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Economic And Environmental  
Aspects Of The Proposed  
William L. Springer Project,  
Illinois

Corps of Engineers (Civil Functions)  
Department of the Army

*BY THE COMPTROLLER GENERAL  
OF THE UNITED STATES*

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APRIL 18, 1975



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

B-177466

11 + R The Honorable Charles H. Percy  
United States Senate

Dear Senator Percy:

Pursuant to your request of March 11, 1974, and subsequent discussions with your office, this is our report on the economic and environmental aspects of the proposed Corps of Engineers' William L. Springer project, Illinois.

As you directed, we obtained written comments on this report from the Department of the Army, and Decatur, and their comments have been considered in this report.

We do not plan to distribute this report further unless you agree or publicly announce its contents. We invite your attention to the fact that this report contains a recommendation to the Secretary of the Army, which is set forth on page 14. As you know, section 236 of the Legislative Reorganization Act of 1970 requires the head of a Federal agency to submit a written statement on actions he has taken on our recommendations to the House and Senate Committees on Government Operations not later than 60 days after the date of the report and the House and Senate Committees on Appropriations with the agency's first request for appropriations made more than 60 days after the date of the report. Your release of the report will enable us to send it to the Secretary and the four committees for the purpose of setting in motion the requirements of section 236.

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c6 A copy of this report is being sent to the Honorable John C. Stennis, United States Senate.

Sincerely yours,

Comptroller General  
of the United States

C o n t e n t s

		<u>Page</u>
DIGEST		i
CHAPTER		
1	INTRODUCTION	1
	Background	1
	Project status	3
	Scope of review	5
2	PROJECT BENEFITS	7
	Water supply benefits	7
	Recreational benefits	10
	Flood control benefits	12
	Conclusions	13
	Recommendations	14
	Agency comments	15
3	ENVIRONMENTAL ASPECTS	16
	Springer project may not supply acceptable drinking water	16
	Possible flood damage to Allerton Park	18
4	INTEREST RATE USED IN THE PROJECT'S ECONOMIC EVALUATION	20
	Initiation of construction phase	21
	Effective date of local assurances	22
	Conclusions	23
APPENDIX		
I	Letter dated March 11, 1974, from Senator Charles H. Percy	25
II	Letter dated March 14, 1975, from Deputy Assistant Secre- tary of the Army (Civil Works)	27
	<u>ABBREVIATIONS</u>	
EPA	Environmental Protection Agency	
GAO	General Accounting Office	

COMPTROLLER GENERAL'S  
REPORT TO THE  
HONORABLE CHARLES H. PERCY  
UNITED STATES SENATE

ECONOMIC AND ENVIRONMENTAL ASPECTS  
OF THE PROPOSED WILLIAM L. SPRINGER  
PROJECT, ILLINOIS  
1 Corps of Engineers (Civil Functions) 305  
2 Department of the Army 20

D I G E S T

WHY THE REVIEW WAS MADE

Senator Charles H. Percy asked GAO to review economic and environmental aspects of the Corps of Engineers' proposed William L. Springer (formerly Oakley) project in Illinois.

FINDINGS AND CONCLUSIONS

The Springer project is to be located on the Sangamon River near Decatur and is to provide flood control, recreation, and water supply benefits. It was to include a single dam and reservoir and 98 miles of downstream channel improvements.

Design of the project was modified in 1970 to include two dams and reservoirs and a 98-mile long woodland corridor downstream to accommodate flood releases and provide for recreational activities. (See pp. 1 and 3.)

Estimated cost of the project increased from \$27.2 million in 1962 to \$110.5 million in 1974. Through February 28, 1975, \$4.8 million had been expended for engineering and design and for a minor amount of land acquisition. Actual construction work has not started and the Corps did not request funds for the project in its fiscal year 1976 budget request. (See p. 3.)

Project benefits

Since 1962, there has been a major change in the mix of project benefits. Originally, flood control was the major benefit but now it is recreation:

<u>Benefit</u>	Percent of Total Benefits	
	<u>1962</u>	<u>Latest</u> (Aug. 1974)
Flood control	67	31
Water supply	24	16
Recreation	9	53

In the Corps' latest analysis, annual benefits and costs were estimated to be \$5.4 million and \$4.9 million, respectively--a benefit-cost ratio of 1.11 to 1. (See p. 7.)

GAO questioned the reasonableness of certain claimed benefits amounting to \$1.2 million annually. Exclusion of these questionable benefits would reduce the project's benefit-cost ratio to .91 to 1--meaning that costs would exceed benefits. (See p. 13.)

There are questions as to whether the water quality in the Springer project will be acceptable for consumption. Even if water quality problems are solved, water supply benefits are overstated because the Corps used outdated demand figures in its economic analysis.

The Corps' water supply benefits were determined by using water demand figures of 58.3 million gallons per day which were based on the 1960 U.S. census. Demand figures (44.3 million gallons per day) based on the 1970 census show that less water will be needed than originally anticipated.

The latest demand figure should be used in computing water supply benefits. This figure would reduce annual benefits by \$65,900. (See p. 7.)

Projected recreational benefits may not be fully realized because the expected poor water quality in the project will probably prohibit swimming. The Corps said bathing places cannot be considered assuredly safe for swimming.

The Corps had proposed to treat the water but the Environmental Protection Agency questioned whether this would be acceptable. Exclusion of estimated benefits attributable to swimming opportunities would reduce annual benefits by \$641,200. (See p. 10.)

Estimated annual flood control benefits computed by the Corps included \$477,500 for protection to be provided by 98 miles of downstream channel improvements. These improvements were part of the project when authorized in 1962 but were eliminated in 1970 in favor of retaining the 98 miles in a natural state. These benefits should not be claimed because the level of flood protection which was expected from the channel improvements will not be realized. (See p. 12.)

### Environmental aspects

The Environmental Protection Agency has rated the Springer project as environmentally unsatisfactory based primarily on the poor water quality in the Sangamon River and its expected adverse impact on the project's water supply and swimming benefits.

The Agency said the project should not be constructed unless it was accompanied by a specific program of water quality improvement.

The Corps has recognized the problem but said construction should proceed based solely on a conditional assurance from the Governor of Illinois that his State was capable of initiating a program by the time construction was completed. (See p. 16.)

Robert Allerton Park, which is owned by the University of Illinois, consists of 1,500 acres, 600 of which are natural-forest bottom lands bordering the Sangamon River.

In recognition of the park's unique value, 1,000 acres have been included in the National Registry of Natural Landmarks to be preserved as one of the few remaining examples of native Illinois river bottom land forest. (See p. 18.)

In 1970 the Corps redesigned the Springer project to mitigate expected flooding damage to the park's bottom lands. On January 15, 1975, however, the University's Board of Trustees concluded the project was not in the interest of the University because of the potential damage to Allerton Park.

The Trustees adopted a resolution withdrawing their support for the project and opposing any more appropriations by Illinois or the Federal Government for the project. (See p. 19.)

Interest rate used in economic evaluation

In computing estimated annual benefits and costs for the project, the Corps used a 3-1/4 percent interest rate--the one in effect for fiscal year 1968. GAO found no basis for concluding that the rate used to prepare the economic analysis was not in compliance with applicable law. (See p. 20.)

RECOMMENDATION

The Secretary of the Army should

- require the Corps to resolve questions on project benefits raised in this report during

its review process for the revised General Design Memorandum; and

- report its findings to the Congress for its use in evaluating future requests for appropriations for the project.

Questions involve using outdated demand figures for computing water supply benefits, the effect of expected poor water quality on benefits associated with swimming, and the claiming of flood control benefits which will not be realized. (See p. 14.)

AGENCY ACTIONS AND UNRESOLVED ISSUES

The Army advised GAO that the Corps had been asked to fully consider the points raised in GAO's report as part of its review of the General Design Memorandum and that the Congress would be advised of the findings. (See p. 15.)

## CHAPTER 1

### INTRODUCTION

At the request of Senator Charles H. Percy (see app. I), we have reviewed certain economic and environmental aspects of the Corps of Engineers' proposed William L. Springer (formerly Oakley) project. The project involves constructing dams and reservoirs on the Sangamon River, near Decatur, Illinois, and is to provide flood control, recreation, and water supply benefits.

### BACKGROUND

The project was authorized by the Flood Control Act of 1962 (Public Law 87-874, October 23, 1962) and originally was to include a single multiple-purpose dam, a reservoir of about 2,400 surface acres averaging 5 feet in depth, and 98 miles of downstream channel improvements on the Sangamon River. (See map on page 2.)

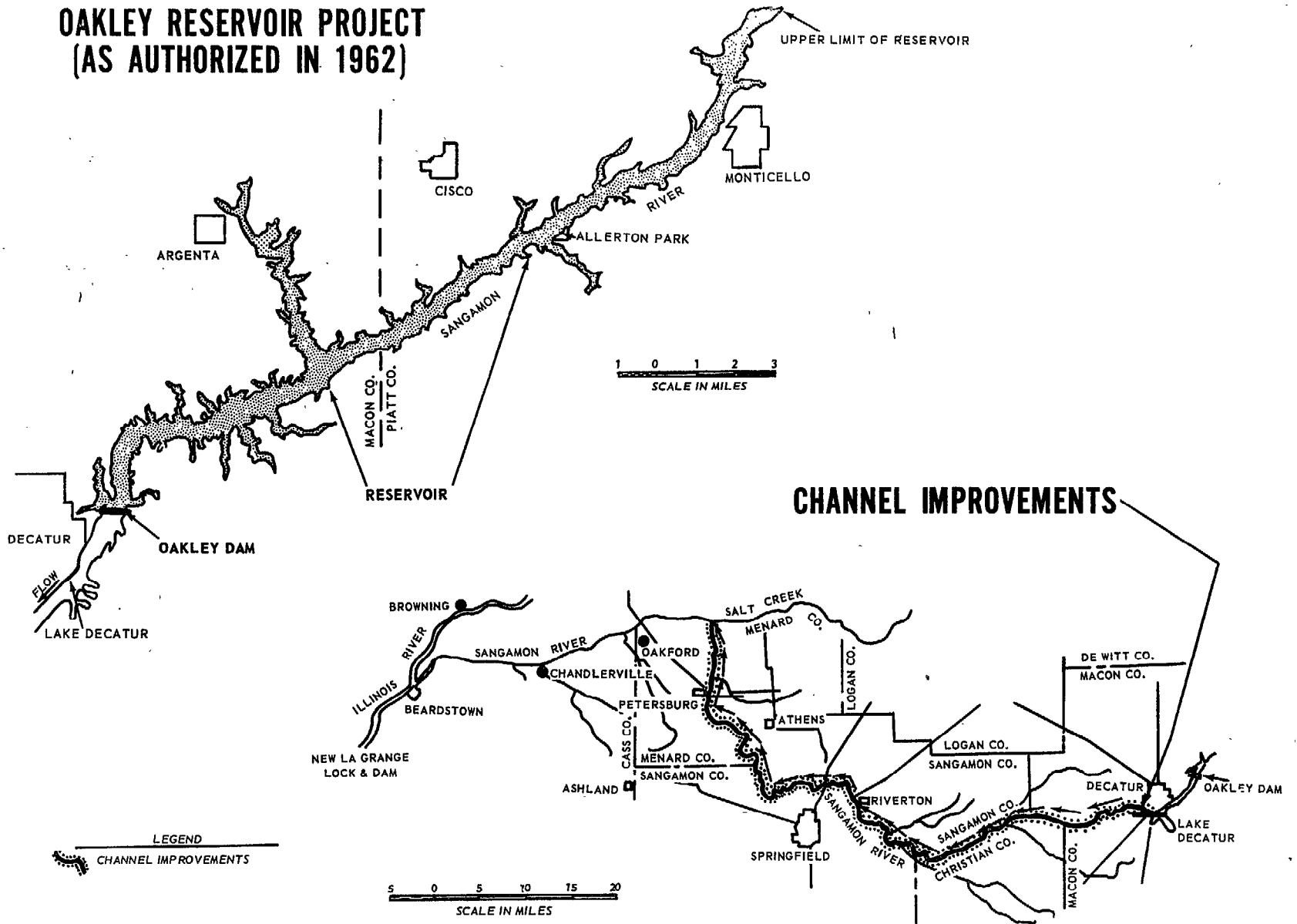
The project was originally designed to provide a permanent reservoir pool 621 feet above mean sea level. The proposed elevation was increased to 636 feet in 1966 and 640 feet in 1969. These increases generated a great deal of controversy in the area of the proposed project because they increased the potential for flooding of portions of Robert Allerton Park, owned and operated by the University of Illinois.

As a result of this controversy, the Corps in 1970 adopted a proposal--the Waterways Alternative--prepared by the Illinois Division of Waterways. This proposal was the basis for a revised plan submitted to the Appropriations and Public Works Committees of the Congress in a December 1970 report entitled "Proposed Modifications to the Authorized Oakley Reservoir Project, Sangamon River, Illinois" (Committee Print, Committee on Public Works, United States Senate, Serial No. 92-2, 92d Cong., 1st sess.). The plan, which is the basis for the current design for the project, includes a

- dam and reservoir with a permanent pool of 2,335 surface acres at the original site (Springer dam and lake),

- second dam and reservoir with a permanent pool of 1,865 surface acres on a tributary upstream of the Springer dam (Friends Creek dam and subimpoundment), and

# OAKLEY RESERVOIR PROJECT (AS AUTHORIZED IN 1962)



SOURCE: CORPS OF ENGINEERS



--98-mile long woodland corridor downstream of the Springer dam to accommodate flood releases and to provide for recreational activities (greenbelt). (See map on p. 4.)

The revised plan also lowered the proposed height of the reservoir pool from 640 feet to 623 feet.

#### PROJECT STATUS

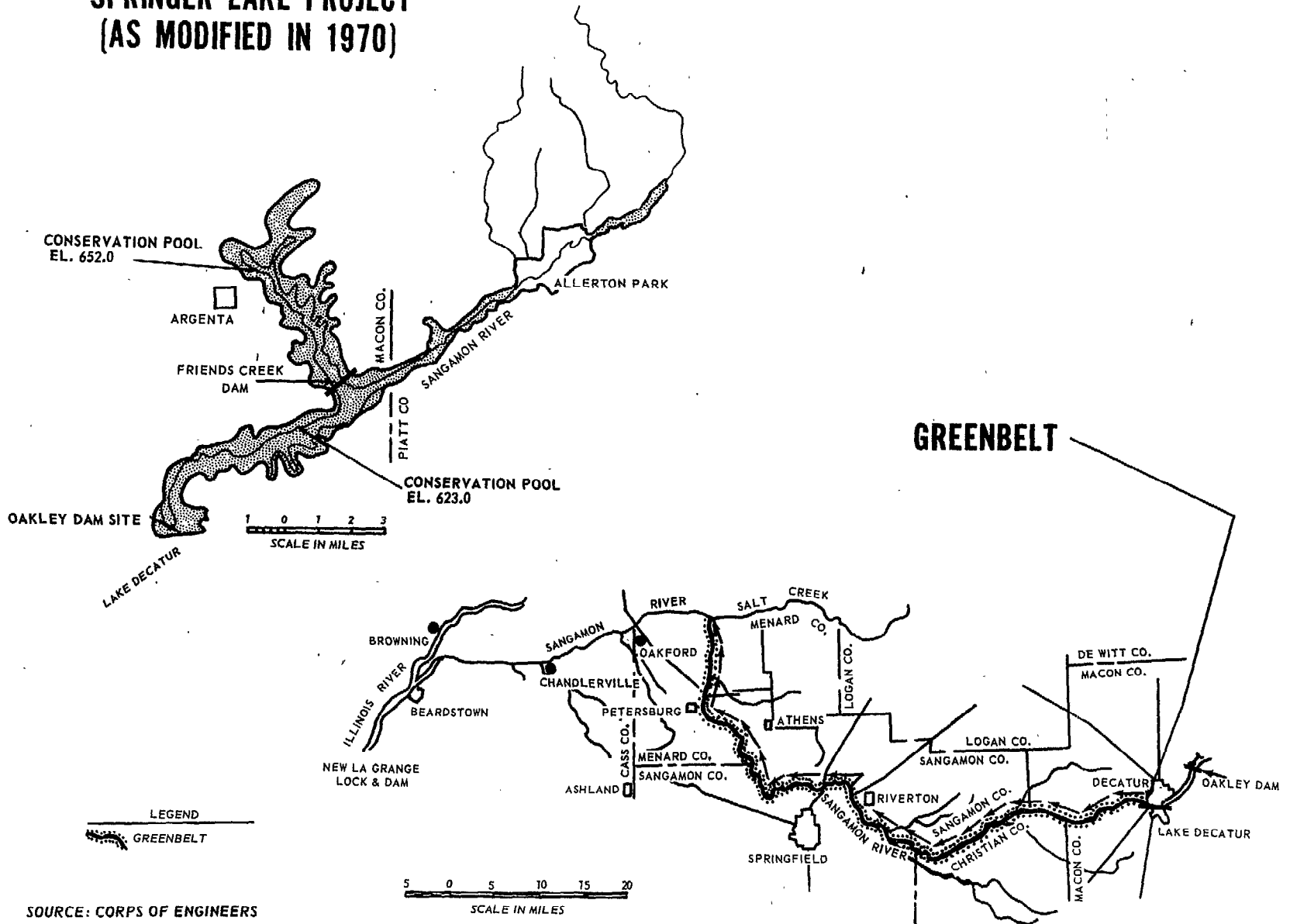
When the Springer project was authorized in 1962, its estimated cost was \$27.2 million. In October 1974, the estimated total cost was \$110.5 million. The Corps attributed most of the cost increase to (1) the 1970 design revisions and (2) price level increases. Through February 28, 1975, a total of \$4.8 million had been expended on the project. Of this total, about \$300,000 had been expended for land acquisition, and the remainder for engineering and design work. Actual construction work has not started and the Corps has not established construction dates for the project.

The Corps did not request any funds for the project in its fiscal year 1976 budget request because, according to an official, the Governor of Illinois didn't want land acquisition and construction to proceed until certain conditions were met. Illinois is the local sponsor of the project.

On May 10, 1973, the Governor of Illinois announced his support for the project, contingent on five conditions that would have to be met before any more land could be acquired, or before construction could begin. These conditions were

1. renegotiation of a water supply agreement with the City of Decatur,
2. assurance that recreation benefits would be realized,
3. assurance that water quality would be acceptable,
4. assurance that Allerton Park would be protected, and
5. assurance that land above the reservoirs, when not covered with water, would be suitable for recreation.

# SPRINGER LAKE PROJECT (AS MODIFIED IN 1970)



The Corps' Chicago District Engineer sent a letter to the Governor on September 20, 1974, requesting a reaffirmation of State support and sponsorship requiring that the

--State reimburse the necessary costs allocated for water supply,

--State serve as the sponsor for the greenbelt and reimburse the necessary costs allocated to its recreational development,

--State operate and maintain selected recreational sites at the reservoirs, and

--Illinois Environmental Protection Agency be capable of completing a plan and establishing an approved program to control all sources of water pollution in the Sangamon River Basin concurrent with construction of the project.

On January 10, 1975, the Governor reaffirmed his position and the State's support and sponsorship, subject to a later determination by him that his previously stated conditions had been met.

The project's revised General Design Memorandum<sup>1</sup> and updated draft Environmental Impact Statement were forwarded to the Office of the Chief of Engineers in October 1974, and had not been approved as of February 6, 1975.

#### SCOPE OF REVIEW

We made our review at the Corps' district office in Chicago, Illinois, which has made the environmental and benefit-cost studies for the project. We examined Corps records and reports and talked with officials of the

--Corps of Engineers in Washington, D.C. and the North Central Division in Chicago,

--U.S. Environmental Protection Agency (EPA), Region V in Chicago,

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<sup>1</sup>The General Design Memorandum includes the basic project plan of development, extent of major features of development, estimated benefits and costs, operating requirements, real estate requirements, and the extent of local cooperation.

--Office of the Governor of Illinois, and

--City of Decatur.

We also met with a spokesman for the Committee on Allerton Park, a project opponent.

Much of our information was taken from draft copies of the revised General Design Memorandum and the updated draft Environmental Impact Statement.

Our review covered the following specific environmental and economic matters of concern to Senator Percy:

- Reasonableness of the projected need for the project's water supply through the year 2020.
- Expected water quality of the project.
- Reasonableness of the claimed recreational benefits.
- Reasonableness of the claimed flood control benefits.
- Environmental impacts of the project on Allerton Park.
- Propriety of the interest rate used in the benefit-cost computations.

The Department of the Army was given an opportunity to comment on the matters in this report. (See app. II.) Also, Decatur, Illinois furnished comments on the portions of the report pertaining to its interest in the project and its views have been considered in preparing this report.

## CHAPTER 2

### PROJECT BENEFITS

As authorized in 1962, the Springer project was primarily justified for flood control benefits with water supply and recreation as other benefits. Currently, the principal benefit in the Corps' benefit-cost analysis is recreation.

The following table shows annual benefits and costs, by project purpose, as originally proposed in 1962, modified in 1970, and as estimated in the latest revised General Design Memorandum.

Project purpose	Initial estimate (1962)		Modified project (1970)		Latest estimate (Aug. 1974)	
	Amount	Percent	Amount	Percent	Amount	Percent
Flood control	\$1,015,000	67	\$1,207,500	36	\$1,645,300	31
Water supply	357,000	24	812,900	24	877,400	16
Recreation	135,000	9	<sup>a</sup> 1,350,000	40	<sup>a</sup> 2,847,900	53
Total annual benefits	<u>\$1,507,000</u>	<u>100</u>	<u>\$3,370,400</u>	<u>100</u>	<u>\$5,370,600</u>	<u>100</u>
Total annual costs	<u>\$1,272,000</u>		<u>\$2,925,000</u>		<u>\$4,856,600</u>	
Benefit-cost ratio	1.18 to 1		1.15 to 1		1.11 to 1	

<sup>a</sup>The estimates for 1970 and 1974 include amounts for fish and wildlife and streamflow regulation, both of which are considered recreation benefits.

The Springer project has been considered economically marginal by both the Congress and the Corps. On August 1, 1974, the Senate Committee on Appropriations commented that the project "had very marginal justification on the cost-benefit ratio." Chicago district Corps officials have referred to the project as marginal and stated that if construction was further delayed the costs would probably overtake the benefits.

Our review questioned the reasonableness of the Corps' computation of certain project benefits. Exclusion of such benefits from the project's economic evaluation would reduce the benefit-cost ratio to less than unity.

#### WATER SUPPLY BENEFITS

Senate Document No. 97, 87th Congress, 2d session, contains the policies, standards, and procedures applicable to

the economic analysis for the Springer project. Under this document the value of water supply benefits is determined by considering alternative methods to obtain the same amount of water and assigning as the value of the water supply benefit the cost of the most likely alternative.

After considering various alternatives, the Corps concluded that the least costly feasible one to meet Decatur's future water supply needs was using deep wells at an average annual cost of \$877,400, the value assigned to the annual water supply benefits.

There are questions on the water quality of the Springer project being acceptable for human consumption. As discussed in chapter 3, EPA has raised serious questions about the water quality and has recommended against project construction unless there is a specific program of water quality improvement.

An EPA official told us that under current circumstances the water made available by the Springer project will exceed the U.S. Public Health Service standards for nitrates in drinking water. He also said that, because of the agricultural nature of the Sangamon River Basin, the prospects for continued and possibly increased nitrates in the river are a reality, and that there are questions as to the economic feasibility of removing nitrates from water.

The EPA official also said that to solve the water quality problem, nitrates must be prevented from entering the Sangamon River upstream of the proposed project. This would involve implementing a plan for the control of agricultural runoff.

Even if the water quality problems are solved, we believe that \$65,900 of the water supply benefits would still be questionable because the Corps used outdated water demand figures in its economic analysis.

In 1923 Decatur constructed a dam on the Sangamon River and the resulting reservoir, Lake Decatur, has since been the city's primary source of water. In 1955 increased population and sedimentation of Lake Decatur necessitated raising the dam to increase the water supply. Also, two deep wells were sunk in the mid-1950's to supplement the existing water supply. The water supply capacity of the Springer project was designed to meet Decatur's future water needs in the year 2020, as requested by Illinois and computed by the Illinois Division of Water Resource Management, the State agency having responsibility for water resource development. The Division originally projected a demand for Decatur of 58.3

million gallons per day in the year 2020 based on 1960 U.S. census data. However, in 1973 the Division reduced the year 2020 projection to 43.8 million gallons per day, based on 1970 census data.

The Corps has continued to use the 58.3 million gallons per day demand figure in its economic analysis and the Corps' district office told us that the higher demand rate was justified because Illinois had the responsibility to purchase the excess water. However, in January 1974, the head of the Illinois Division advised the Corps that "the State was reluctant to enter into the water supply business and preferred that it be handled on the local level." The Division also stated that no other downstream communities had expressed an interest in using Lake Springer as a water supply source. A Corps survey of potential users of Lake Springer water indicated a future demand of only .5 million gallons per day outside Decatur. Decatur officials told us, however, that they are willing to purchase the entire water supply to be produced by the project.

The following table compares the projected water demand in 2020, based on the updated census figures, with the projected available water supply based on the proposed project development:

Projected Water Supply and Demand For the Year 2020

<u>Source of supply</u>	<u>Million gallons per day</u>
Lake Decatur	26.8
Lake Springer	27.0
Existing wells	<u>5.0</u>
Total supply	58.8
Decatur's projected demand	43.8
Other communities' demand	<u>.5</u>
Total demand	<u>44.3</u>
Estimated excess water supply in 2020	<u>14.5</u>

We believe that the current water supply demand figure (44.3 million gallons per day) should be used in computing the water supply benefits for the Springer project.

## RECREATIONAL BENEFITS

Projected recreational benefits<sup>1</sup> may not be fully realized because the expected poor water quality in the project will probably prohibit swimming.

Recreation is currently the largest benefit category for the Springer project--about \$2.8 million annually or 53 percent of estimated total annual project benefits. The recreational benefits, based on estimated project visitors, were considerably increased by the 1970 project modification which added the Friends Creek subimpoundment and the green-belt. As currently planned, the Springer project will consist of about 4,800 acres of recreation land and 5,700 surface acres of water.

The Corps' revised General Design Memorandum states that, from a public health standpoint, bathing places cannot be considered assuredly safe for swimming. The water quality problems in the Sangamon River Basin are primarily caused by agricultural runoff. The runoffs pollute the river because they are rich in nitrates and phosphates causing high levels of biological oxygen demand, and increased growth of algae.

In addition, an EPA official told us that high fecal coliform counts are expected for the proposed project, meaning that the water will be unacceptable for body contact recreation. This official further told us that although the coliform problem will have an impact on the realization of swimming benefits, it will not be a problem for water supply benefits because normal chlorination will eliminate this problem from the municipal water supply.

While the Corps acknowledged that poor water quality will have an adverse effect on swimming, it concluded that water quality could be improved by installation and proper use of disinfection treatment equipment to maintain a chlorine residual in the water.

In its March 7, 1974, comments on the draft Environmental Impact Statement for the Springer project, EPA questioned the inclusion of swimming as a project benefit as follows:

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<sup>1</sup>Picnicking, swimming, camping, hiking, sightseeing, boating, fishing, bicycling, canoeing, fish and wildlife, and streamflow regulation.