

FINAL
ENVIRONMENTAL IMPACT STATEMENT

Recommended Plan for the Yazoo Area Pump Project
Yazoo Backwater Area, Mississippi

The responsible lead agency is the U. S. Army Engineer District, Vicksburg.
The responsible cooperating agency is the U. S. Fish and Wildlife Service.

Abstract: The project area comprises approximately 539,000 acres subject to inundation by the 100-year flood and includes parts of Humphreys, Issaquena, Sharkey, Warren, Washington, and Yazoo Counties, Mississippi, and part of Madison Parish, Louisiana. The area is a highly developed agricultural area with an economy which is heavily dependent on the agricultural industry. The area also possesses an extremely valuable bottom-land hardwood forest-wetland ecosystem which supports excellent wildlife populations. Of the ten plans initially considered, three were selected for detailed study. Plan C (NED), consisting of a pumping station with a capacity of 25,000 cubic feet per second, would provide the greatest net economic benefits of all the plans studied. Fish and wildlife resources would be severely impacted. Plan C (Recommended Plan), consisting of a 17,500-cubic-foot-per-second pumping station, would produce annual economic benefits of \$21.3 million, with \$14.7 million excess benefits over cost. Implementation of this plan would result in a 68 percent reduction in damages. Wildlife losses would be compensated by the acquisition of bottom-land hardwoods and the development of greentree reservoirs. Plan H (EQ), consisting of a 15,000-cubic-foot-per-second capacity pumping station, would provide net positive fish and wildlife contributions through the purchase and development of bottom-land hardwoods. Plan C (17,500 cfs) has been recommended based on its performance in addressing the identified public concerns and its contributions to the goals of National Economic Development and Environmental Quality.

If you would like further information on this statement, please contact:

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NOTE: Information, displays, maps, etc., discussed in the Main Report are incorporated by reference in the EIS. The Fish and Wildlife Mitigation Report, Yazoo Area Pump Project and Yazoo Area and Satartia Area Backwater Levee Projects, July 1982, is also incorporated by reference in this EIS. A brief description of this report is presented on pages EIS 24-26.

ENVIRONMENTAL IMPACT STATEMENT 1/

SUMMARY

MAJOR CONCLUSIONS AND FINDINGS

Plan C-25,000 (National Economic Development (NED) Plan)

The major feature of this plan is a pumping station with a capacity of 25,000 cubic feet per second located in the lower ponding area just west of the Steele Bayou drainage structure. Pumping would begin when interior ponding reaches an elevation of 80 feet, NGVD, from 1 March to 30 November and 85 feet, NGVD, from 1 December to 1 March. Flooding conditions below elevation 80 feet, NGVD, would remain unchanged.

Plan C-25,000 represents the NED plan in that it provides the greatest net economic benefits of all the plans studied. This plan would produce annual benefits of \$28.0 million, with excess benefits over costs totaling \$18.7 million. Implementation of this plan would result in an 86 percent reduction in damages.

Plan C-25,000 would induce \$120,000 net fish and wildlife losses and require 22.6 million kilowatt hours of electricity annually to operate the pumping station. Installation of this plan would also result in induced clearing of 4,800 acres of land.

Plan C (Recommended Plan)

This plan consists of a 17,500-cubic-foot-per-second pumping station located in the lower ponding area just west of the Steele Bayou drainage structure. Pumping would begin when interior ponding reaches an elevation of 80 feet, NGVD, with the exception of the period of 1 December through 1 March when pumping would be initiated when the ponding elevation reaches 85 feet, NGVD.

The plan feature which alters the pumping elevation to 85 feet, NGVD, during the winter will minimize wildlife and fishery losses. Wildlife and fishery losses from rights-of-way, induced land clearing, and reduced flooding will be compensated to the extent possible by fee title acquisition or acquisition of land use easements.

The recommended plan which includes mitigation would produce annual economic benefits of \$21.3 million, with \$14.7 million excess benefits over cost. Implementation of this plan would result in a 68 percent reduction in damages. Operation of this pumping station would require 14.9 million kilowatt hours of electricity annually. The recommended plan would induce clearing on 1,200 acres of woodlands including rights-of-way.

1/ A list of persons primarily responsible for preparation of this Environmental Impact Statement is shown in Table EIS-1.

TABLE EIS-1
LIST OF PREPARERS
ENVIRONMENTAL IMPACT STATEMENT

Name	Expertise	Experience	Professional Discipline
Mr. Steve Reed (EIS Coordinator)	Biology	5 years, Biologist, Vicksburg District, Corps of Engineers; 1 year Environ- mental Specialist, Lower Mississippi Valley Division.	General Biologist
Mr. Greg Ruff (Study Manager)	Civil Engineering	4 years, Water Resource Planning, Vicksburg District.	Engineer
Mr. Ken Bray	Civil Engineering	6 years, Conservation Engineering Program, USDA-SCS; 2-1/2 years, EIS Studies and Water Resource Planning, USDA-SCS; 4 years, Water Resource Plan- ning, Vicksburg District.	Engineer
Mr. Bobby Gilliam	Economics	1 year, Statistician USDA-ESCS, Nashville; 2-1/2 years, economic evaluation of water resources development projects, Vicksburg District.	Regional Economist
Mr. Jim Ward	Hydraulics Engineer	6 years, hydrologic analysis and hydraulic design of water resources resources projects, Vicksburg District; 2 years hydraulic research, Waterways Experiment Station.	Engineer

Plan H (Environmental Quality (EQ) Plan)

The EQ objective includes preservation, protection, or enhancement of valuable ecological resources.

The EQ plan has one 15,000-cubic-foot-per-second capacity pumping station in the lower ponding area and results in net positive fish and wildlife contributions. Pumping would be initiated only when interior ponding reaches elevation 85 feet, NGVD. Approximately 30,000 acres of nondedicated bottom-land hardwoods in tracts of 100 acres and larger remain in the study area and would be purchased and developed for the purpose of preserving bottom-land hardwoods and increasing fish and wildlife resources. This relatively large acreage is the majority of the remaining nondedicated bottom-land hardwoods in the total Yazoo Basin. Operation of the pumps in this plan would induce the clearing of 700 acres of woodlands, including rights-of-way, and would require 4.7 million kilowatt hours of electricity annually.

Section 404(b) Evaluation

Based on the guidelines established by the Environmental Protection Agency (40 CFR 230), an evaluation pursuant to Section 404 of the Clean Water Act has been completed (Appendix J). The proposed disposal sites for the discharges of dredged material are specified as complying with the requirements of the guidelines.

Flood Plain Management

Executive Order 11988 concerns flood plain management and directs all agencies to assert Federal leadership in order to reduce flood losses; minimize the impact of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial functions served by flood plains.

The protection of the project area from flooding will have an adverse impact on the natural environment. The plans presented in this report will not adversely impact the natural storage benefits of the flood plain during floods of great magnitude, nor will the plans induce development other than the conversion of some woodlands to farmlands.

Flood protection for the Yazoo area will not induce structural development within the existing flood plain. Although some additional residential development and possibly some industrial development may occur in the future, there are adequate alternative sites for development outside the flood plain area. The project benefits did not include any benefits for induced residential or industrial development.

During the study, several means of minimizing adverse impacts were developed and coordinated with various fish and wildlife agencies. The plan formulation process for this study includes a no-action alternative, nonstructural alternatives, and various structural alternatives. There is no alternative for location of project works outside the flood plain.

Wetlands

Executive Order 11990 for the Protection of Wetlands, issued 24 May 1977, states that Federal agencies shall avoid, to the extent possible, the long- and short-term adverse impacts associated with the destruction or modification of wetlands. It further states that each agency shall avoid undertaking new construction located in wetlands, unless the director of the agency finds there is no practicable alternative to such construction and that the proposed action includes all practicable measures to minimize harm to wetlands.

Implementation of the recommended plan will convert about 12 acres of wooded swamp to open water, create approximately 200 additional acres of open water, and reduce the frequency of flooding on about 1,900 acres of wooded swamp and approximately 2,600 acres of wooded wetlands now flooded annually. The project will induce the clearing of 1,200 acres of woodlands including project rights-of-way and approximately 100 acres of wooded swamp wetlands. In addition to the acres of wetlands directly impacted by the project, additional wetlands may receive indirect effects related to such factors as flood reduction and drainage. However, all impacts have been considered and adverse impacts have been avoided to the extent possible.

The frequency and duration of interior ponding on wetlands lying above 85 feet, NGVD, will be reduced somewhat. However, most of the wetlands lying above the 5-year frequency flood are affected much more by rainfall runoff and stream channel overflow than by interior ponding.

Threatened and Endangered Species

No Federally recognized critical habitat of endangered or threatened species has been designated in the project area. With the exception of the American alligator and the southern bald eagle, it is highly unlikely that any endangered animal species exist in the Yazoo area.

Coordination with FWS has indicated that the American alligator is the only endangered or threatened species that could be impacted by the project. Formal Section 7 consultations with FWS regarding the American alligator and issuance of their Biological Opinion have determined that the project is not likely to jeopardize the continued existence of the American alligator.

Based on studies and investigations at this stage of design, the proposed action is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat of such species.

Historic, Archeological, and Cultural Resources

In accordance with the National Historic Preservation Act of 1966 (Public Law 89-665), National Environmental Policy Act of 1969 (Public Law 91-190), and Protection and Enhancement of the Cultural Environment (Executive Order 11593), a cultural resources analysis of the project area was undertaken

by Corps archeologists. A literature search and records review were accomplished to determine what resources are known to be located in the project area. One archeological site, 22IS522, is located in the general vicinity; however, the site is not in the direct impact area. No sites eligible for listing in the National Register of Historic Places are located within the study area.

An on-the-ground cultural resources survey was conducted over the entire project area. No evidence of historic/archeological sites was discovered during the survey.

AREAS OF CONTROVERSY

Plan selection with regard to pump size and pumping elevation represents an area of major concern. Selection of a pump size and pumping elevation involves analysis of the associated impacts in relation to flood frequency and elevation, since existing flooding conditions impact the agriculture and environment of the project area. Extensive study and evaluation were required to select the pump size and pumping elevation that would both meet the needs of the local interests and minimize environmental impacts.

Another major area of controversy concerns the impact of reduced flooding on bottom-land hardwoods and associated fish and wildlife resources. Evaluation of this issue involved analysis of the impacts on the environment as compared to the economic returns from installing a more efficient pump at a lower pumping elevation.

Acquisition of mitigation land by fee title represented a major area of concern for local interests. Purchase of mitigation land from willing sellers was considered by local interests to be the only acceptable means of acquiring fee title mitigation land. Land use easements was the method favored by the majority of the local interests.

UNRESOLVED ISSUES

It is expected that further coordination will be required with the FWS regarding land use easements and fee title acquisition for project-induced fish and wildlife losses.

RELATIONSHIP TO ENVIRONMENTAL REQUIREMENTS

The recommended plan (Plan C) and Plans A and H are in full compliance with the environmental requirements listed below. This indicates that these plans meet all requirements of the environmental policy and related regulations.

<u>Federal Policies</u>	<u>State and Local Policies</u>	<u>Land Use Plans</u>	<u>Required Federal Entitlements</u>
Fish and Wildlife Coordination Act Federal Water Project Recreation Act Water Resources Planning Act of 1965 National Historic Preser- vation Act of 1965 National Environmental Policy Act Clean Water Act of 1977 Endangered Species Act of 1973 Flood Plain Management (E.O. 11988) Protection of Wetlands (E.O. 11990)	Mississippi Water Quality Criteria	None	None

NEED FOR AND OBJECTIVES OF ACTION

PROJECT AUTHORITY

Flood protection for the Yazoo Backwater Area was authorized by Section 3 of the Flood Control Act of 18 August 1941.

PUBLIC CONCERNS

Significant flood damages occur to crops, levees, drainage systems, and roads. Such floods occur on the average of approximately 1.5 times a year with a duration in excess of 30 days. Present average annual damages to agriculture (crop and noncrop) for without-project conditions in the project area are \$3,177,000 including \$2,722,000 to crops alone.

Flood damages also occur to residences and other nonagricultural properties. Flooding of rural residences causes social and health problems such as disruption of sanitation facilities, fouling of water wells, and increased breeding areas for mosquitoes. Flooding also poses the threat of loss of life and requires residents to seek temporary housing outside the overflow area. In addition, residential flooding has a demoralizing effect upon self-help efforts for community improvements. Present nonagricultural damages for without-project conditions are approximately \$717,000 annually.

Land clearing in recent years has substantially reduced bottom-land hardwood forests and the related timber and fish and wildlife resources. The increased agricultural activity has also caused a general decline in water quality throughout the project area. There is public concern for the need to preserve or improve the fish and wildlife resources of the project area.

PLANNING OBJECTIVES

Planning objectives stem from the national, state, and local water and related land resources management needs specific to the Yazoo Area of the Yazoo Backwater Project. These objectives have been developed through problem analysis and an intensive public involvement program and have provided the basis for formulation of alternatives, impact assessment, and evaluation and selection of a recommended plan. These objectives are as follows:

- a. Reduce flood damages to agricultural lands in the project area resulting from prolonged high stages on the Mississippi River.
- b. Reduce flood damages to rural residences, churches, and public buildings.
- c. Preserve or improve any project-related recreational opportunities in the study area, particularly those of waterfowl and deer hunting.
- d. Minimize destruction of wetlands and significant tracts of bottom-land hardwoods and improve remaining acreages of these resources.
- e. Minimize degradation of water quality in the study area during construction; preserve or improve significant aquatic resources of the area such as Eagle Lake.
- f. Preserve or improve related wildlife resources in the area.

ALTERNATIVES

Nine plans which include pump capacities of 10,000 cubic feet per second or greater were formulated and evaluated in connection with existing levees, gravity control structures and related channel works. Eight of these plans include a single pumping station located immediately southwest of the Steele Bayou drainage structure. The other plan consists of pumping stations located near both the Steele Bayou and Little Sunflower drainage structures. The primary differences among these plans are as follows:

- a. Pump capacities.
- b. The ponding elevation at which pumping is to be initiated.
- c. Additional feature in some plans to operate the existing drainage structure in a manner to maintain a minimum ponding elevation during certain periods of the year.

PLANS ELIMINATED FROM FURTHER STUDY

The following plans were considered in stage 2 but were not included in the stage 3 final array of alternatives.

Pump Plan A

This plan consists of a pumping station located in the lower ponding area just west of the Steele Bayou structure, with pumping initiated when interior ponding reaches elevation 80 feet, NGVD. Pumping capacities at 10,000, 15,000, 17,500, 20,000, 25,000, and 30,000 cubic feet per second were evaluated as a part of this plan. This plan would not affect the frequency of flooding on the land below elevation 80 feet, NGVD. When considering comparative pump sizes, Plan A provided the greatest net benefits of all the plans. However, the excess benefits for Plan A are only about 1 percent higher than Plan C. In addition, Plan C has essentially the same damage reduction effectiveness as Plan A but consumes about 13 percent less energy and results in approximately 10 percent less clearing of hardwoods and 35 percent fewer fish and wildlife losses. For these reasons, Plan A was not carried into the final array of alternatives.

Pump Plan B

This plan consists of two pumping stations, one in each of the interior ponding areas. One station would be located just west of the Steele Bayou drainage structure and the other southwest of the Little Sunflower drainage structure. Pumping for both of the stations could begin when interior ponding stages reach 80 feet, NGVD.

Only combinations of structures to provide 25,000-cubic-foot-per-second pumping capacity were evaluated in detail for this alternative. Combinations evaluated are as follows: 15,000-cubic-foot-per-second lower area and 10,000-cubic-foot-per-second upper area; 10,000-cubic-foot-per-second lower area and 15,000-cubic-foot-per-second upper area; and 7,000-cubic-foot-per-second lower area and 18,000-cubic-foot-per-second upper area.

Plan B was eliminated from further study because it has the highest fish and wildlife losses of any plan and would induce some damages along the Yazoo River due to increased stages below the Little Sunflower pumping stations.

Pump Plan D

This plan consists of a 25,000-cubic-foot-per-second pumping plant near the Steele Bayou structure, with pumping initiated when interior ponding reaches elevation 80 feet, NGVD, except between 1 December and 15 March when pumping would not be initiated until the ponding level reaches elevation 85 feet, NGVD. On 1 January, the drainage structures could be closed and the sump level raised to 85 feet, NGVD, as water is available. The 85-foot NGVD elevation would be held until 15 March when the water would be lowered to 80 feet, NGVD, and held until 15 April to lower the fish and wildlife losses.

During June, July, and August, the sump level would be held at 75 feet, NGVD (approximately the level of Eagle Lake), to benefit the fishery resource. During all other periods, the drainage structures would be operated as they are now, and pumping would begin when the interior ponding elevation reaches 80 feet, NGVD. This plan would require modification of the drainage structures to structurally withstand the large differential in water levels inside and outside the structures.

Plan D was eliminated because it requires the relocation of 21 families and flood easements on approximately 68,000 acres, features which increase the annual cost of the project by almost \$2 million while reducing fish and wildlife losses by only about \$125,000 annually. The 75-foot hold feature during summer months induced substantial damage to timber.

Pump Plan E

This plan is the same as Plan D except that on 1 January the drainage structures would be closed and the sump level would be maintained at 80 feet, NGVD, as water is available, until 15 April. This plan was eliminated for the same reasons described for Plan D.

Pump Plan F

This plan consists of a pumping station located in the lower ponding area just west of the Steele Bayou drainage structure, with pumping initiated when interior ponding reaches elevation 83 feet, NGVD, except during the period 1 December through 1 March when pumping would be initiated when water rises above elevation 85 feet, NGVD. Pumping capacities of 10,000, 15,000, 17,500, 20,000, 25,000, and 30,000 cubic feet per second were evaluated as a part of this plan. This plan would not affect flooding on the land below elevation 83 feet, NGVD.

This plan was investigated as a trade-off between the 80- and 85-foot sump. Plan F was eliminated from further study primarily because it provided considerably less flood protection than desired.

Pump Plan G

The major feature of this plan is a pumping station located in the lower ponding area just west of the Steele Bayou drainage structure, with pumping initiated when interior ponding reaches an elevation of 85 feet, NGVD. Pumping capacities of 10,000, 15,000, 17,500, 20,000, and 25,000 cubic feet per second were evaluated. The frequency of flooding below 85 feet, NGVD, would not be changed by this plan.

Plan G has lower fish and wildlife losses; however, it was eliminated because it also has fewer excess benefits over costs and provides a low degree of protection.

Pump Plan I

This plan includes one pumping station, with pumping of interior ponding beginning at 90 feet, NGVD. Pumping capacities of 10,000, 15,000, and 20,000 cubic feet per second were evaluated in detail. This plan results in the fewest fish and wildlife losses of any plan except the EQ plan. Plan I was eliminated from further consideration since none of the pump capacities considered provided economic benefits which exceeded cost.

No-Action Alternative

The no-action alternative does not provide flood control or flood protection works in the project area. No action is considered as an alternative to

structural flood control measures (levees and pumps) and provides without-project conditions for evaluation of structural measures. The no-action alternative would occur if additional project authorization is not received.

Flooding in the Yazoo Area is historic and will continue in similar magnitude as long as pumps are not constructed to complete the flood control system for the area. The flooding will continue to damage crops, homes, roads, and other improvements in the project area. Current average annual damages in the project area are estimated at \$3.9 million.

Even with a no-action alternative, more extensive agricultural development is expected. Large tracts of land in the Yazoo Area were cleared and converted to row crop agriculture in the late 1960's and 1970's. Most of these tracts flood more frequently than once every 3 years, indicating that landowners are willing to risk occasional flooding to gain the benefits of cultivation. The land clearing trend in the area will continue, with an estimated 27,200 acres of bottom-land hardwoods in the project area being cleared in the next few years.

The effect of the no-action alternative on water quality trends would be one of continued deterioration. Turbid, pesticide-laden rainfall runoff is a by-product of agriculture. Following natural drainage patterns, this runoff enters the streams and lakes in the project area in increased amounts and degrades the water quality.

Nonstructural Alternatives

All practicable nonstructural measures to reduce flood damages were given consideration in the screening of alternatives. These alternatives included floodproofing, flood plain zoning, and relocation. These nonstructural measures, if totally successful, would prevent only 12 percent of the damages and therefore were not considered appropriate to meet the flood control objective.

PLANS CONSIDERED IN FINAL PLANNING STAGE

Based on the results obtained in preliminary planning, six pump plans (Plans C-10,000, C-15,000, C-17,500, C-20,000, C-25,000, and H-15,000) were advanced to and evaluated in detailed Stage 3 planning. These plans are economically feasible and allow for the addition of features for fish and wildlife mitigation.

Pump Plan C

The major feature of this plan is a pumping station located in the lower ponding area just west of the Steele Bayou drainage structure. Pumping would be initiated when interior ponding reaches an elevation of 80 feet, NGVD, except during the period 1 December to 1 March when pumping would be initiated at elevation 85 feet, NGVD. Pumping capacities of 10,000, 15,000, 17,500, 20,000, 25,000, and 30,000 cubic feet per second were evaluated in detail. The 30,000-cubic-foot-per-second pump was not carried into the final array of alternatives. When compared to the 25,000-cubic-foot-per-second pump, the 30,000-cubic-foot-per-second pump uses more energy and causes more fish and wildlife losses but provides nearly \$500,000 less in excess benefits.

Pump Plan H

This plan includes one 15,000-cubic-foot-per-second capacity pumping station in the lower ponding area. Pumping would be initiated when interior ponding reaches elevation 85 feet, NGVD. Approximately 30,000 acres of bottom-land hardwoods in tracts of 100 acres and larger (all the hardwoods expected to remain in manageable tracts in the base year, 1990) would be purchased and developed for the purpose of preserving bottom-land hardwoods and improving fish and wildlife resources. This plan is the only plan which has net positive contributions to the EQ account and is designated the EQ plan.

Table EIS-2 presents the comparative impacts of project alternatives on significant resources and plan economics.

AFFECTED ENVIRONMENT

ENVIRONMENTAL CONDITIONS

Human Environment

In 1978, the population of the project area was 52,500. Population projections for the Yazoo River Basin, Mississippi, indicate that a slightly decreasing trend in population will continue to the year 2030, at which time the population will begin to increase. A 7 percent decrease is projected over the 52-year period between 1978 and 2030. Projections indicate the project area density to be 22 persons per square mile in 1990 and 2039. The density of the population in 1978 was 24 persons per square mile.

In 1970, 15,431 persons, 16 years of age and over, were employed in the four counties containing the most land in the project area. Four major industries within the project area employed 82 percent of the total employment in 1970: (1) services - 4,099; (2) agriculture, forestry, and fisheries - 3,954; (3) manufacturing - 2,436; (4) retail trade - 2,168. Other significant industries were construction; transportation, communications, and public utilities; and public administration. These three industries accounted for 13 percent of the 1970 project area employment.

Of the total civilian labor force, 935 or 5.7 percent were unemployed. Of the total unemployed, 887 were experienced unemployed. The leading occupation of experienced unemployed was farmworkers, with 259 unemployed. Other occupations contributing significantly to unemployment were (1) craftsmen, foremen, and kindred workers (189); (2) laborers, except farm (116); and (3) service workers (112).

Unemployment was more common among females as evidenced by the fact that 8.5 percent of the female labor force, compared to 4.1 percent of the male labor force, was unemployed. Male unemployment was concentrated in the farm-worker occupation while female unemployment centered in the occupations of craftsman, farmworker, service worker, and laborer. All counties in the project area are currently designated as redevelopment areas due to substantial unemployment as defined by Title IV of the Public Works and Economic Development Act of 1965.

TABLE EIS-2
COMPARISON OF PLANS
YAZOO AREA PUMP STUDY

Plan (Elevation and Flow)	First Costs/ a/ (\$000)	Annual Costs (\$000)	Operation and Maintenance Costs (\$000)	Annual Benefits (\$000)	Excess Benefits (\$000)	Benefit- Cost Ratio	Reduction in Damages (%)	Energy Use (million kWh)	Induced Clearing (acres)	Net Fish and Wildlife Losses (\$000)
Plan A (80.0 feet)										
10,000 cfs	86,800	3,851	536	14,305	10,454	3.7	45	7.2	2,300	63
15,000 cfs ^{c/}	126,200	5,801	950	19,902	14,101	3.4	62	14.1	3,700	123
17,500 cfs	147,400	6,787	1,119	22,825	16,038	3.4	68	17.0	4,200	146
20,000 cfs	175,400	7,949	1,206	25,347	17,398	3.2	77	19.4	4,800	172
25,000 cfs	212,900	9,639	1,464	28,310	18,671	2.9	86	22.6	5,400	199
30,000 cfs	250,600	11,142	1,551	29,412	18,270	2.6	89	23.9	5,600	202
Plan B (80.0 feet)										
15-10,000 cfs	238,000	10,782	1,649	29,452	18,670	2.7	89	27.0	5,700	215
10-15,000 cfs	239,600	11,096	1,898	29,533	18,437	2.7	90	30.3	5,900	218
7-18,000 cfs	241,000	11,287	2,039	29,483	18,196	2.6	90	32.8	5,900	219
Plan C (80.0 feet Modified) ^{d/}										
10,000 cfs	85,800	3,760	488	14,107	10,347	3.8	45	6.3	2,200	58
15,000 cfs	125,500	5,620	835	19,247	13,627	3.4	60	12.0	3,200	83
17,500 cfs	147,200	6,631	1,021	22,072	15,441	3.3	68	14.9	3,700	95
17,500 cfs with mitigation ^{e/}	150,000	6,633	1,021	21,346	14,713	3.2	68	14.9	1,200	0
20,000 cfs	172,600	7,691	1,117	24,661	16,970	3.2	77	16.5	4,300	107
25,000 cfs	210,900	9,340	1,319	28,001	18,661	3.0	86	19.7	4,800	120
30,000 cfs	250,200	10,926	1,425	29,140	18,214	2.7	89	21.4	5,100	128
Plan D (HOLD 85.0 feet)										
25,000 cfs	251,100	10,401	990	24,418	14,617	2.3	75		3,800	74

Pump Plan H

This plan includes one 15,000-cubic-foot-per-second capacity pumping station in the lower ponding area. Pumping would be initiated when interior ponding reaches elevation 85 feet, NGVD. Approximately 30,000 acres of bottom-land hardwoods in tracts of 100 acres and larger (all the hardwoods expected to remain in manageable tracts in the base year, 1990) would be purchased and developed for the purpose of preserving bottom-land hardwoods and improving fish and wildlife resources. This plan is the only plan which has net positive contributions to the EQ account and is designated the EQ plan.

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Of the total civilian labor force, 935 or 5.7 percent were unemployed. Of the total unemployed, 887 were experienced unemployed. The leading occupation of experienced unemployed was farmworkers, with 259 unemployed. Other occupations contributing significantly to unemployment were (1) craftsmen, foremen, and kindred workers (189); (2) laborers, except farm (116); and (3) service workers (112).

Unemployment was more common among females as evidenced by the fact that 8.5 percent of the female labor force, compared to 4.1 percent of the male labor force, was unemployed. Male unemployment was concentrated in the farm-worker occupation while female unemployment centered in the occupations of craftsman, farmworker, service worker, and laborer. All counties in the project area are currently designated as redevelopment areas due to substantial unemployment as defined by Title IV of the Public Works and Economic Development Act of 1965.

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YAZOO AREA PUMP STUDY

Plan (Elevation and Flow)	First : Costs/ : (\$000)	Annual : Costs : (\$000)	Operation and : Maintenance : Costs : (\$000)	Annual : Benefits : (\$000)	Excess : Benefits : (\$000)	Benefit- : Cost : Ratio	Reduction : In : Damages : (\$)	Energy : Use : (million kWh)	Induced : Clearing : (acres)	Net Fish : and Wildlife : Losses : (\$000)
Plan A (80.0 feet)										
10,000 cfs	86,800	3,851	536	14,305	10,454	3.7	45	7.2	2,300	63
15,000 cfs	126,200	5,801	950	19,902	14,101	3.4	62	14.1	3,700	123
17,500 cfs	147,400	6,787	1,119	22,825	16,038	3.4	68	17.0	4,200	146
20,000 cfs	175,400	7,949	1,206	25,347	17,398	3.2	77	19.4	4,800	172
25,000 cfs	212,900	9,639	1,464	28,310	18,671	2.9	86	22.6	5,400	199
30,000 cfs	250,600	11,142	1,551	29,412	18,270	2.6	89	23.9	5,600	202
Plan B (80.0 feet)										
15-10,000 cfs	238,000	10,782	1,649	29,452	18,670	2.7	89	27.0	5,700	215
10-15,000 cfs	239,600	11,096	1,898	29,533	18,437	2.7	90	30.3	5,900	218
7-18,000 cfs	241,000	11,287	2,039	29,483	18,196	2.6	90	32.8	5,900	219
Plan C (80.0 feet Modified)										
10,000 cfs	85,800	3,760	488	14,107	10,347	3.8	45	6.3	2,200	58
15,000 cfs	125,500	5,620	835	19,247	13,627	3.4	60	12.0	3,200	83
17,500 cfs	147,200	6,631	1,021	22,072	15,441	3.3	68	14.9	3,700	95
17,500 cfs with mitigation	149,900	6,640	1,021	21,346	14,706	3.2	68	14.9	1,200	0
20,000 cfs	172,600	7,691	1,117	24,661	16,970	3.2	77	16.5	4,300	107
25,000 cfs	210,900	9,340	1,319	28,001	18,661	3.0	86	19.7	4,800	120
30,000 cfs	250,200	10,926	1,425	29,140	18,214	2.7	89	21.4	5,100	128
Plan D (HOLD 85.0 feet)										
25,000 cfs	251,100	10,401	990	24,418	14,617	2.3	75		3,800	74

TABLE EIS-2 (Cont)

Plan (Elevation and Flow)	First : Costs ^{a/} : (\$000)	Annual : Costs : (\$000)	Operation and : Maintenance : Costs : (\$000)	Annual : Benefits : (\$000)	Excess : Benefits : (\$000)	Benefit- : Cost : Ratio	Reduction : in : Damages : (\$)	Energy : Use : (million kWh)	Induced : Clearing : (acres)	Net Fish and Wildlife Losses : (\$000)
Plan E (HOLD 80.0 feet)										
25,000 cfs	220,200	9,368	1,027	25,299	15,931	2.7	77		4,700	108
Plan F (83.0 feet) ^{d/}										
10,000 cfs	85,200	3,536	309	9,176	5,640	2.6	29	3.4	1,400	35
15,000 cfs	124,900	5,251	513	13,530	8,279	2.6	41	6.4	2,200	58
17,500 cfs	145,900	6,145	613	15,505	9,360	2.5	46	5.6	2,600	67
20,000 cfs	171,000	7,158	674	17,284	10,126	2.4	52	8.7	3,000	78
25,000 cfs	205,000	8,513	743	20,472	11,959	2.4	62	9.7	3,600	90
30,000 cfs	241,200	9,939	820	21,331	11,392	2.1	65	10.6	3,700	92
Plan G (85.0 feet)										
10,000 cfs	83,900	3,428	259	6,449	3,021	1.9	20	2.6	900	25
15,000 cfs	117,100	4,848	436	11,139	6,291	2.3	35	4.7	1,700	46
17,500 cfs	144,100	5,912	457	12,761	6,849	2.2	38	5.6	2,000	56
20,000 cfs	168,100	6,848	484	14,437	7,589	2.1	44	6.3	2,500	67
25,000 cfs	202,300	8,251	593	17,426	9,175	2.1	54	7.1	3,000	79
Plan H										
15,000 cfs	162,800	6,197	416	10,859	4,662	1.8	35	4.7	700	-253
Plan I (90.0 feet)										
10,000 cfs	81,500	3,223	162	3,846	623	1.2	12	0.9	400	8
15,000 cfs	114,200	4,557	266	5,868	1,311	1.3	18	1.7	700	13
20,000 cfs	164,700	6,522	335	7,185	663	1.1	22	2.3	800	17

a/ Does not include mitigation costs, but tentative mitigation costs increase this figure by less than 10 percent.

b/ Includes right-of-way.

c/ Approximates authorized plan.

d/ Pumping initiated at 85 feet, 1 December - 1 March.

e/ Recommended plan.

Per capita income (PCI) in the project area was \$2,548 in 1970. Based on population and total personal income projections, PCI was expected to reach \$4,000 in 1978, a 57 percent increase over that of 1970. This increase in PCI is expected to continue and is projected to be \$24,300 by 2039, reflecting an average annual rate of increase of approximately 3.3 percent over 1978.

Natural Environment

The Yazoo Area of the Yazoo Backwater Project is located in west-central Mississippi and lies between the east bank Mississippi River levee and the Will M. Whittington Auxiliary Channel (see Plate 1). The Yazoo Backwater levee, which connects the lower limits of the Mississippi River east bank levee and the west levee of the Will M. Whittington Auxiliary Channel, protects the area from all but extreme backwater floods from the Mississippi River.

The total Yazoo Area comprises about 900,000 acres of which about 80 percent is cleared and in agricultural production. The project area (the area flooded by the 100-year flood) includes approximately 539,000 acres of land. Of this total, about 74 percent (397,500 acres) is cleared and used for row crops, livestock production, and miscellaneous and idle uses.

An estimated 26 percent (141,500 acres) of the project area is in woodlands. Of the total woodland area, approximately 80,200 acres are located within the Delta National Forest, the Panther Swamp National Wildlife Refuge, the Yazoo National Wildlife Refuge, and Delta Wildlife and Forestry, Inc. (a privately owned corporation operated with the primary objective of providing hunting for its stockholders) (Plate 4).

The Big Sunflower and Little Sunflower Rivers, Deer Creek, and Steele Bayou flow through the area. A connecting channel from the Big Sunflower River to the Little Sunflower River, and from there to Steele Bayou, intercepting Deer Creek, has been constructed to connect the Steele Bayou and Sunflower River interior ponding areas. The high ground along Deer Creek forms a natural divide between the Steele bayou and Sunflower River Basins. Interior drainage is evacuated by drainage structures at the Little Sunflower River and Steele Bayou. Many sloughs, bayous, brakes, and oxbow lakes, including Eagle Lake, comprise the remaining aquatic environment.

Woodlands within the Delta National Forest, Panther Swamp National Wildlife Refuge, and Delta Wildlife and Forestry, Inc., comprise about 76,600 acres or 85.5 percent of the woodlands within the upper ponding area. Woodlands within the Yazoo National Wildlife Refuge comprise approximately 3,600 acres or 7.0 percent of the lower ponding area woodlands. These 80,200 acres are considered dedicated forestry areas on which no clearing is expected. Thus, a total of 48,400 acres within the lower ponding area and 12,900 acres within the upper ponding area are considered undedicated and potential acreages for clearing under with- and without-project conditions. Land use categories within the project area are shown in Table EIS-3.

TABLE EIS-3
PROJECT AREA LAND USE

Item	: Steele Bayou : : Ponding Area :	Sunflower River : Ponding Area :	Total
Bottom-land hardwoods (acres)	39,545	79,355	118,900
Wooded and shrub swamp (acres)	6,100	5,100	11,200
Wooded wetlands (acres)	6,355	5,045	11,400
Agricultural land (acres)	148,000	249,500	397,500
Standing water (acres)	9,400	5,300	14,700
Major streams (miles)	41	109	150
Intermittent streams (miles)	148	282	430

SIGNIFICANT RESOURCES

Forests and Wetlands

The project area is characterized by flood plain and meander belt topography of low relief afforded by natural levees extending along existing and former stream courses. Land elevations range from about 70 to 100 feet, NGVD. The soils of the area are of the Quaternary period and are generally high in organic content, plant nutrients, and minerals. The slightly elevated, well-drained loamy areas adjacent to natural streams are typified by Commerce, Convent, and Robinsonville soil associations.

The interstream areas are lower, poorly drained clay soils of slack-water areas including Alligator, Bowdre, Sharkey, Tunica, and Sharkey Depressional Phase (Dowling) associations. These highly fertile soils support vigorous growths of hardwood forests comprised of many species adaptable to varying and complex soil and moisture conditions. The better drained natural levees and ridges, with loamy or sandy clay soils, support a water oak-sweetgum timber type in which several other deciduous species are present.

Extensive flats of slightly lower elevation with tighter clay soils are occupied by hackberry, elm, ash, and Nuttall oak. Lower-lying backwater areas support overcup oak-water hickory, cypress, tupelogum, willow, and water elm. Most of the forest remaining in the project-affected area is comprised of overcup oak-water hickory and cutover cypress, willow, and water elm timber types.

The remaining large woodland tracts of the Yazoo Delta are found primarily within the project area of the Yazoo River backwater, and include several wetland areas and cypress brakes which mark abandoned Mississippi and Ohio River channel courses. The 59,000-acre Delta National Forest in Sharkey County and adjacent forests in the lower Big and Little Sunflower Rivers and Steele Bayou

areas are the largest remaining forested areas. The best remaining wildlife habitat and public hunting opportunities are provided by the Delta National Forest lands and the 10,210-acre Yazoo National Wildlife Refuge, which includes Swan Lake (5,000 acres) in Washington County. Leroy Percy State Park (2,442 acres) is the only state recreation area found in the delta.

Delta Wildlife and Forestry, Inc., is a private hunting area in Issaquena County which contains 20,909 acres of land, about 3,000 acres of which are cleared for agriculture. The U. S. Fish and Wildlife Service recently acquired 13,585 acres of woodland and wetland habitat in the Panther Swamp area, of which approximately 4,500 acres are located in the project area east of Holly Bluff, Mississippi.

The project area encompasses a variety of ecological systems with representative flora and fauna. One of the most critical habitats is the remaining wetland area. Wetlands support very high densities of wildlife species and serve important natural biological functions, including food chain production, general habitat, and nesting, spawning, rearing, and resting sites for numerous aquatic and land species.

Wooded swamps (cypress and tupelogum) and wooded wetlands (primarily composed of overcup oak-bitter pecan) are the predominant wetland types throughout the project area. Vegetation in these wetlands is influenced by the soils and the duration, frequency, depth, and season of flooding. These wetlands provide high quality, productive habitat for a variety of game species, nongame species, and furbearers, and provide wintering, feeding, and nesting habitat for resident and migratory waterfowl. The wetland areas also act as much needed buffer zones and filtering systems for siltation and pesticide-contaminated runoff from adjacent agriculture lands.

Annually Flooded Forest Lands and Wetlands

The annual flood within the project area inundates the following land use features: 6,000 acres of standing water bodies, 5,300 acres of wooded and shrub swamp, 8,700 acres of wooded wetlands, and 11,700 acres of forested acres classified as nonwetlands. The forest types and associated wildlife species present in the area are adapted to and thrive under these conditions.

Overstory species include overcup oak, Nuttall oak, honey locust, hackberry, bitter pecan, willow oak, sweetgum, cypress, water elm, and water locust. Such bottom-land species are benefited by periodic flooding. Improved tree growth and mast production is, in turn, beneficial to wildlife species such as deer, squirrel, and waterfowl that depend to some extent on mast for food supply. The presence of water from frequent flooding is essential to use of the area by waterfowl, wading birds, and certain furbearers, reptiles, and amphibians.

Frequent flooding of the forest land areas also makes a positive contribution to the aquatic resources of lakes and streams in the area. The flooded forests and wetlands serve as storage areas for floodwaters and recharge areas for groundwater. The wetlands also play an important role in natural filtration, contributing to the maintenance of water quality.

Annually Flooded Openland

Approximately 20,560 acres of openland are subject to flooding from the 1-year frequency flood. The land flooded at this elevation is used mainly for soybean production. The terrain of the area is a series of low ridges and swales; in many instances, ponded water is found in low areas. The isolated wet areas provide ideal habitat for waterfowl, wading birds, furbearers, and reptiles and amphibians.

The isolated wet areas, by occasionally preventing intensive farming, allow the occurrence and growth of native grasses, herbs, and woody vegetation. This diversity of habitat is highly beneficial to small game such as rabbits, quail, and dove, and a variety of nongame birds and small mammals. Small mammals provide food sources for hawks, owls, and other predators.

Flooding of the low areas, including native vegetation and soybean fields, provides food sources for waterfowl in season. Periodic flooding of openlands is important to maintaining the present habitat conditions for wildlife.

Fish and Wildlife

Fish and wildlife resources in the project area are valued at \$2,100,000 annually (see Table EIS-4). The wildlife resource portion of this total value is \$1,906,500 and is comprised of big game hunting for white-tailed deer, turkey, and waterfowl; small game hunting for rabbit, squirrel, and furbearers; and nature-oriented recreation such as bird watching, wildlife photography, and nature walking.

Fishery values for the project area consist of \$81,500 for sport fishing and \$86,200 for the commercial fishery. The sport fishery consists of species such as bass, crappie, and other sunfish. Primary commercial species are catfish, drum, buffalo, gar, carp, and bowfin. These fish and wildlife resources represent recreation potential that is important to the project area and provide a resource value of state and regional importance.

Prime Farmlands

Cleared, agriculturally developed lands in the Yazoo Area total about 397,000 acres. Of this, approximately 328,000 acres or 83 percent is classified as prime farmlands by the Department of Agriculture. The incidence of poor drainage and frequent flooding of a large portion of the agricultural areas is reflected in crop losses and other agriculturally related losses totaling more than \$3.2 million annually. These losses reflect a definite need for flood protection and improved drainage.

Resources Subject to Flood Protection

The project area contains 1,054 structures subject to flooding valued at \$32.3 million, including structure cost and contents. The total value of all farm products from the area sold in 1978 was approximately \$125.3 million.

TABLE EIS-4
EXISTING ANNUAL FISH AND WILDLIFE VALUES (1979)

Item	: Dollar : Value/Acre :	Acres	: :	Total
TERRESTRIAL HABITAT				
Bottom-land Hardwoods (without waterfowl)	10.87	118,900		1,292,443
Wooded Wetlands (without waterfowl)	10.87	11,400		123,918
Wooded Swamp (without waterfowl)	6.88	11,200		77,056
Cleared Land (without waterfowl)	.61	397,500		242,475
Waterfowl (5-year flood frequency - 1 Dec-15 Jan)				
Cleared	2.70	15,798		42,655
Wooded	6.30	20,310		<u>127,953</u>
TERRESTRIAL VALUE				1,906,500
AQUATIC HABITAT				
Sport Fishing				
Lakes	15.75	2,355		37,091
Streams	4.50	7,238		32,571
Wetlands	2.25	5,300		11,925
Commercial Fishing				
Lakes	10.00	2,355		23,550
Streams	5.00	7,238		36,190
Wetlands	5.00	5,300		<u>26,500</u>
AQUATIC VALUE				167,827
TOTAL				<u>\$2,074,327</u>

These residences and agricultural products are essential to social and economic well-being in that they affect the basic welfare of area residents.

Other problems include the disruption of sanitation facilities, fouling of water wells, and threat of loss of life. The significance of these resources is obvious since they involve the basic welfare of the people in the area.

ENVIRONMENTAL EFFECTS

FORESTS AND WETLANDS

The primary environmental impacts associated with the various plans are directly linked with the impacts to bottom-land hardwoods and wooded and shrub swamp. In addition to the 27,000 acres being cleared without the project, installation of the project would result in the loss of 600 to 4,400 acres of bottom-land hardwoods and 100 to 400 acres of wooded and shrub swamp. Project-related land requirements for each plan considered in the final array are shown in Table EIS-5.

TABLE EIS-5
PROJECT-RELATED LAND REQUIREMENTS

Plan	Project-Induced Land Clearing ^{a/}		
	Woods	Wooded and	Total
	(acres)	Shrub Swamp	(acres)
C-10,000	2,000	200	2,200
C-15,000	2,950	250	3,200
C-17,500	3,400	300	3,700
C-20,000	3,950	350	4,300
C-25,000	4,400	400	4,800
H-15,000	600	100	700

^{a/} Includes rights-of-way.

ANNUALLY FLOODED FOREST LANDS AND WETLANDS

Impacts related to the alleviation of flooding frequency and duration would be long-term impacts but cannot be easily determined. However, these impacts will occur and were recognized when evaluating the impacts associated with implementation of the proposed project. Most of the wetlands lying above the 5-year frequency backwater flood are affected much more by rainfall runoff and stream channel overflow than by interior ponding. Presently 5,300 acres of wooded swamp, 8,700 acres of wooded wetlands, and 11,700 acres of nonwetland forested areas are flooded annually.

Implementation of the recommended plan (Plan C-17,500) would not reduce the duration of flooding on 6,100 acres of wooded wetlands and 3,300 acres of wooded swamp below the 1-year with-project flood. Approximately 2,600 acres

of wooded wetlands and 1,900 acres of wooded swamp now flooding on a 1-year frequency would be flooded on only a 1.5- to 2-year frequency with the project. The project would not reduce the flooding frequency during the period 1 December to 1 March. The flood duration on this acreage will not be significantly affected by the recommended plan. The frequency and duration of interior ponding on wetlands lying above 85 feet, NGVD, will be reduced somewhat.

Plan C-25,000 would reduce flooding on about 2,200 acres of wooded swamp, approximately 3,100 acres of wooded wetlands, and 11,000 acres of forested land by reducing the duration and frequency of the annual flood by approximately 70 percent.

Plan H represents the conditions of the annual flood and would not significantly impact the wetlands and forest land, dependent on the 1-year flood frequency. Reduced flooding would impact and/or alter forest product growth, species composition, water table elevation, wetland longevity, and wildlife resources that are dependent on the flooding cycle for maintenance of their life cycle or a certain stage of their life cycle. Flooding is an important factor in maintaining the quality of the project area environment.

ANNUALLY FLOODED OPENLAND

The recommended plan would reduce the cleared acres flooded by the 1-year frequency flood from 20,560 to 5,660, a 72 percent reduction. Plan C-25,000 would reduce the acreage from 20,560 to 5,470, a 73 percent reduction. Plan H would not significantly alter the 1-year flood frequency. There would be no change in flooding of cleared land under future without-project conditions.

Flood protection and reduced flooding would be beneficial from an agricultural standpoint, but would have adverse impacts on water-related wildlife species such as waterfowl, wading birds, furbearers, reptiles and amphibians. Beneficial effects of reduced flooding to other wildlife, if any, would not offset losses to water-related species.

FISH AND WILDLIFE RESOURCES

Plan C-17,500 represents a monetary loss of \$49,100 to the fishery resource of the project area and a \$47,200 loss of wildlife resources. There are also some nonmonetary and nonquantifiable losses that will occur. The acquisition of fee title and/or land use easements as part of the mitigation plan; and raising the pumping elevation to 85 feet, NGVD, during 1 December through 1 March would reduce the impacts to the fish and wildlife resources.

Implementation of other Plan C pump plans would result in fish and wildlife losses of \$58,000 to \$120,000. Plan H would result in benefits of \$252,700 to the fish and wildlife resources of the project area.

PRIME FARMLANDS

Installation of any of the proposed pump plans would have a beneficial effect on the prime farmlands in the area. In addition to the reduction in agricultural damages, farmers would be able to intensify agricultural production to increase yields on these lands. Some additional prime farmlands may also be created as a result of the reduction in flood stages and duration.

MINERAL RESOURCES

Thirteen producing commercial sand and gravel companies have been tested by the Corps of Engineers within a 50-mile radius of the two proposed pump station sites. The list prepared by the Bureau of Mines Mineral Industry Location System indicates approximately the same number of sand and gravel pits. The proposed project should have no adverse impact on mineral resources.

PUBLIC INVOLVEMENT

PUBLIC INVOLVEMENT PROGRAM

Key Federal and state agencies have been kept informed of plan development during the course of the study. An initial coordination meeting was held on 26 February 1975, and representatives of the following agencies were in attendance: Mississippi Bureau of Recreation and Parks of the Mississippi Department of Natural Resources, U. S. Forest Service, Environmental Protection Agency, U. S. Fish and Wildlife Service, Soil Conservation Service, Delta Council, Yazoo-Mississippi Delta Levee District, Mississippi Farm Bureau, and Board of Mississippi Levee Commissioners. On 5 March 1975, a separate meeting was held with representatives of the Mississippi Department of Wildlife Conservation.

During the course of the study, additional contacts have been made with each of these agencies. Numerous informal meetings were held with FWS during 1978, 1979, 1980, and 1981 to transfer information and discuss alternatives. Meetings were held with the Environmental Protection Agency in March 1980, February 1981, and April 1981. The March 1980 and April 1981 meetings included joint field trips with the FWS.

A copy of the draft report and EIS covering the Yazoo Area Pump Study was provided to the Federal, state, and local agencies or interests listed below for their review and comment. Comments received during this review are contained in Appendix H along with corresponding responses.

a. Federal Agencies:

(1) Environmental Protection Agency

(2) U. S. Department of Agriculture

Economic Research Service

Soil Conservation Service

Forest Service

(3) Advisory Council on Historic Preservation

(4) Department of the Interior

Fish and Wildlife Service

(5) Department of Housing and Urban Development

(6) Department of Commerce

Economic Development Administration

National Oceanic and Atmospheric Administration

(7) Department of Transportation

Federal Highway Administration

(8) Department of Energy

(9) Council on Environmental Quality

b. State Agencies:

(1) Mississippi Department of Archives and History

(2) Mississippi Department of Wildlife Conservation

(3) Mississippi Department of Natural Resources

Bureau of Geology

Bureau of Pollution Control

(4) Mississippi Forestry Commission

(5) Mississippi State Highway Department

(6) Coordinator Federal-State Programs

Central Mississippi Planning and Development District

South Delta Mississippi Planning and Development District

c. Local Agencies or Institutions:

(1) Lower Mississippi Valley Flood Control Association

(2) Yazoo-Mississippi Levee District

(3) Board of Mississippi Levee Commissioners

d. Environmental Organizations:

(1) National Wildlife Federation

(2) Mississippi Wildlife Federation

(3) Mississippi Audubon Society

- (4) Sierra Club (Delta Chapter)
- (5) Environmental Defense Fund
- (6) Wildlife Management Institute
- (7) The Nature Conservancy
- (8) Society of Wetland Scientists
- (9) Mississippi Chapter of the Wildlife Society
- (10) Delta Wildlife Council
- (11) Delta Wildlife and Forestry, Inc.

e. Other Interests:

- (1) Delta Council
- (2) Mississippi Farm Bureau Federation
- (3) River and Harbor Association of Mississippi
- (4) Anderson-Tully Company
- (5) Mississippi Forestry Association
- (6) Mississippi Power and Light Company

PUBLIC MEETINGS

A plan formulation stage public meeting concerning the Yazoo Area Pump Project was held in Vicksburg, Mississippi, on 10 July 1979. The plans and alternatives were presented to the public, and comments were solicited for guidance in the plan selection process. A final public meeting was held in Rolling Fork, Mississippi, on 6 April 1982 to present findings on the tentatively selected plan to the public. The public views and responses for both meetings are discussed in the following paragraphs.

PUBLIC VIEWS AND RESPONSES

Plan Formulation Public Meeting

The District received comments on the Yazoo Area Pump Project from 293 individuals, plus 6 petitions containing 660 signatures and 9 resolutions. Most of the responses concerned the need for mitigation of fish and wildlife losses caused by the project. Approximately one-half of those responding objected to

fee title acquisition of land for mitigation. The most preferred type of mitigation was land use (environmental) easements. Fee title acquisition from willing sellers was the next most preferred method of mitigation.

On the matter of the pumps, the majority favored the building of pumps, with 88 percent in favor, 12 percent opposed. In summary, local interests favor construction of a pumping plant to relieve flooding. The local interests also favor land use easements as opposed to fee title acquisition to meet mitigation requirements.

Final Public Meeting

Prior to, during, and after the final public meeting, comments were received from 180 individuals. Of those responding, approximately 94 percent favored the recommended pump project while only 6 percent opposed the installation of pumps. Of those responding regarding mitigation, approximately 72 percent opposed mitigation. If mitigation is authorized, approximately 78 percent favored easements for the life of the project.

Those attending the final public meeting and supporting implementation of the recommended plan included Honorable William Winter, Governor of Mississippi; Congressman David Bowen; and Mr. C. B. Newman, Speaker of the State House of Representatives. Statements from U. S. Senators Thad Cochran and John C. Stennis and Congressman G. V. Montgomery were read supporting the pump project. A statement was also received from Congressman Trent Lott supporting the recommended pump plan.

Various agencies supporting the project included the Mississippi Levee Board, the Delta Council, and the Mississippi Farm Bureau Federation. Those agencies opposing implementation of the proposed project included U. S. Fish and Wildlife Service, the Environmental Defense Fund, the National Wildlife Federation, and the Mississippi Wildlife Federation.

INDEX, REFERENCES, AND APPENDIXES

An alphabetized subject index with references to the EIS, Main Report, and report appendixes is presented in Table EIS-6.

Fish and Wildlife Mitigation Report

The purpose of the Fish and Wildlife Mitigation Report for the Yazoo Area Pump Project and Yazoo Area and Satartia Area Levees was to present the results of studies conducted to determine the modifications that should be made to

achieve a balance in the use of the Yazoo Backwater Area's natural resources in accordance with the Fish and Wildlife Coordination Act (FWCA) of 1958 (Public Law 85-624) and the National Environmental Policy Act of 1969 (Public Law 91-190). The report discusses the mitigation analysis for the construction and operation of the Yazoo Area and Satartia Area Backwater Levee Projects, including the connecting channel, drainage structures, and other appurtenances, as well as the recommended Yazoo Area Pump Project. The U. S. Fish and Wildlife Service (FWS) participated as a major cooperating agency.

The project area comprises approximately 757,000 acres and includes portions of Humphreys, Issaquena, Sharkey, Warren, Washington, and Yazoo Counties, Mississippi, and part of Madison Parish, Louisiana. The area is generally triangular in shape and extends northward from Vicksburg approximately 65 miles to a latitude north of Belzoni, Mississippi.

The area is a highly developed agricultural area with an economy heavily dependent upon the agricultural industry. The area possesses an extremely valuable bottom-land hardwood forest which supports excellent wildlife populations. Extensive clearing of the bottom-land hardwoods for agricultural production has resulted in the loss of much of the valuable wildlife habitat in the area.

Under existing conditions, interior ponding inundates low-lying lands in the Yazoo Backwater Area damaging manmade resources and agricultural crops. Currently 757,000 acres of land in the areas impacted by the Yazoo Area and Satartia Area Backwater Levee Projects are affected by flooding from a 100-year frequency flood. Average flood duration is in excess of 30 days and the average frequency of occurrence is 1.5 times annually. In addition to agricultural crops, numerous farm improvements, public roads and bridges, and rural residential, recreational, commercial, industrial, public, and semi-public properties in the backwater area are subject to flooding.

A definite need exists to provide flood protection and thereby reduce the financial and social risks involved in rural development. There is also a need to maintain quality habitat to support fish and wildlife resources.

Various solutions to the area's problems and needs have been analyzed, resulting in several flood control measures. Projects completed in the Yazoo Backwater Area include a 27.7-mile Yazoo Area Backwater levee and appurtenances, including two drainage structures (one at Steele Bayou with a design capacity of 19,000 cubic feet per second and one at Little Sunflower River with a design capacity of 8,000 cubic feet per second) and a channel between the Sunflower River and Steele Bayou to connect the upper and lower ponding areas within the Yazoo Area and a 20.2-mile Satartia Area Backwater levee. Additionally, a 17,500-cubic-foot-per-second Yazoo Area pumping plant is recommended for removing interior ponding during high Mississippi River stages. The levee system is completed to an interim grade of 107.0 feet, National Geodetic Vertical Datum (NGVD). The backwater levees are scheduled to be raised to a grade 2 feet below the refined 1973 Mississippi River and

Tributaries (MR&T) project flood flow line after the Mississippi River levees have been raised. The completed backwater levees and the proposed pumping plant will meet the needs of area inhabitants by reducing the adverse impacts of flooding; by providing for intensified agricultural operations; and by promoting social well-being of area inhabitants.

The Habitat Evaluation Procedure (HEP) was used as the primary analysis for conducting impact assessments and evaluation of mitigation requirements. The man-day (user) analysis was utilized to quantify the monetary losses as a supplemental procedure to evaluate the project mitigation requirements.

Five potential basic mitigation plans for mitigating fish and wildlife losses were evaluated: structural fishery measures (Plan 1), development of existing public lands (Plan 2), acquisition of marginally productive cleared lands (Plan 3), fee (simple) title land acquisition (Plan 4), and perpetual land use easement acquisition (Plan 5). In addressing the area wildlife losses, Plans 4 and 5 were considered reasonably balanced measures to offset project-related wildlife values lost as a result of the construction and operation of the completed levee projects and the recommended pumping plant facility.

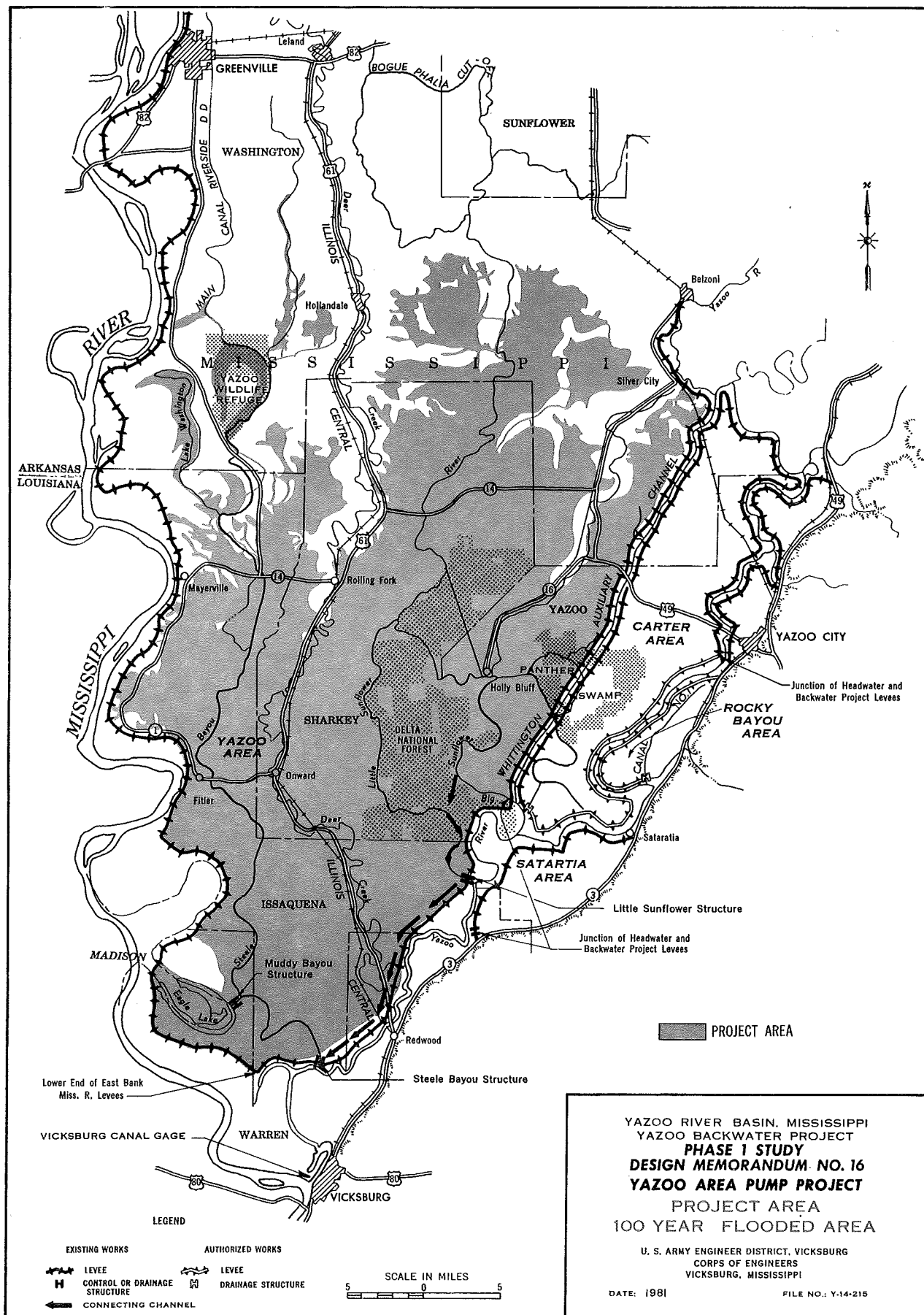
The acquisition of woodlands in the project area in perpetual land use easements (40,000 acres) or fee (simple) title (32,800 acres), or a combination of easements and fee title based on the HEP analysis, was recommended to mitigate area wildlife losses as a result of construction and operation of the recommended pumping plant facility and the completed levee projects. The fishery losses as a result of these projects were mitigated by Muddy Bayou Structure at Eagle Lake; waterfowl losses were mitigated by constructed and/or authorized greentree reservoirs and slough control structures in the Yazoo Backwater Area.

Total first costs for the recommended mitigation plan were estimated to be \$17,593,000 for the perpetual land use easement woodland acquisition alternative or \$38,384,000 for the fee (simple) title woodland acquisition alternative. Average annual costs were estimated to be \$621,000 for the perpetual land use easement woodland acquisition alternative or \$1,603,000 for the fee (simple) title woodland acquisition alternative, based on the authorized discount rate of 2-1/2 percent, a 50-year project economic life, and a development period of 50 years.

The Fish and Wildlife Service has submitted an FWCA Report, in accordance with the FWCA of 1958 (48 Stat. 401, as amended; 16 USC 661 et seq.) and is in general agreement concerning the recommended mitigation requirements. The FWCA Report is included as Appendix I to this report.

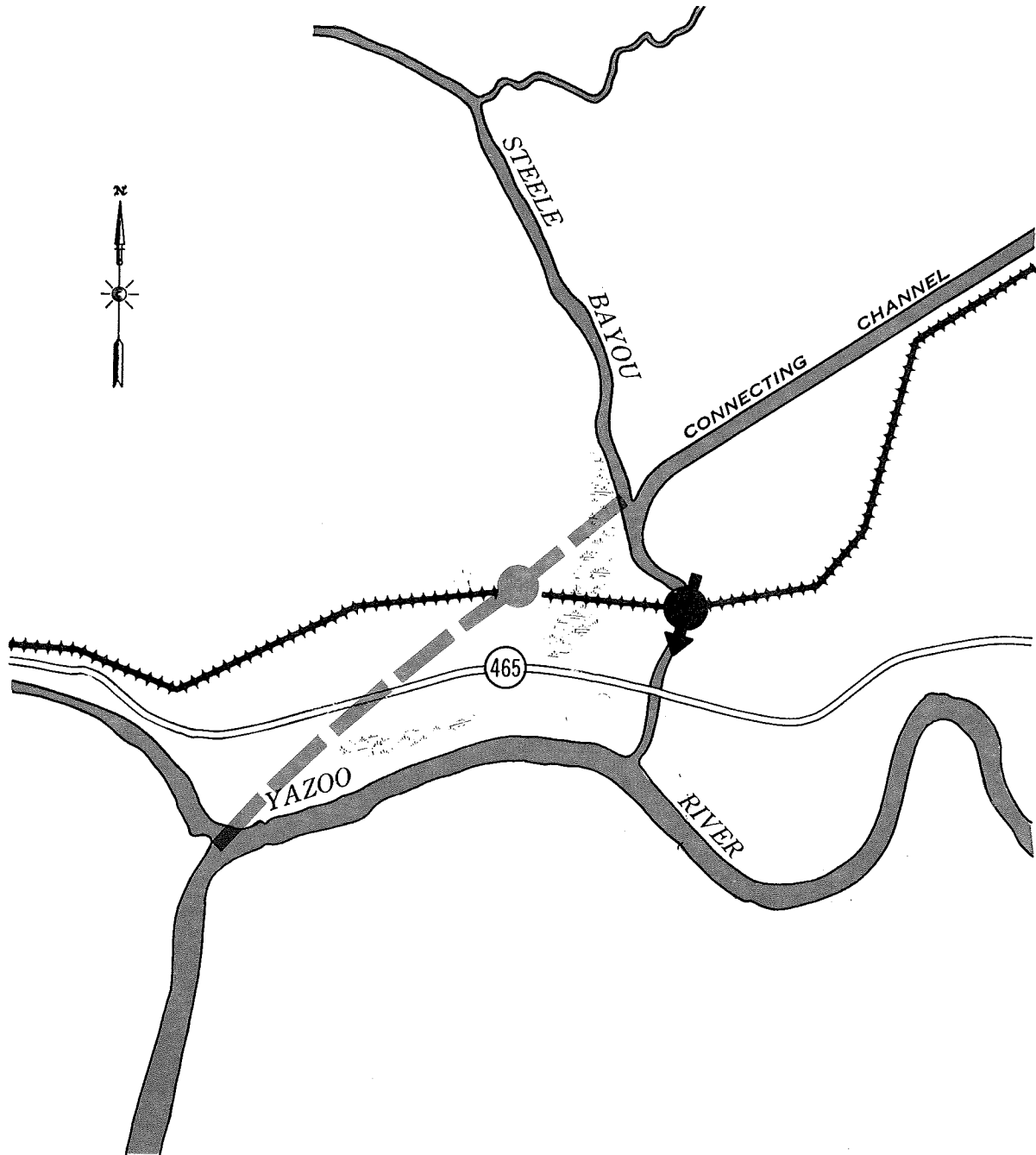
TABLE EIS-6
INDEXES, REFERENCES, AND APPENDICES

Subject	Study Documentation			Report Appendices
	Environmental Impact Statement	Main Report		
Affected Environment	Pg EIS-11 - EIS-19	Pg 6-10		Pg A-3 - A-14 and Pg G-1 - G-12
Alternatives	Pg EIS-7 - EIS-11, Table EIS-2	Pg 21-25, Table 1		Pg B-4 - B-14, Pg C-4, Pg E-1, Table B-1
Areas of Controversy	Pg EIS-5	N/A		Pg H-7 - H-8
Comparative Impacts of Alternatives	Pg EIS-19 - EIS-21	Pg 25-32, 35-40		Pg B-14 - B-29, Pg C-12 - C-16, Pg G-12 - G-18, Tables B-2, B-3, B-4, B-5, B-6, B-8, B-9, B-10, B-11, B-12, and B-13
Environmental Conditions	Pg EIS-11 - EIS-15	Pg 6-10		Pg A-3 - A-14, Pg G-1 - G-12
Environmental Effects	Pg EIS-19 - EIS-21	Pg 38-40		Pg B-27 - B-29, Pg G-12 - G-18
List of Preparers	Table EIS-1	N/A		N/A
Major Conclusions and Findings	Pg EIS-1 - EIS-5	Pg 57-58		N/A
Need for and Objectives of Action	Pg EIS-6 - EIS-7	Pg 16-17		Pg A-23 - A-24
Planning Objectives	Pg EIS-7	Pg 17		Pg A-24
Plans Considered in Detail	Pg EIS-10 - EIS-11	Pg 32-35, Tables 4, 5, 6 and 7		Pg B-19, Table B-9
Plans Eliminated from Further Study	Pg EIS-7 - EIS-10	Pg 25-32		Pg B-17 - B-19
Public Concerns	Pg EIS-6	Pg 55-57		Pg H-7 - H-8
Public Involvement Program	Pg EIS-21 - EIS-23	Pg 55-57		Pg H-7 - H-11
Public Views and Responses	Pg EIS-23 - EIS-24	Pg 55-57		Pg H-8 - H-11
Relationship to Environmental Requirements	Pg EIS-5 - EIS-6	Pg 18-20		Pg B-1 - B-4
Required Coordination	Pg EIS-21 - EIS-23	Pg 55-57		Pg H-7 - H-11
Significant Resources	Pg EIS-15 - EIS-19	Pg 6-10		Pg A-5 - A-8 and G-1 - G-12
Statement Recipients	Pg EIS-21 - EIS-23	N/A		N/A
Study Authority	Pg EIS-6	Pg 1-2		Pg A-1
Summary	Pg EIS-1 - EIS-6	N/A		N/A
Unresolved Issues	Pg EIS-5	N/A		N/A
Without Conditions (No-Action)	Pg EIS-9 - EIS-10	Pg 11, 21-22		Pg A-14 - A-18, B-4 - B-5, and G-1 - G-12

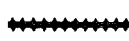






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THE
HISTORY
OF
THE
CITY
OF
NEW
YORK
FROM
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TO
1898
BY
JOHN
B. HOGAN
AND
JOHN
W. HOGAN
NEW
YORK
1898



SCALE: 1" = 1.5 MI.

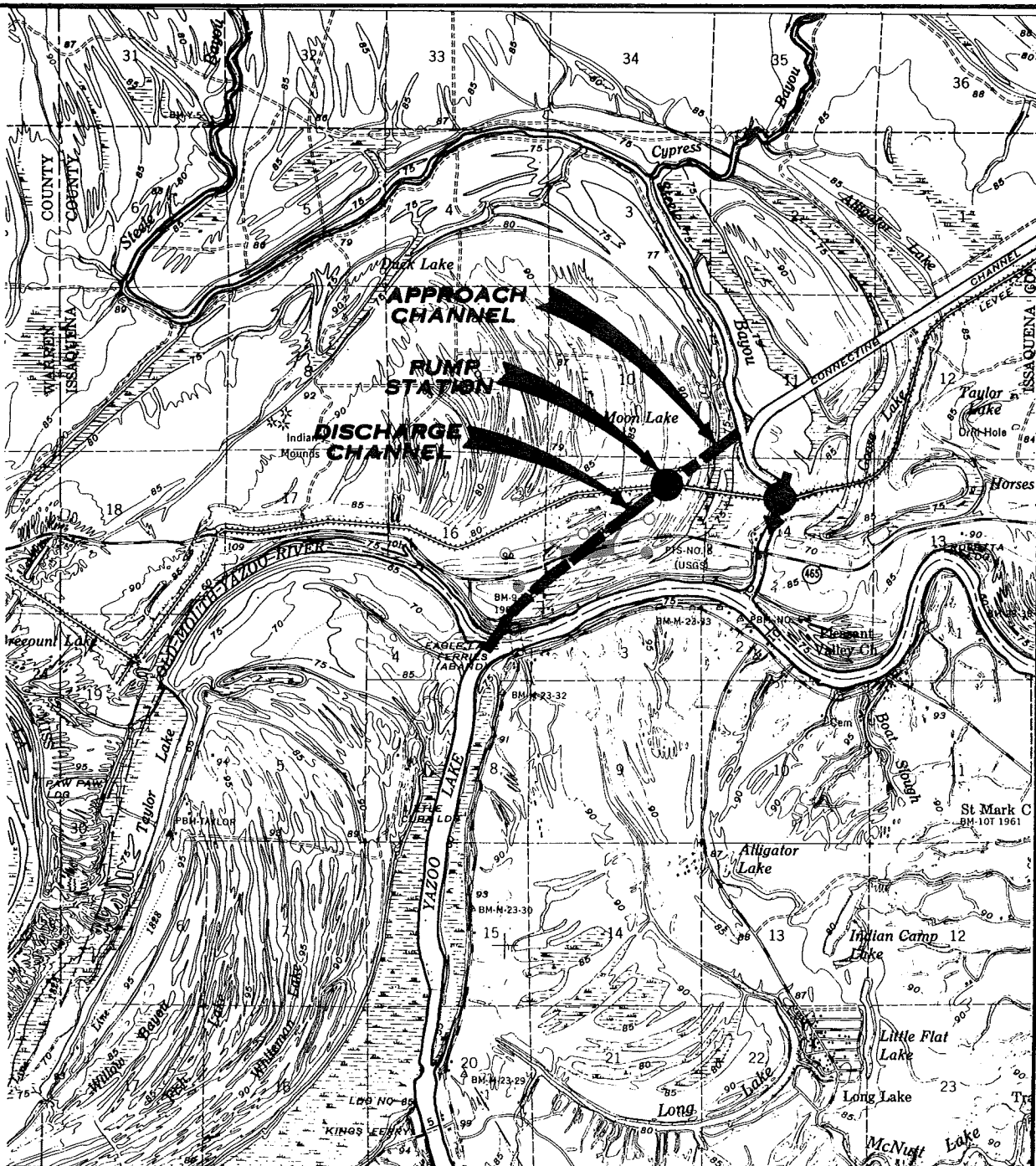
-  LEVEE
-  DRAINAGE STRUCTURE
-  PUMPING PLANT
-  DIVERSION CHANNEL
-  WOODED SWAMP

YAZOO RIVER BASIN, MISSISSIPPI
YAZOO BACKWATER PROJECT
PHASE I STUDY
DESIGN MEMORANDUM NO. 16
YAZOO AREA PUMP PROJECT
SELECTED SITE
LOCATION MAP







U.S. ARMY ENGINEER DISTRICT, VICKSBURG
CORPS OF ENGINEERS
VICKSBURG, MISSISSIPPI

DATE: 1981

FILE NO.: Y-14-215



LEGEND

- RELOCATIONS**
- BRIDGE 
 - POWERLINE 
 - AERIAL TEL. LINE 
 - BURIED TEL. LINE 
 - ROAD 
 - DRAINAGE STRUCTURE** 

SCALE: 1" = 1 MI.

YAZOO RIVER BASIN, MISSISSIPPI YAZOO BACKWATER PROJECT ENVIRONMENTAL IMPACT STATEMENT **YAZOO AREA PUMP PROJECT** SELECTED SITE LOCATION MAP

U.S. ARMY ENGINEER DISTRICT, VICKSBURG
CORPS OF ENGINEERS
VICKSBURG, MISSISSIPPI

DATE: 1981

FILE NO.: Y-14-215

