these assumptions. As examples, reductions in the number of empty backhauls, or an increase in the tons per tow, can increase capacity without changing the number of lockages.

3. Discussions of the effects of the TTW on the BWT need to consider that the projected 44 million tons was based on an assumed operational pattern which included an average loading of 2500 tons per tow for BWT traffic. Actual data for 1979 and 1980 indicate an average loading of about 4000 tons per tow for BWT traffic through Demopolis and Coffeeville locks. Although one could anticipate that on this basis the BWT portion of the capacity could be increased from 15 million tons to 24 million tons, the actual increase would be less than anticipated because of longer service times for the larger tows and other factors.

4. Operational characteristics of the local towing industry may change due to fuel cost increases, the availability of a larger service area with the completion of the TTW and other factors. It is anticipated that the trend will be toward larger tows and thus increased tonnages per tow, which in turn will lead to an even greater capacity at the locks. Experience at lock and Dam 26 indicates that as congestion increases, measures are taken to improve efficiency of operation. This of course represents a changed operational pattern and thus an increase in capacity.

[GAO COMMENT: The above comments are further amplification of how changes in operating patterns impact on capacity limitations. (See discussion on p. 47.)]

5. The TTW is justified on its own merit without any improvements downstream of Demopolis. The Corps is preparing a feasibility report that will provide more definitive information on the capacity questions, and on the advisability of downstream modifications. The ultimate determination of the public interest and the need for Federal investments in downstream modifications rests with the Congress.

APPENDIX II

[GAO COMMENT: We have recognized these points several places in our report. (See discussions on pp. 39 to 41.)]

6. The first full paragraph on page 40 attributes statements to the Mobile District Executive Assistant that do not adequately reflect his position. Revised remarks were provided on April 17th together with suggested reorganization of this chapter to clarify the answers. These were:

(1) Relocate the above paragraph, as revised, from page 40 and include this material in paragraph 3, page 33.

(2) Relocate the first paragraph at top of page 36 into answer of question at bottom of page 37. The answer to this question should also be expanded to address the constraints on the BWTW north of Demopolis such as the more restrictive channel, sharp bends, Oliver Lock size, and other factors.

[GAO COMMENT: Changes suggested by the Executive Assistant to the statement on page 40 were made as appropriate. The location of the two paragraphs was not changed as we believe they are appropriately located. We also believe, as shown on pages 35 and 39, that we have adequately addressed the limits on BWTW north of Demopolis.]

CHAPTER 4

COST ESTIMATES

1. General Observations. On 6 March 1981, the Director of Civil Works transmitted Corps of Engineers comments on Draft Summary #1, which dealt with cost estimates. The views expressed in the transmittal letter are still applicable, and pertinent excerpts are provided below:

[GAO COMMENT: The March 6, 1981, comments have been incorporated where appropriate.]

a. We believe our actions in reporting costs were appropriate, i.e., fairly and timely. Based upon professional judgment and experience, the Corps decided to report the lower $815 million figure in support of the fiscal year 1976 budget. That figure could be supported based on approved design, in accordance with the procedures then being followed, until such time as the cost estimate could be substantiated and an economic reanalysis was available.

b. During the fiscal year 1976 testimony, both the Senate and House Committee on Appropriations were advised by the Corps that, "Due to recent rapid escalation of transportation and construction costs and the lengthy period since the 1963 field survey, an economic reanalysis based on new field traffic surveys, current freight rate analysis and updated construction costs has been initiated. The results of this analysis will be available in January 1976." These studies were completed and a firm cost estimate and updated benefits were provided to Congress and the Executive Office of the Administration, and they chose to continue construction funding, as they have every subsequent year.

[GAO COMMENT: The Corps' reasons for reporting the $815 million estimate are discussed on pages 55 and 56. Although the Corps told the Congress that it was performing an economic reanalysis, we believe the Corps could have been more specific. (See p. 54.) After reporting the $815 million estimate in January 1975, the Corps had ample opportunity to report the higher cost estimates but did not do so until August 1975.]

c. This is not a typical water resources project by today's standards, and that is partly the basis for cost estimating problems. Preauthorization planning, completed prior to 1946, was not as detailed as would be the case today. There was relatively little detailed design work available when construction was initiated in fiscal year 1971. During the period of rapidly increasing costs, major elements were in various stages of design, and therefore there was not as firm a basis for estimating costs as would have been desirable. Bid experiences at Aliceville and Gainesville indicated serious problems with the estimates based upon approved design memorandum and cost indexing. The Army Audit Agency was asked by the Assistant Secretary of the Army (CW) to review the significant changes to determine whether cost estimating and contract award procedures complied with applicable regulations. Their report suggested changes in our estimating and reporting procedures, most of which were adopted. This experience has been a source of significant criticism,

debate, and adverse publicity. While we would have perferred not to have gained this exposure, there was no effort to withhold information, and we have benefited because the experience was instrumental in improving our cost estimating and reporting procedures.

[GAO COMMENT: The Army Audit Agency report is discussed on page 50. Cost estimating procedures are discussed on pages 50 to 54.]

2. It should also be noted that, as explained to GAO in a meeting on 17 April, the date that the $1.21 billion estimate was prepared was in August 1975, not January 1975 as stated on page 56 of the GAO draft report. Documentation furnished to GAO at the referenced meeting indicates that this particular estimate was a "what if" estimate which was used for briefing purposes. References to this estiamte should therefore be corrected and placed into proper perspective.

[GAO COMMENT: This section was revised to reflect the Army's comment.]

APPENDIX II

CHAPTER 5

FISH AND WILDLIFE COORDINATION ACT

1. The development of this project includes a long period of consultation efforts by the Corps of Engineers with the Fish and Wildlife Service, Department of the Interior, and with State wildlife agencies. Both the 1960 GMD, and the 1966 Supplement to the GMD reflect coordination with the Fish and Wildlife Service and basic agreement between the Corps and the Service on measures that would be taken the maximize fish and wildlife benefits and to minimize losses. The final Environmental Impact Statement of 1971 reflects the views of the Service, and raises no objection concerning lack of a final proposal for acquistion of mitigation lands. The 1971 EIS also contains reports from the wildlife agencies of Tennessee, Alabama, and Mississippi. The Corps continues consultation efforts with Federal and State fish and wildlife agencies to the present time.

2. Chapter 5 should include discussion on the numerous measures that have been incorporated into the planning design and construction of this project, for the purposes of environmental protection and enhancement. Some of these measures include:

a. River Sections.

(1) Disposal Measures--Two celled diked disposal sites, with buffer strips surrounding the site for aesthetic and ecological purposes. Sites located to minimize adverse impacts on wetlands and other important resources. U.S. Fish and Wildlife Service (FWS) participated in the selection of the sites and EPA approved the disposal measures and the sites. State water quality certification has been obtained.

(2) Fixed Crest Spillways and Minimum Flow Structures--The dams in the River Section include either fixed crest spillways or minimum flow structures to ensure that uninterrupted minimum flow is maintained in the interest of good water quality. Reaeration devices have been incorporated into the structures to insure maximum reoxgenation.

(3) Modified Clearing Plans--A policy of selected clearing has been adopted to improve wildlife, water fowl and fishing habitat. Special fish attractor areas are being incorporated to improve the lake fisheries.

(4) Resiting of Columbus Lock and Dam--The damsite was changed to protect and preserve a valuable paleontological site (fossils).

(5) Channel Alignment--Channel alignments were shifted to protect valuable cultural resources such as archeological sites and to minimize the adverse impacts on wildlife resources.

b. Canal Section.

(1) Adoption of Chain-of-Lakes Concept--This plan maximizes the aesthetic and recreational potential of this section of the waterway. Additional wetlands resources will be created. Minimum flow structures have been incorporated to maintain flow in severed tributaries and to preserve the wetlands resources of the Tombigbee River Flood Plain.

(2) The levees are being constructed to provide improved aesthetic quality. Buffer strips are incorporated and revegetation is planned to protect the structures and to provide wildlife habitat.

(3) By-Pass Structures--In the interest of protecting and enhancing water quality, provisions have been incorporated to ensure that adequate flow is passed down the canal to prevent stagnation and improve the assimilative capacity.

(4) Grade Stabilization Structures--These structures are being placed where tributary streams enter the canal from an elevation above the normal pool. They prevent scour, control erosion and trap sediment. In addition, reoxygenation is provided in the interest of water quality.

c. Divide Cut Section.

(1) Disposal Measures--The disposal measures adopted for the Divide Cut evolved through the application of interdisciplinary environmental planning. The sites were selected to minimize the impacts on important cultural and wildlife resources. The sites are designed to provide erosion control and to protect water quality. Special studies have been conducted to ensure proper revegatation. Wildlife ponds are incorporated in the disposal sites and the Mississippi Game and Fish Agency will manage these disposal areas as well as surrounding lands to promote wildlife propagation.

(2) Erosion Control Measures--In addition to the measures mentioned above, several techniques are being incorporated to minimize erosion and to protect water quality. Examples include sediment ponds, diversion ditches, terraces, interim revegetation, slope berms, retention dikes, silt screens, check dams, and the use of chemical floculants.

(3) Water Quality Measures Bay Springs Lock and Dam--Elaborate physical and mathematical model studies have been conducted to insure that the design measures incorporated into this project feature would result in the release of good water quality. In addition, provisions have been incorporated to ensure that water can be released downstream to protect water quality and fish and wildlife resources, even if the Bay Springs Lock is out of operation.

(4) Modified Clearing Plans--The clearing plans for Bay Springs Lake have been modified in a fashion similar to that being done for the River section. This will be beneficial to the wildlife, waterfowl and fishery resources.

[GAO COMMENT: Although we do not question the Army's claimed environmental protection and enhancement measures, they are outside the scope of this review.]

APPENDIX II

CHAPTER 6

LOCAL SPONSOR'S OBLIGATIONS

1. The work required to restore the local road network disrupted by the navigation project was authorized as a non-federal responsibility. The federal government does not design this network nor have the responsibility for determining what relocations constitute satisfactory replacement. The Corps annually requests an updating of the project-related local replacement needs, and the associated costs, from the states and local sponsors, for use in preparing budget testimony. This data forms the basis for the $3.6 million non-Federal cost included in the fiscal year 1982 budget request.

[GAO COMMENT: This report was revised to clarify that these estimates are not prepared by the Corps.]

2. During our evaluations of the access road relocations, it was determined that the Walkers Switch Access Road included in the Fiscal year 1982 budget request, is not a waterway relocation. The local cost for this work will be deleted from the next updated cost estimate.

[GAO COMMENT: When the Corps removes this road, it should lower the estimate by about $1.2 million.]

3. The Appalachian Regional Commission (ARC) access roads are related to the waterway in that they provide access to recreation sites, industrial areas, ports and marinas, etc. Their program takes advantage of the waterway to help in the development of the Appalachian region. The access roads included in the Corps project cost estimate are limited to those necessary to restore the local traffic network severed by the project.

[GAO COMMENT: The report was revised to clarify the different purposes of these roads. (See p. 66.)]

4. The Corps and ARC both list the Old Macon Road as a relocation necessitated by the waterway. Further analysis of this relocation reveals that the portion of Old Macon Road relocated because of the Tenn-Tom construction was totally financed by the local sponsor. An extension of this road to improve the integrity of the county road network is being jointly funded by ARC and Lowndes County, Ms., thus explaining why this road is listed by both agencies.

[GAO COMMENT: Discussion of this road relocation has been removed to reflect the Army's comment.]

CHAPTER 7

TERMINATION COSTS

1. The Corp's estimate of termination costs must be placed in proper focus. The estimate was in response to request from a Senate Subcommittee, as part of information provided for oversight hearings. Assistant Secretary Blumenfeld was notified on July 17, 1980, of oversight hearings to be held on July 25, 1980. Over 100 contracts were analyzed by Mobile and Nashville District personnel in a very short period of time, to develop the data for the costs of terminating the project.

2. Many assumptions had to be made regarding contract liquidations, protection of completed works, real estate settlements, and other matters, because we have little experience with project terminations. A quick answer on a project of this size, with so many elements in various stages of development, necessitated some generalized assumptions. There was not sufficient time for detailed studies nor review of the estimates. This is not to say that the data produced was inadequate.

3. The Corps often receives requests for information with a short leadtime. We do the best job possible in responding to these requests, relying on our experience and professional judgment. The termination cost estimate developed for the July and August 1980 hearings was a good estimate, given the lack of a precedent and the timing. As with any estimate, its use should be with a full understanding of the purpose for which it was developed. Lieutentant General J. W. Morris, in his testimony before the Senate Subcommittee on August 21, 1980, indicated the Corps had studied the effects of termination, but not in depth.

[GAO COMMENT: See discussion on pages 82 to 84.]

4. The GAO estimate of a $143.501 million termination cost, as of 1 March 1981, was developed using the same generalized Corps assumptions. We have no basis for challenging this estimate.

[GAO COMMENT: The development of this estimate is shown on page 81. Using this estimate along with certain other information, we estimated savings at approximately $685,000 if the project were terminated in March 1981.]

5. On 17 March 1981, Mobile District received a Congressional request for updated termination costs. New estimates were developed in an extremely short time period, using the previous Corps assumptions except that a 25% contingency factor was included for government costs and unknowns. A new estimate was computed assuming termination at the end of fiscal year 1981 for the portion of the project north of Columbus lock and dam, completion of the project south of that point, and restoration of the canal section.

[GAO COMMENT: See discussion on pages 82 to 84.]

CHAPTER 8

ISSUES FOR RESOLUTION BY THE CONGRESS

1. Our comments on Chapters 1-7 should be incorporated into Chapter 8.

[GAO COMMENT: The Corps' entire comments have been included as appendix II. Also, we have shown in each chapter what we believe to be the basic thrust of the Corps' position on the subject covered by that chapter.]

2. As discussed previously, Congress is not sowing the seed for a future project. The Tenn-Tom is an independently viable project without any modifications to the existing inland navigation system. Although modifications to the existing BWTW south of Demopolis, along with other system modifications, are under study in the interest of maximizing the economic efficiency, no recommendations have been developed. If, at a future date, recommendations are made to Congress, the decision as to whether to authorize them would be a separate decision based upon the facts and circumstances at that time. Construction would be yet another separate investment decision for Congress to make after authorization, if any. In any event, the cost should be shown as $323 million (October 1979 dollars), the latest estimate available.

3. If both waterways are to reach their full potential, some modifications in the BWTW south of Demopolis may be required as discussed in the last full paragraph of page 86. However, as previously discussed there are constraints that exist on both waterways which preclude the movement of traffic levels as projected in the economic studies. These projections are intended to reflect "economic growth of the area" and do not recognize any constraints in the transportation systems whether it be rail, highway, water or air transportation. Constraints exist in all the systems. As an agency responsible for the planning for the efficient development of water resources, the Corps should identify waterway constraints as they become known. Just as an extension of a highway doesn't, of itself, force improvements to the existing system, neither does the addition of the Tenn-Tom to the inland navigation system automatically force modifications of existing systems.

[GAO COMMENT: See discussion on pages 88 and 89.]

4. Page 88. Alternative financing of water resource developments is a complex issue, the merits of which have long been debated. The recommendations by the GAO raise questions about its responsibility for doing so, and about the advisability of recommending and not exploring the ramifications.

[GAO COMMENT: We agree that alternative financing is a complex issue that has long been debated. We raised the issue only to point out that, in considering what to do about Tenn-Tom, the Congress could explore ways to complete the project and reduce Federal expenditures. In this connection a Senate bill (S. 810) was introduced on March 26, 1981, to provide for the recovery of capital and operation and maintenance costs on certain Corps inland waterway projects.]

APPENDIX II

CHAPTER 9

OBJECTIVE, SCOPE, AND METHODOLOGY

This chapter is introductory material which would be more appropriate at the beginning of the report.

[GAO COMMENT: In drafting the report, we considered putting this section after the introduction. However, it was decided that the section fits better at this place in the report. A reference to this chapter has been made in chapter 1.]

APPENDIX I

ARGUMENTS FOR AND AGAINST THE TENNESSEE-TOMBIGBEE PROJECT

1. This Appendix should be deleted. It adds nothing but confusion, contains exaggerations, inaccuracies, distortions, and allegations not addressed in the audit.

2. As a minimum, the assumed project impacts should address the current condition of the waterway area, and not present pre-project conditions, such as the environmental impacts presented on page 101. Depending upon what type measures were taken for restoration, and the amount of funds that would be available to accomplish this restoration, the impacts on the environment associated with project termination could vary significantly. Because of the extensive measures that have been taken by the Corps to minimize environmental damage and to maximize the improvement and protection of environmental quality, it would certainly be difficult at this stage of project completion to envision a betterment in the overall environmental quality of the project area with the waterway terminated.

[GAO COMMENT: We disagree with the Corps' comments concerning appendix I. We believe that it is advantageous to both proponents and opponents to summarize the arguments advanced for and against Tenn-Tom. Controversy has been swirling around this project for years, and to present this information in one place, in our view, is helpful to a reader. Concerning whether there are exaggerations, inaccurracies, or distortions, we noted that the information shown was not based on our review. In fact, most of the information in this chapter has come from Corps documents; publications of the Subcommittee on Energy and Water Development, Senate Appropriations Committee; and hearings of the Subcommittee on Water Resources, Senate Committee on Environment and Public Works.]

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

APR 23 1981

Mr. William J. Anderson
Director
General Government Division
United States General Accounting Office
Washington, D. C. 20548

Dear Mr. Anderson:

This is in reply to your letter of April 6, 1981, enclosing a copy of the GAO proposed draft report entitled "Tennessee-Tombigbee Waterway -- Some Answers to Help Resolve Difficult Issues." The report is a very balanced presentation of the questions which must be addressed concerning the Tennessee-Tombigbee Waterway. Our comments on the report are very brief.

The remaining benefit to remaining cost ratio is mentioned in the report on Page 99. We would point out that this ratio is an analytical tool which can be used as a factor in making budget decisions on the continued funding of a large capital project like the Tennessee-Tombigbee Waterway. As noted in your report, the remaining benefit to remaining cost ratio for the Tennessee-Tombigbee Waterway is currently 3.0. The fact that this ratio supports the continued funding of the Tennessee-Tombigbee Waterway should be expressly mentioned in your report.

[GAO COMMENT: OMB is correct in stating that the remaining benefit to remaining cost is a factor in making budget decisions on Tenn-Tom. As suggested, we have noted this in the introduction chapter rather than just in appendix I.]

We also believe that the question of developing a new federal project to expand the existing Demopolis to Mobile Waterway is unrelated to the question of completing the Tennessee-Tombigbee project. Should such a project be authorized by the Congress, it would be subject to the same policy review and competition for scarce budget resources as any other potential new water resource project before being included in the Administration's budget.

[GAO COMMENT: See discussion on pages 88 and 89.]

APPENDIX III

I want to thank you for providing us with the opportunity to comment on this draft report.

Sincerely,

Frederick N. Khedouri
Associate Director
for Natural Resources,
Energy and Science

APPENDIX IV

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

APR 24 1981

Mr. Henry Eschwege
Director
United States General
Accounting Office
Washington, D.C. 20548

Dear Mr. Eschwege:

This is in response to your request for review of that portion of your draft report, Tennessee-Tombigbee Waterway--Some Answers to Help Resolve Difficult Issues, dealing with fish and wildlife mitigation. The material contained in that section is accurate but one question needs additional input.

Question

What are the latest estimates of mitigation cost on Tenn-Tom?

Answer

The GAO answer needs clarification.

The $32,500,000 estimate was provided to us by the Mobile District based upon their prior experience along the waterway. It is not an independent FWS estimate.

The O&M figure of $318,000 is only partially correct. For the 97,000 acres of lands recommended for separate purchase, the $318,000 is accurate. The overall mitigation plan also calls for the management of approximately 47,000 acres of present project lands. Of the 47,000 acres, 19,350 have been offered to the Mississippi Department of Wildlife Conservation. Annual costs for O&M required would be $144,000 for these lands. This includes a $100,000 base annual cost plus $2.25 per acre based on 1979 prices.

There are approximately 28,000 acres of scattered project lands to which the Corps wanted management-mitigation credit applied. These lands will probably be left for the Corps to manage. Funds for O&M would be required. Assuming the Corps would have similar needs, the amount would be $163,000.

APPENDIX IV

The total O&M figure thus becomes $625,000 and involves the management of 47,000 acres of project lands plus the recommended additional 97,000 acres.

Sincerely,

J. Craig Potter

for Actg. Deputy Assistant Secretary
for Fish and Wildlife
and Parks

[GAO COMMENT: This section was revised to reflect Interior's suggested changes. (See p. 61.)]

APPALACHIAN REGIONAL COMMISSION
1666 Connecticut Avenue, N.W
Washington, D.C. 20235

April 23, 1981

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

Dear Mr. Eschwege:

Pursuant to the request in your recent letter to me, we have reviewed the draft section of your proposed report on the Tennessee-Tombigbee Waterway Report which relates to "Local Sponsor's Obligations." The draft report suggests that there is some difference of opinion between the Corps of Engineers and ARC which is really not the case.

The Corps has limited its estimates of Tennessee-Tombigbee related project costs for access roads to those roads necessary to restore the local traffic network severed by the project. ARC funded local access roads serve a broader purpose. While it is, of course, true that these roads have the result of improving the continuity of the traffic network in the area, the primary objective of Commission-funded roads is the facilitation and enhancement of economic development. The ARC roads are being built to take advantage of the waterway, not merely to restore the status quo.

Section 201 of the Appalachian Regional Development Act authorizes a highway system and local access roads for the general purpose of opening up areas with a developmental potential where commerce and communication have been inhibited by lack of adequate access. The section contemplates that access roads will serve recreational, residential, educational, commercial, industrial or other like facilities. 40 App. U.S.C. 201(a). The Commission has adopted implementing policies (in Chapter 201B of its Code) which provide that access roads serve areas identified in State Appalachian Development Plans as having significant potential for future growth or special development opportunities. Other policy provisions require, variously, - demonstration of significant employment opportunities, meeting demonstrated needs for housing, or significant impact on local economy, etc.

The Commission has recognized that the Tennessee-Tombigbee Waterway presents a special opportunity for development in those areas through which it passes. The roads for which ARC funding has been approved are designed to enhance the economic development expected to occur from the Tennessee-Tombigbee's construction. In short, and pertinent to the discussion in your

APPENDIX V

report, the Appalachian funded roads are for the purpose of taking advantage of the economic development potential which the waterway brings and not for the more narrow purpose of merely restoring the traffic network disrupted by its construction.

I hope these comments are helpful.

Sincerely,

HENRY H. KREVOR
Executive Director

[GAO COMMENT: This section of the report was rewritten to clarify the Commission's position. (See pp. 66 and 67.)]

APPENDIX VI

U.S. Department of Transportation
Office of the Secretary of Transportation

Assistant Secretary for Administration

400 Seventh Street, S.W.
Washington, D.C. 20590

May 6, 1981

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

Dear Mr. Eschwege:

This is in response to your letter dated April 6, 1981, requesting our comments on the General Accounting Office draft report entitled, "Tennessee-Tombigbee Waterway--Some Answers To Help Resolve Difficult Issues." We have reviewed the report and have no comment. The statements in the report describing the Federal Highway Administration's financial involvement through 23 U.S.C. 156 correspond to our records.

Sincerely,

Robert L. Fairman
Acting

Kearney

MANAGEMENT CONSULTANTS

A. T. KEARNEY, INC.
222 SOUTH RIVERSIDE PLAZA
CHICAGO, ILLINOIS 60606
312/648-0111

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

April 23, 1981

Dear Mr. Eschwege:

A. T. Kearney, Inc. appreciates the opportunity to review and comment on portions of your draft report entitled "Tennessee-Tombigbee Waterway -- Some Answers to Help Resolve Difficult Issues." Two sections of your report deal with questions relating to work which Kearney did under contract with the U.S. Army Corps of Engineers. These sections deal with issues associated with the benefit and capacity analyses for the Tennessee-Tombigbee Waterway (TTWW). Some of the issues raised relate to work done by Kearney under its contract.

Discussions and comments on our work and on the draft sections have been directly provided to your staff on two separate occasions. We assume that these comments will be appropriately reflected in the final report now in development. The major purpose of this letter is to comment on several key aspects of your draft sections which we feel are important to call to your attention.

[GAO COMMENT: We have incorporated, as appropriate, comments made by A. T. Kearney's representative.]

We recognize that the GAO must respond directly to the questions raised by members of Congress. However, we would like to forcefully point out that a number of the questions imply that the results of our work can be interpreted in a manner which is inconsistent with the contract under which Kearney performed its study and the methodology required under Corps regulations.

[GAO COMMENT: We do not believe that the questions imply that Kearney's work was not in compliance with its contract.]

Several key questions deal with "predicted" movements. Kearney did not "predict" any specific movements would materialize in the future nor did the Corps of Engineers request that we do so. This applies to both the continuance of specific current movements and the materialization of future movements. Both types of movements were developed similarly in the study as inputs to form a "benefit base." We developed the benefit base incorporating current and future movements based on information provided through contact with survey respondents. This benefit base was then updated to the starting year for operation of the proposed waterway. Total benefits thereafter were projected for the life of the project. Kearney did not "predict" any specific movement would materialize in any given year nor did the methodology used in the project or required under the applicable Engineering Regulations take or require the "prediction" which is implied by the questions.

[GAO COMMENT: Kearney is expressing concern about the use of the word "predicted" in the questions raised by the congressional requestors. We believe that the background section on pages 11 and 12 clearly shows how Kearney determined project navigational benefits. In our opinion, Kearney is drawing a very fine distinction. The Kearney study shows that a number of movements were expected to commence after 1975. For example, if a movement was expected to commence in 1977, Kearney included benefits generated by that movement for that year and used growth factors to forecast the benefits to 1986, the first year of operation. The questions concerning "predicted" movements generally are asking if the movements have occurred as assumed. We do not believe any change is needed, as the reader can determine whether Kearney was or was not predicting movements.]

A number of questions were raised about assumptions or estimates involved in the analytical approaches used for establishing benefits. We would like to point out that none of these questions can be answered in isolation. The primary questions relate to the incorporation of parameters in a set of models which were utilized to estimate barge rates. Kearney's reported results depend on the quality of the output of these models. The questions relate only to a subset of input parameters incorporated in these models. They seem to imply that greater operational detail or accuracy for inputs to this subset of parameters to these models would materially change the result. No questions were raised with respect to the quality of the output of the models themselves. We believe such questions as those addressed in your draft report can only be properly addressed within the context of the overall models, their outputs and the intended use of the outputs in the analysis.

[GAO COMMENT: We have recognized on page 25 that many assumptions were made during the benefit study and that questions were raised by the requestors concerning only three of the assumptions. Since the questions concerned the rationale for how certain parameters were established in the assumptions, we believe that they can be addressed in isolation.]

A major question has been raised concerning the relationship between Black Warrior-Tombigbee Waterway benefits and those of the Tennessee-Tombigbee Waterway. Both these waterways were handled in an analogous manner in our report. Both were considered authorized and funded waterways by the Corps (one in operation, the other under construction). It was our direction from the Corps of Engineers that they be treated in an equivalen' manner in the analysis. It was and is our understanding that this is consistent with long-standing interpretations of the regulations guiding such planning studies and analyses. One Congressionally mandated waterway is not normally "preferred" over another in planning for meeting citizen/industry needs.

[GAO COMMENT: The question concerning the relationship between Tenn-Tom and BWTW focuses, in our review, on the impact of Tenn-Tom on the existing BWTW. We have not implied that Kearney was incorrect in handling the two waterways in a similar manner.]

We would like to point out that the materials we reviewed did not seem to capture the essence of the environment at the time of our study, nor to reflect the relationship of our re-study to the original studies that were done in analyzing navigation benefits for the TTWW.

At the time our study was done, the official date for completion of the TTWW was 1981-1982. This was not a simple planning study based on assumptions. The TTWW was under construction and had passed several legal challenges. Your draft report seems to abstract from the reality of construction and stated availability at the time of the re-study. Our primary work was done incorporating some slippage in that completion schedule. In the latter stages of our study the Corps instructed us to use a 1986 date, apparently due to the practical limitations on funding which would further extend the start-up of the full project. These types of changes are considered by the methodology used and the study was undertaken such that results could be "updated" to deal with these and other changes.

[GAO COMMENT: Kearney was provided, consistent with our practice for organizations outside the Federal Government, with chapters 2 and 3 as they were the only two chapters where Kearney was mentioned. We believe that other sections of the report clearly show that Tenn-Tom was under construction in 1975, that legal challenges to the project existed, and the prior benefit-cost analyses had been accomplished. While we did not recognize the original project completion date given to Kearney, we do not feel that has any significant impact on our answers.]

Many of the questions raised have been analyzed in terms of subsequent events since our study was done in 1975. Our study was a re-study of a project which was under construction. There were major differences between the results of our re-study and the original study. The movements incorporated in the benefit base were very different. This was expected and is anticipated by the methodology used by the Corps of Engineers for addressing these types of studies.

[GAO COMMENT: Since the scope of our work did not include a review of the original study, we do not have a comment on this point.]

It is our understanding that many new intended users have been identified to the Corps subsequent to our study. This is also to be anticipated. We suspect a new benefit base developed today would have many differences from our re-study 1975 base, just as our re-study did from the prior Corps benefit base. In addition, such general trends as exports of coal, expected further domestic dependence on coal, deregulation of railroads and associated increases in rates, and continued economic growth in the South suggest future benefits may be well above those estimated in 1975. The fundamental question is whether the methods used by the Corps of Engineers provide reasonable total project benefit estimates for the Congress to consider when it is making its decisions to approve and fund investments for navigable waterways. The question is not whether specific movements occur or not. Many changes in specific movements can be anticipated since both the project planning phase and the project life extend over decades.

[GAO COMMENT: See discussion on pages 29 and 30 concerning this point.]

APPENDIX VII

Finally, we should make clear that our study was completed for the Mobile District of the Corps of Engineers. The study dealt exclusively with estimating navigation benefits as an input to the Corps. It was reviewed in process and after its completion extensively by Corps professional and management staff at the District, Division and Headquarters levels. The Corps had full access to all our working documentation during and after our study as well as frank and open professional interaction with our project staff. Our report represents Kearney's project results. The work was accepted by the Corps as fully professional in meeting all of the requirements of our contract.

Quite apparently the final responsibilities for all aspects of the benefits and costs transmitted forward by the Mobile District to Corps management and the Congress were the sole and exclusive responsibility of the Corps, since our effort was only supportive to their program. In addition, at no time was Kearney project staff informed concerning the results of areas of the Corps re-study program dealing with other benefits, costs of the TTWW, or treatment of other issues which were an integral part of their final submittals.

Should there be any further information or clarifications which we can provide, our staff will be pleased to be helpful to you.

Sincerely,

Marshall Field, Jr.
Group Vice President

APPENDIX VIII

United States Senate

COMMITTEE ON APPROPRIATIONS
WASHINGTON, D.C. 20510

October 2, 1980

Honorable Elmer B. Staats
Comptroller General
General Accounting Office
441 G Street, N. W.
Washington, D. C. 20548

Dear Mr. Staats:

During the recent debates in the Congress on appropriations for continuing construction of the Tennessee-Tombigbee Waterway Project, several members of both the House and Senate requested a GAO report or study on the project. I also understand that the GAO has received individual, separate requests from members of Congress for a report.

Because of the controversies and allegations appearing in the news media and in Congressional debate prior to and during consideration of the Supplemental Appropriation Bill, Fiscal year 1980, the Subcommittee on Energy and Water Development of the Committee on Appropriations examined again the controversies and principal allegations concerning the project in preparing and reporting the Fiscal year 1981 appropriation bill. As ordered by the Committee on Appropriations, the documents accompanying the FY 81 appropriation bill concerning these issues and allegations were made available to every member of the Senate in advance of the debate on the bill in order to present the facts as determined by the Committee and to help clarify and correct what the Committee considered to be false, distorted, erroneous, unfair and misleading criticism of the project.

During the debate, Senator Levin stated that he had discussed the matter of a GAO report with you and asked if I would request the GAO to complete the study or report on the project in my capacity as Chairman of the Subcommittee. (See the Congressional Record, September 10, 1980, page S-12326).

In accordance with that colloquy with Senator Levin on the Senate Floor, and under the Legislative Reorganization Act, I request that the General Accounting Office complete the report or study on the Tennessee-Tombigbee Waterway which GAO began several years ago but subsequently terminated due to pending litigation relating to the waterway, subject to appropriate arrangements between GAO and the Justice Department due to the continued litigation. Because of the other requests which GAO has

APPENDIX VIII

received from members of Congress concerning the project, and because Senator Levin has indicated that he may have additional questions and would be seeking additional information under separate cover, I suggest that a meeting with you and your staff and our interested colleagues and staff would be appropriate in order to secure agreement on the work to be undertaken.

I have designated Proctor Jones of the Committee staff to coordinate this matter.

With best wishes, I am

Sincerely,

J. Bennett Johnston
Chairman
Subcommittee on Energy and Water Development

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