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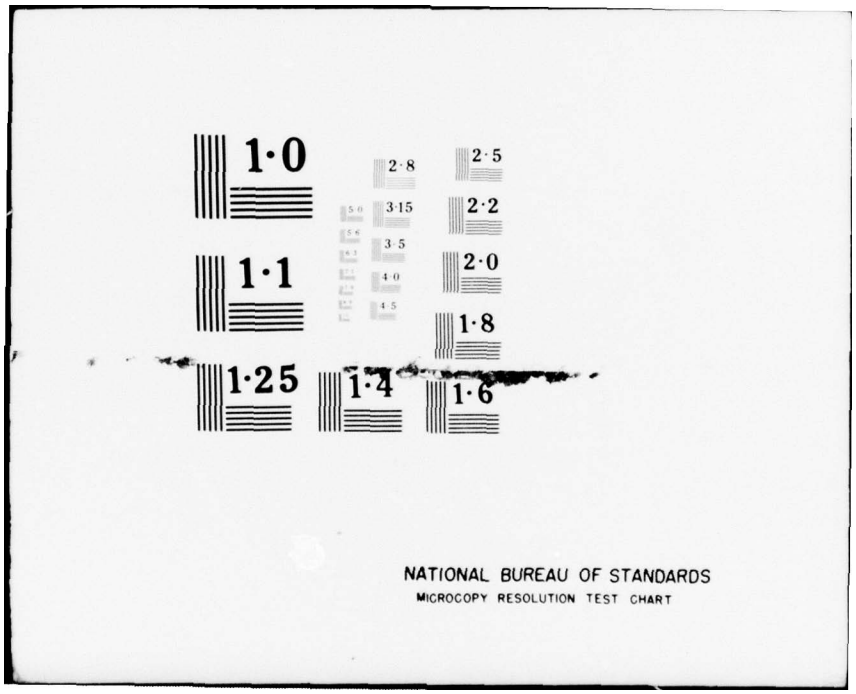
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Lower Mississippi Region
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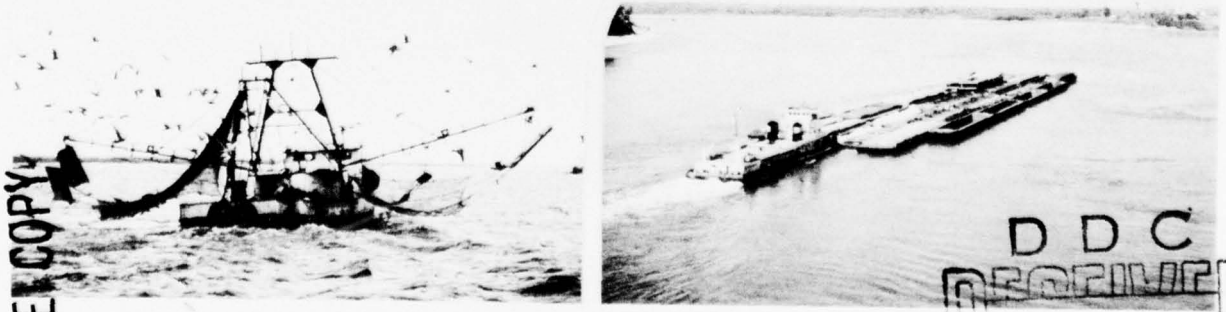

Appendix A
History of Study
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This appendix is one of a series of 22 documents comprising the complete Lower Mississippi Region Comprehensive Study. A list of the documents is shown below.

Main Report

Appendixes

Appendix	Description	Appendix	Description
A	History of Study	K	M and I Water Supply
B	Economics	L	Water Quality and Pollution
C	Regional Climatology, Hydrology & Geology	M	Health Aspects
D	Inventory of Facilities	N	Recreation
E	Flood Problems	O	Coastal and Estuarine Resources
F	Land Resources	P	Archeological and Historical Resources
G	Related Mineral Resources	Q	Fish and Wildlife
H	Irrigation	R	Power
I	Agricultural Land Drainage	S	Sediment and Erosion
J	Navigation	T	Plan Formulation
		U	The Environment

HISTORY OF STUDY

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(11) 1974

(12) 196 p.

(6) LOWER MISSISSIPPI REGION COMPREHENSIVE STUDY

Appendix A.
History of Study.

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PREPARED UNDER THE SUPERVISION OF
THE LOWER MISSISSIPPI REGION COMPREHENSIVE STUDY
COORDINATING COMMITTEE

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This report was prepared at field level by the Lower Mississippi Region Comprehensive Study Coordinating Committee and is subject to review by interested Federal agencies at the departmental level, by Governors of the affected States, and by the Water Resources Council prior to its transmittal to the President of the United States for his review and ultimate transmittal to the Congress for its consideration.

PREFACE

In 1944 the comprehensive and coordinated Federal-State development of the Nation's water resources was declared to be the Congressional policy (Flood Control Act of December 22, 1944); and in 1959 Congress directed the Senate Select Committee on National Water Resources to make a study of National water policies and problems, including a study of the character and extent of governmental and non-governmental water resource activities required to meet all water needs to the year 1980. In its report, transmitted in Congress in January 1961, the Committee recommended the development of a program for preparing comprehensive plans for each of the major river basins in the Continental United States.

The program recommended by the Committee was developed by appropriate agencies at the request of the President, and was approved by Congress in 1963. As a follow-up action, Congress created a five-member Water Resources Council vested with broad powers to coordinate water resources planning, and with responsibility for administering a program of grants to the States for water resources planning purposes (Water Resource Planning Act of 1965). The original members of the Council were the Secretaries of the Federal Departments of Agriculture; Army; Interior; Health, Education and Welfare; and the Chairman of the Federal Power Commission. The Secretary of Transportation was added as a member in 1966. The Council is currently coordinating the nationwide comprehensive study program, which includes the framework study of the Lower Mississippi Region.

TABLE OF CONTENTS

APPENDIX A
HISTORY OF STUDY

	Page No.
List of Figures	v
List of Tables	v
INTRODUCTION	
Purpose and Scope	1
Presentation of Material	2
ORGANIZATION	
General	3
Coordinating Committee	4
Specialty Groups	6
Plan Formulation Committee	6
Plan Formulation Task Force	6
Environmental Committee	8
Publicity Committee	8
Economics Subcommittee	9
Land Use and Management Subcommittee	9
Mineral Resources Subcommittee	9
Municipal, Industrial, and Agricultural Water Supply and Water Quality Subcommittee	10
Navigation Subcommittee	10
Power Subcommittee	10
Recreation, Fish and Wildlife Subcommittee	11
Regional Hydrology and Geology Subcommittee	11
Water Damage Control Subcommittee	11
Report Preparation Guidelines Subcommittee	12
Laws and Regulations Subcommittee	12

TABLE OF CONTENTS (con.)

Page No.

MANAGEMENT

General 13
Funding 13
Contracts 13
Federal Participation 17
State Participation 23

PROCEDURES

General 25
Studies 26
Basic Resource Studies 28
Climatology 28
Surface Water Hydrology 28
Geology 29
Land Resources 30
Economic Studies 30
Functional Studies 31
Related Mineral Resources 32
Power 32
Municipal and Industrial Water Supply 32
Irrigation 33
Water Quality and Pollution 33
Navigation 33
Recreation 33
Fish and Wildlife 33
Coastal and Estuarine Resources 34
Flood Problems 34
Agricultural Land Drainage 35
Sediment and Erosion 35
Health Aspects 35

TABLE OF CONTENTS (con.)

	Page No.
Archeological and Historical Resources	36
The Environment	36
Inventory of Facilities	36
Correlation	37
Review	37
Subcommittee Review	37
Draft Review	38
Field Level Review	40
APPROACH TO PLANNING	
Framework Program	41
Plan Formulation Task Force	41
Objectives	41
National Objectives	41
State and Local Objectives	42
Goals - State of Missouri	42
Goals - State of Mississippi	43
Planning Procedure	51
Planning Areas	51
Data Compilation	51
Resource Needs	51
Potential Solutions	52
Plan Formulation	52
PUBLIC INVOLVEMENT	
Purpose	53
Approach	54
Phase I	54
Plan	54
Implementation	57
Results	59
Conclusions	67

TABLE OF CONTENTS (con.)

	Page No.
Phase II	68
Plan	68
Implementation	69
Results	72
CHRONOLOGY OF EVENTS	
General	77
Coordinating Committee Meetings	82
Critique	92

LIST OF FIGURES

No.		Page No.
1	Major River Basins of the Contiguous United States	3
2	Lower Mississippi Region Comprehensive Study Organization Chart	5
3	Lower Mississippi Region	27

LIST OF TABLES

No.		Page No.
1	Organization for Lower Mississippi Region Comprehensive Study	7
2	Coordinated Comprehensive Basin Planning Budget, Lower Mississippi Region, Type 1	14
3	Distribution of Occupations	61
4	Comparison of Raw and Adjusted Scores	63
5	Factors	64
6	Attitude Rating Toward Factors	65
7	Public Opinion Survey on Water and Land Resources, Lower Mississippi Region	73
8	Public Opinion Survey on Public Involvement Meetings, Lower Mississippi Region	75
9	Summary of Major Events for the Lower Mississippi Region Comprehensive Study	78

INTRODUCTION

On November 7, 1966, Congress authorized and directed the Secretary of the Army to cause a survey to be made under the direction of the Chief of Engineers of the watersheds and streams within the alluvial valley of the Mississippi River below Cairo, Illinois, with respect to a framework plan for developing the water resources of the region. The Lower Mississippi Region Comprehensive Study is based upon that authority (Public Law 89-789), and is part of the nationwide program of comprehensive water and related land resources studies underway in response to recommendation No. 1 of the Senate Select Committee on National Water Resources in its report of January 30, 1961.

The accomplishment of the nationwide program is being coordinated by the Water Resources Council with a view to providing a broad-scaled analysis of water and related land resources problems within all major river basins of the United States, and to furnishing general appraisals of the probable nature, extent, and timing of measures for their solution. The Council requested that a Federal-State Coordinating Committee be organized and given the responsibility of providing leadership for the Lower Mississippi Region Comprehensive Study. On October 31, 1967, the Chief of Engineers assigned the responsibility for the Study to the Mississippi River Commission and requested that its President organize a Federal-State Coordinating Committee and serve as the chairman of the committee.

The Coordinating Committee recognized that early and complete integration of Federal and State Planning is essential to an orderly development of projects and programs designed to best serve water and related land resource needs and desires of the people in the Lower Mississippi Region. Accordingly, the study was performed on a coordinated and cooperative basis among 9 Federal Departments and 7 States to determine objectively the overall 50-year needs of the region and how best to meet those needs.

PURPOSE AND SCOPE

The purpose of this appendix is to document the history of the Lower Mississippi Region Comprehensive Study. The organization and procedures of the study are included along with an account of study methods for involving the public in the planning process.

PRESENTATION OF MATERIAL

This appendix is presented in seven sections. The second section summarizes the organization of the Study and includes a description of the Coordinating Committee established to provide leadership and guidance for the participating Federal and State agencies. The Plan Formulation Committee organized to implement decisions of the Coordinating Committee and to serve as a central clearinghouse between Coordinating Committee meetings is also described, and the organization and study responsibilities of other committees and subcommittees are presented.

Study management including funding and the administration of contract work is described in the third section. The items of work accomplished by contract included the writing of the published Lower Mississippi Region Comprehensive Study Main (Summary) Report. They also included several data reports which are unpublished but available at the cost of reproduction. A listing of those reports is presented.

Study procedures, as described in the fourth section, involved the preparation and review of basic resource, economic, and functional studies needed for plan formulation. These studies provided basic planning data for the 10 water resource planning areas (WRPA's) described on page 26. An overview of the purpose and scope of the various studies is presented.

Plan formulation studies are summarized in the fifth section. The multi-objective framework plan developed for the region includes full consideration of all needs projected for 1980-2020 for each functional use of water and related land resources, and general approaches that appear appropriate for satisfying the overall needs and associated problems. The framework plan can be used as a guide by officials at all levels of government in formulating more detailed plans in the future.

The sixth section describes the Study's public involvement program. Included are discussions of public meetings, brochures, and press releases used to inform the public, and methods employed to measure public attitudes toward water and related land resources development in the region. These attitudes received major consideration in formulating the comprehensive framework plan.

The final section presents a chronology of major events associated with the Study. Included is a synoptic account of the proceedings of all Coordinating Committee meetings held during the course of the Study.

ORGANIZATION

ORGANIZATION

GENERAL

Previous framework studies under the guidance of the Water Resources Council have almost unanimously followed the Coordinating Committee approach to obtain overall integrated plans for major river basins of the Nation. This approach was also used in developing a framework plan for water and related land resources development in the Lower Mississippi Region.

Figure 1. Major river basins of the contiguous United States.

COORDINATING COMMITTEE

The Lower Mississippi Region Coordinating Committee was organized on an ad hoc basis during the spring of 1968; its first official meeting was held in Vicksburg, Mississippi, on June 17, 1969. Primary functions of the Committee initially included the establishment of study objectives and preparation of a plan of study. The Committee's duties were subsequently expanded to include monitoring progress, resolving study problems of a policy nature, and providing leadership and guidance for the overall study effort.

The Committee was chaired by the President of the Mississippi River Commission, representing the Department of the Army. Members consisted of representatives of the States of Arkansas, Illinois, Kentucky, Louisiana, Mississippi, Missouri, and Tennessee, and the Federal Departments of Agriculture; Commerce, Health, Education and Welfare; Housing and Urban Development; Interior; Labor; Transportation; the Federal Power Commission; and the Environmental Protection Agency. These members were designated by the Governors of the respective States and by the Directors and Secretaries of the Federal agencies.

State representatives were responsible for direct communication with their respective Executive Branches and all subordinate elements of their States. They were also responsible for the conduct of the publicity and public involvement programs for the Study.

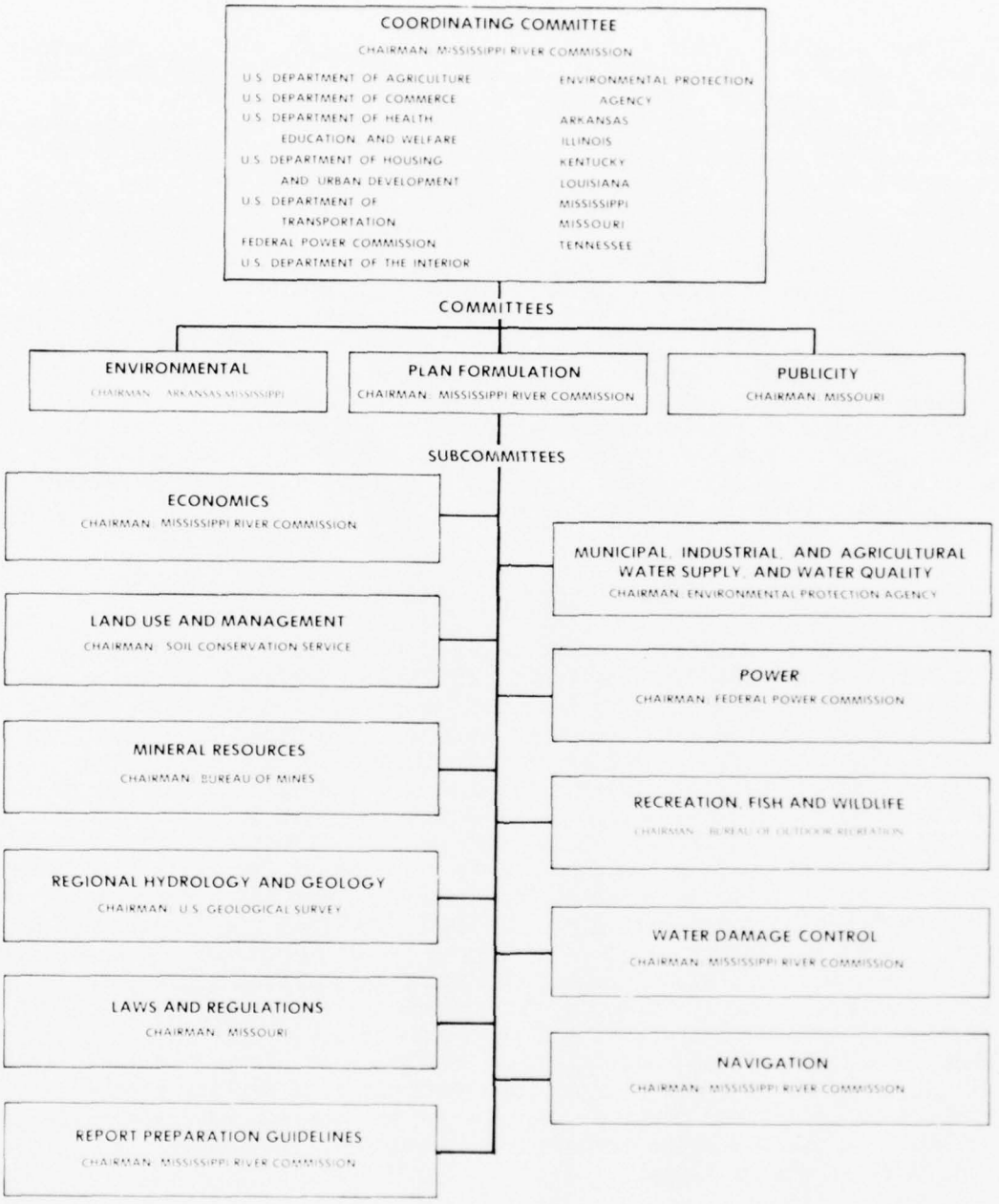


Figure 2. Lower Mississippi Region Comprehensive Study Organization Chart

SPECIALTY GROUPS

The planning effort at the working level was coordinated and accomplished through a Plan Formulation Committee, two additional committees, and 10 subcommittees. These were composed of interdisciplinary teams of experienced State and Federal personnel organized to assess the present status of water and related land resources development within the region, quantify the region's water resources problems and needs, identify program measures and costs, and integrate those measures and costs into a final framework plan. Portions of the work not requiring a full committee effort were accomplished by study elements, task groups, or designated individuals within the committees, subcommittees, and study elements. The chairmen of the committees and subcommittees participated in the meetings of the Plan Formulation Committee to report on the progress of their individual studies and to discuss problems and conflicts. Problems that could not be resolved by the Plan Formulation Committee were presented to the Coordinating Committee for resolution. Matters of minor importance and reviews were generally accomplished by correspondence. The overall organization for the Study displayed to subcommittee level is shown in table 1.

Plan Formulation Committee

The Plan Formulation Committee was responsible for implementing decisions of the Coordinating Committee and serving as a central clearinghouse between Coordinating Committee meetings, and was also responsible for formulating the framework program. The Chairman of the Plan Formulation Committee served as the coordinator for the total study effort, and maintained regular contact with subcommittee chairmen to assure timely coordination; to avoid duplication; to integrate study input; and to avoid delays. Assistance in this effort was provided by a Plan Formulation Task Force headed by a 10-member Executive Committee composed of the Plan Formulation Committee Chairman and a representative from each of the seven participating States and from the Departments of Agriculture and Interior. In addition to these members of the Executive Committee, the full Plan Formulation Committee included representatives from the Department of Commerce, Environmental Protection Agency, Southwestern Power Administration; and the Corps of Engineers Districts at Memphis, Vicksburg, and New Orleans. An agenda of planned subjects to be discussed at Plan Formulation Committee meetings was distributed to members prior to each meeting. Minutes of the meeting were also distributed to the Committee members and to subcommittee members who participated in the meetings.

Plan Formulation Task Force

Initially, there were three plan formulation work groups organized to formulate development programs for the different water resources

Table 1. Organization for Lower Mississippi Region Comprehensive Study

Participating States And Federal Agencies	Committee				Subcommittee										
	Coordinating	Plan Formulation	Environmental 1/	Publicity 1/	Economics	Land Use and Management	Laws & Regulations	Mineral Resources	MIA Wtr. Supply & Water Quality	Navigation	Power	Recreation, F & WL	Reg. Hydrology & Geology	Water Damage Control	Report Preperation Guidelines
Dept. of Agriculture	x		x												
Soil Conservation Ser.		x				2/	x		x			x	x	x	x
Forest Service		x			x	x						x	x	x	
Econ. Research Ser.		x			x	x			x			x			
Dept. of Army															
Miss. River Commission	2/	2/	x		2/	x	x	x	x	x	x	x	x	x	2/
Corps of Engineers															
Memphis District		x			x				x	x			x	2/	
New Orleans District		x			x				x	2/			x	x	
Vicksburg District		x			x				x	x			x	x	
Dept. of Commerce	x	x			x					x			x	x	
Bureau of Domestic Com.															
National Weather Ser.															
Bureau of Econ. Analy. 3/															
Maritime Administration															
National Marine Fish Ser.												x			
Dept. of Interior	x	x	x				x								
Outdoor Recreation		x			x	x			x	x		2/		x	
Sports Fish. & Wildlife		x				x			x						
Mines								2/							
National Park Ser.		x										x			x
Geological Survey		x							x				2/	x	x
Southwestern Pow. Adm.		x			x						x				
Dept. of Health. Ed. & Welfare	x								x			x			
Dept. of Housing & Urban Development	x	x		x	x	x			x			x		x	
Dept. of Labor	x				x										
Dept. of Transportation	x		x		x				x	x		x			
Environmental Protection Agency 4/	x	x			x	x			2/			x	x		x
Federal Power Commission	x								x		2/	x			
State															
Arkansas	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Illinois	x	x	x		x	x	x	x	x	x	x	x	x	x	
Kentucky	x	x	x		x	x	x	x	x	x	x	x	x	x	
Louisiana	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Missouri	x	x	x	2/	x	x	2/	x	x	x	x	x	x	x	
Mississippi	x	x	2/		x	x	x	x	x	x	x	x	x	x	
Tennessee	x	x	x		x	x	x	x	x	x	x	x	x	x	

1/ Ad hoc Committee
2/ Lead Agency
3/ Formerly Office of Business Economics
4/ Office of Water Quality

planning areas (WRPA's) of the region. These groups were composed of Plan Formulation Committee members, with Federal agency representatives assigned to virtually all of the work groups and State representatives assigned only to those groups concerned with portions of the region within their respective States. This organization proved to be cumbersome; thus, the work groups were supplanted by the Plan Formulation Task Force in order to streamline the study effort. The major portion of the plan formulation work was accomplished by the Task Force independently of the full Plan Formulation Committee, but the output of the Task Force was subject to review and approval of the full committee.

Environmental Committee

The Environmental Committee was established on an ad hoc basis in 1970, with a view to forming a temporary organization to: (1) develop a list of natural land and water areas needing special treatment because of their environmental value, and (2) provide a description of the action needed to enhance, restore, or preserve these areas. This information was to be used in large measure by the Plan Formulation Committee to formulate both a single-objective Environmental Quality Plan and multi-objective plans, including the final plan.

The Committee was chaired initially by the State of Arkansas and later by the State of Mississippi, with representatives from the other participating States and Federal agencies as shown in table 1. The original demands upon the ad hoc Committee were later expanded to include the responsibility for preparing an Environmental Appendix. Consequently, the Committee gained permanent status and played an active role throughout the major portion of the Study.

Publicity Committee

At the outset of the study, there was a need for an active organization to guide the establishment of advisory groups in each State. These groups in turn could be informed of the study effort and asked to suggest areas of public concern; to review programs of development; and to discuss alternatives and degree of development before a final program was selected. An ad hoc Publicity Committee was established for this purpose. The Committee was chaired by the State of Missouri, with a representative from the Department of Housing and Urban Development and a representative from the State of Louisiana. To insure that the above objectives were met effectively by direct public involvement in the Region study area, a Public Involvement Task Force was established. The Task Force was chaired by the chairman of the Publicity Committee, and was composed of members designated by each member of the Coordinating Committee. This Task Force was responsible for developing an action program for involvement of the public in the study effort, and to provide the Plan Formulation Committee with information regarding the public's desires on study

goals and objectives by January 1, 1972, if possible. It was hoped that this program would accomplish two primary objectives: (a) disseminating information to the public from the study teams; and (b) gathering information from the public for use by the study teams. The success of the program suffered somewhat in that all the States involved did not establish effective programs. The activities of this Committee and the associated public involvement program for the Study are discussed in detail in a later section of this appendix.

Economics Subcommittee

The Economics Subcommittee, chaired by the Mississippi River Commission, was responsible for the coordination and preparation of Appendix B, Economics. Other participating organizations are listed in table 1.

National economic projections by the Bureau of Economic Analysis (formerly Office of Business Economics) of the Department of Commerce and the Economic Research Service, Department of Agriculture, provided estimates of what to expect nationally in terms of population, employment, earnings, income, and production of goods and services. Those estimates guided the Subcommittee in developing corresponding demographic projections for the region for individual programs emphasizing national income on one hand and regional development on the other. Federal agencies provided basic data and projections for the agricultural, forestry, mining, and electric power sectors of the region's economy, and participated with the Economics Subcommittee in translating the economic and demographic projections into needs for water and related land resources.

Land Use and Management Subcommittee

The Land Use and Management (Land Resources) Subcommittee, chaired by the Soil Conservation Service of the Department of Agriculture, was responsible for the preparation of Appendix F, Land Resources, and Appendix S, Sediment and Erosion. The first appendix inventoried past and present use of the region's land resources; quantified future land needs for food and fiber production and urban expansion, and compared those needs to the total available land resource. The second appendix provided an appraisal of the existing and potential sediment and erosion problems and damages in the region.

Mineral Resources Subcommittee

The Mineral Resources Subcommittee was responsible for the preparation of Appendix G, Related Mineral Resources. The Bureau of Mines of the Department of Interior chaired this Subcommittee, which included

other participants from the Mississippi River Commission and the seven involved States. The Related Mineral Resources Appendix provided basic data and projections on the region's mineral industry output and on related water and land needs.

Municipal, Industrial, and Agricultural Water Supply and Water Quality Subcommittee

The Municipal, Industrial, and Agricultural Water Supply and Water Quality Subcommittee, chaired by the Environmental Protection Agency, was responsible for the preparation of four appendixes: Appendix H, Irrigation; Appendix K, Municipal and Industrial Water Supply; Appendix L, Water Quality and Pollution; and Appendix M, Health Aspects. The Irrigation Appendix inventoried the region's present freshwater withdrawals for irrigation and for livestock and poultry production, and estimated future withdrawals for those purposes. The Municipal and Industrial Water Supply studies quantified the present and expected future water withdrawals to supply municipal systems, industries, and thermoelectric power plants. The Water Quality and Pollution Appendix identified problems associated with waterborne wastes, and provided basic data on the natural characteristics and capability of the region's surface water resource to assimilate those wastes. Basic data on the health of man as it relates to water resources development directly through drinking and recreational water was provided by the Health Aspects Appendix.

Navigation Subcommittee

The Navigation Subcommittee was responsible for the preparation of Appendix J, Navigation, and was chaired by the New Orleans District of the Corps of Engineers. The navigation studies included a broad determination of improvements which will be required to satisfy navigational needs over the 50-year time period 1970-2020 within the Lower Mississippi Region. Needs were identified with respect to the national income, regional development, and environmental objectives of the study.

Power Subcommittee

The Power Subcommittee, chaired by the Federal Power Commission, was responsible for the preparation of Appendix R, Power. The Study inventoried the existing thermal and hydroelectric resources and power requirements, and estimated future power requirements and the need for additional hydroelectric projects within the region.

Recreation, Fish and Wildlife Subcommittee

The Recreation, Fish and Wildlife Subcommittee, chaired by the Bureau of Outdoor Recreation of the Department of Interior, was responsible for the preparation of three appendixes: Appendix N, Recreation; Appendix P, Archeological and Historical Resources; and Appendix Q, Fish and Wildlife. The Recreation Appendix estimated the region's outdoor recreation needs for water and related land in terms of resource requirements, and also identified problem areas. The Archeological and Historical study provided a broad-scale analysis of factors which affect natural heritage and archeological aspects, and isolated those aspects as they relate to the region as a whole. The Fish and Wildlife Study inventoried fish and wildlife resources; determined present and future hunting, fishing, and other fish and wildlife-oriented needs; assessed the fish and wildlife resources influenced by existing water and related land resources programs; and identified program measures for immediate and long-range implementation that emphasize fish and wildlife resources.

Regional Hydrology and Geology Subcommittee

The Regional Hydrology and Geology Subcommittee was responsible for the preparation of Appendix C, Regional Climatology, Hydrology and Geology. The Subcommittee was chaired by the Geological Survey of the Department of Interior. The study provided basic data on the climate, meteorology, and hydrology of the Lower Mississippi Region pertinent to the development of plans for the utilization of water and related land resources, including data on the quantity and distribution of surface water resources. It also provided a general appraisal of ground-water resources of the region, including descriptions of the geologic framework, the geologic units that form significant aquifers, and the hydrologic characteristics of the aquifers.

Water Damage Control Subcommittee

The Water Damage Control Subcommittee, chaired by the Mississippi River Commission, was responsible for the preparation of four appendixes: Appendix E, Flood Problems; Appendix I, Agricultural Land Drainage; Appendix O, Coastal and Estuarine Resources; and Appendix D, Inventory of Facilities. The Flood Problems study provided a general description of the nature, location, and extent of flood problems in the region, and identified alternative means and costs of resolving those flood problems. The Land Drainage Study identified regional lands that have a drainage problem, outlined solutions to meet current and future land drainage needs, and assessed the impacts of land drainage agricultural development, land utilization, and fish and wildlife. The location, extent, and nature of water and related land resources problems in the coastal and estuarine areas of the region were identified in the Coastal and

Estuarine Resources Appendix. The needs for preserving and developing the water and related land resources of the coastal and estuarine areas were also identified in the appendix. The Inventory of Facilities Appendix is a reference publication listing and describing all water-related projects within the limits of the Lower Mississippi Region. The listing includes privately owned as well as Federal, State, and local government projects.

Report Preparation Guidelines Subcommittee

The Vicksburg District chaired the Report Preparation Guidelines Subcommittee until February 1973, at which time the Mississippi River Commission assumed the responsibilities of this Subcommittee, which included preparing guidelines for the format of field drafts of appendixes and summary reports, developing base maps, a glossary, informational brochures, reviewing subcommittee drafts for conformance to established guidelines, and coordinating the reproduction and dissemination of the draft and final field level reports with the Waterways Experiment Station.

Laws and Regulations Subcommittee

The original Plan of Study included a Laws and Regulations Subcommittee responsible for insuring that legal and institutional constraints be given proper consideration in the planning process. The organization of the Subcommittee consisted of the State of Missouri as lead agency, with participants from the other six States and from the Soil Conservation Service, the Mississippi River Commission, and the Department of Interior. The Subcommittee was charged with the responsibility of gathering State laws and policies regarding water and related land resources, but no definite decision was made regarding the necessity for preparation of a legal and institutional appendix. The assembled data was analyzed in detail during the summer of 1972, and it was determined that the value of a formal Legal and Institutional Appendix based only on State and Federal water laws and policies would not justify the effort involved in its compilation. It was concluded that in lieu of a Legal and Institutional Appendix, formulation of the framework plan would be guided by the assembled data and the final plan would be presented to the legal staffs of each State and Federal agency for comment prior to finalization.

MANAGEMENT

GENERAL

The accomplishment of studies to develop nationwide comprehensive plans for proper utilization of water and land resources is being coordinated by the Water Resources Council. The Council requested that a Federal-State Coordinating Committee be organized to provide the required leadership for the Lower Mississippi Region Comprehensive Study. On October 31, 1967, the Chief of Engineers assigned the responsibility for the Lower Mississippi Region Comprehensive Study to the Mississippi River Commission, and requested that the President of the Commission organize and serve as chairman of a Federal-State Coordinating Committee. The Water Resources Council requested the Commission to develop a preliminary plan of study and budget estimate in cooperation with Federal and State agencies. This was accomplished through an ad hoc Coordinating Committee created to establish the study goals, procedures, and subject matter, and to organize appropriate Federal-State work groups to conduct individual studies covering the subject matter. This initial planning step laid the groundwork for a cooperative and coordinated planning effort on the part of the 9 Federal agencies and 7 States concerned with the water and related land resources of the Lower Mississippi Region.

FUNDING

After responding to the Council's initial request, the ad hoc Coordinating Committee continued to function only on an "as needed" basis until Federal agency funds were received in Fiscal Year 1970 to carry out the study program. The approved Federal cost estimate was approximately $3.5 million (table 2), with State participation estimated to cost an additional $324,000. The Federal funds were distributed by direct appropriation and by reimbursement of Federal agencies by the Mississippi River Commission. The States and the Department of Transportation received funds from the Water Resources Council to help finance their participation in the Study. The Department of Labor did not receive any funds for its participation, which was limited to attendance at certain of the Study's meetings.

CONTRACTS

Contract work during the course of the Study amounted to a total cost of $374,801. This included the cost of investigations and reports

Table 2. Coordinated Comprehensive Basin Planning Budget, Lower Mississippi Region, Type I 1/

(Values in Thousands of Dollars)

Program	Method of Financing	Total Estimated Cost 2/	To 30 June 1971	Annual Funding 1972	Annual Funding 1973
Dept. of Agriculture		(783.0)	(428.0)	(218.0)	(137.0)
Soil Conservation Service	Direct	398.0	209.0	112.0	77.0
	Transfer from Army	77.0	77.0		
Forest Service	Direct	103.0	39.0	36.0	28.0
	Transfer from Army	16.0	16.0		
Economic Research Service	Direct	168.0	66.0	70.0	32.0
	Transfer from Army	21.0	21.0		
Dept. of the Army					
Mississippi River Commission	Direct	(1728.0)	(733.0)	(637.0)	(358.0)
Dept. of Commerce		150.0	(70.0)	(62.0)	(18.0)
Bureau of Domestic Commerce	Direct	16.0		14.0	2.0
	Transfer from Army	16.5	16.5		
National Weather Service	Direct	9.0		7.0	2.0
	Transfer from Army	8.5	8.5		
Bureau of Economic Analysis 3/	Direct	58.0		32.0	6.0
	Transfer from Army	20.0	20.0		
Maritime Administration	Direct	6.0		4.0	2.0
	Transfer from Army	10.0	10.0		
National Marine Fisheries Service	Direct	11.0		5.0	6.0
	Transfer from Army	15.0	15.0		
Dept. of the Interior		(381.0)	(199.0)	(116.0)	(66.0)
Outdoor Recreation	Transfer from Army	125.0	55.0	46.0	26.0
Sport Fisheries and Wildlife	Transfer from Army	51.0	26.0	17.0	8.0
Mines	Transfer from Army	34.0	24.0	7.0	3.0
National Park Service	Transfer from Army	61.0	43.0	9.0	9.0
Geological Survey	Transfer from Army	98.0	44.0	35.0	19.0
Southwestern Power Adm.		12.0	9.0	2.0	1.0
Department of Health, Education and Welfare	Direct				
	Transfer from Army				
Department of Housing and Urban Development		(109.0)	(85.0)	(23.0)	(1.0)
	Direct	94.0	70.0	23.0	1.0
	Transfer from Army	15.0	15.0		
Environmental Protection Agency 4/		(370.0)	(190.0)	(131.0)	(49.0)
	Direct	328.0	148.0	131.0	49.0
	Transfer from Army	42.0	42.0		
Federal Power Commission		(24.0)	(10.0)	(8.0)	(6.0)
	Direct	21.0	7.0	8.0	6.0
	Transfer from Army	3.0	3.0		
TOTAL PROGRAM		3545.0	1715.0	1195.0	635.0
APPROPRIATIONS:					
Department of Agriculture		669.0	314.0	218.0	137.0
Department of the Army		2353.0	1176.0	753.0	424.0
Department of Commerce		80.0		62.0	18.0
Department of Housing and Urban Development		94.0	70.0	23.0	1.0
Environmental Protection Agency 4/		328.0	148.0	131.0	49.0
Federal Power Commission		21.0	7.0	8.0	6.0
TOTAL APPROPRIATIONS		3545.0	1715.0	1195.0	635.0

1/ Approved coordinated budget through FY 1973. Minor budget changes which occurred during remainder of study are not reflected.
2/ Additional State participation is estimated to cost $524,000.
3/ Formerly Office of Business Economics.
4/ Office of Water Quality.

requiring expertise in special fields of study, such as archeology, behavioral and environmental research, history, marine biology, and other disciplines. Contracts were administered by the Corps of Engineers, National Park Service, and the Department of Housing and Urban Development.

The Louisiana State University Center for Wetlands Resources was retained under contract to conduct a number of environmental investigations pertaining to the Louisiana coastal region. These investigations were conducted in support of and to serve as inputs to planning studies, such as: (a) the Lower Mississippi Region Comprehensive Study, (b) the West Texas and Eastern New Mexico Water Import Study, and (c) the Louisiana Coastal Area Study. These investigations and studies include an assessment of the composition of the active Mississippi River delta, identifying areas of land losses and means for controlling deposition in the delta. They further include an assessment of salinity regimens and water balance in the estuary, temperatures, densities, wave energies, and water chemistry. Also included is an assessment of the desirability of controlled diversions of water into the estuarine area and various other physical aspects of the estuary.

The services of four consultants (doctors in various Social Science and Engineering Departments) from the University of Missouri at Rolla, Missouri, were contracted in 1972. Under this contract, they assisted the Publicity Committee in planning, executing, and evaluating public meetings and forums. They also assisted in preparing informational brochures, press releases, and other items to encourage the public to voice opinions regarding the Study. An initial consultant report entitled "Public Involvement" outlined general procedures to follow in planning, conducting, and following up on public meetings. This included procedures for precise pre-meeting planning, State and local organization of meetings, informality, and providing an opportunity for citizen input to the Study. The final consultant report entitled "Analysis of Public Meetings" presented a summary of public attitudes as perceived from a statistical analysis of opinions expressed at a total of 11 public meetings. The opinions were obtained in the form of responses to specific statements about the use and development of water and related land resources. The public response was very limited when compared to the total region population of 6,293,233 based on the 1970 census.

To arrive at a realistic evaluation of the aesthetic, cultural, and environmental values of the study region, contracts were let to an archeologist, a geologist, a historian, a visual landscape expert, and to persons with special commercial fisheries expertise. Their reports, listed below, served as inputs to several of the functional appendixes and the formulation of the recommended plan for the Lower Mississippi Region.

(1) "An Evaluation of the Major Landscape and Environment of the Lower Mississippi Region" by Trusten H. Holder.

(2) "An Inventory and Assessment of the Archeological and Historical Resources of the Lower Mississippi Alluvial Valley to January 1971" by Hester A. Davis, State Archeologist, Arkansas Archeological Survey.

(3) "Louisiana Estuarine Dependent Commercial Fishery Production and Values" by Alva H. Harris, Nicholls State University, Department of Biological Sciences.

(4) "The Lower Mississippi Valley in North American Prehistory" by Jeffrey P. Brain, Peabody Museum, Harvard University.

(5) "The Mississippi Valley: European Settlement, Utilization and Modification" by Fred Kniffen, Louisiana State University, Department of Geography and Anthropology.

(6) "Quarternary Geology of the Lower Mississippi Valley" by Roger T. Saucier, U.S. Army Corps of Engineers, Waterways Experiment Station.

(7) "Summary of Freshwater Commercial Fisheries Production and Values for Water Resource Planning Areas in the Lower Mississippi Region" by Ronald H. Kilgen, Nicholls State University, Department of Biological Sciences.

Three separate contracts were awarded Gulf South Research Institute, Baton Rouge, Louisiana. The first contract provided for the quantification of 1970-2020 municipal and industrial water supply needs in the Region. These needs were presented in a three-volume report, with one volume covering water resource planning areas (WRPA's) 2 and 3, another covering WRPA's 4 through 7, and another covering WRPA's 8, 9, and 10. The second contract (administered by the Department of Housing and Urban Development) resulted in a report entitled "Urban Development Aspects of the Lower Mississippi Valley, 1970-2020." The last contract was for writing the Summary Report for the Study. Of the various reports prepared under contract, only the Summary Report is included among the body of published documents for the Study. Copies of the other reports can be obtained from the President, Mississippi River Commission, at the cost of reproduction.

FEDERAL PARTICIPATION

The Corps of Engineers participated in the Study through its Lower Mississippi Valley Division and three District offices in Memphis, Vicksburg, and New Orleans. The Lower Mississippi Valley Division Engineer, in his dual role as President of the Mississippi River Commission, served as Chairman of the Coordinating Committee. The Division office staff handled all Coordinating Committee meeting arrangements, including the preparation of agenda for meetings, arranged meeting places, and prepared and distributed minutes of the meetings.

The Division office additionally chaired the Plan Formulation Committee, handled meeting arrangements for this committee, and provided management for the entire study effort, the most important aspects of which were formulation of the framework program, preparation of the Plan Formulation Appendix, insuring proper preparation of the Summary Report, insuring consistency of compatibility between the various study documents, coordinating the budget, and establishing schedules and reporting progress for the Study. It also chaired the Economics Subcommittee and authored the Economics Appendix; prepared the Plan of Study, Report Preparation Guidelines, and History of Study Appendix; provided the bulk of the input to the Environmental Appendix; coordinated review comments on all other appendixes; provided complex rewritings of numerous appendixes for the Study; and coordinated printing of the reports.

The Memphis District chaired the Water Damage Control Subcommittee and coordinated the preparation of the Flood Problems, Inventory of Facilities, and Coastal and Estuarine Resources Appendixes. The District developed basic inputs covering WRPA's 2 and 3 for the Economics; Flood Problems; Navigation; Municipal and Industrial Water Supply; Regional Climatology, Hydrology and Geology; and Inventory of Facilities Appendixes; and cooperated in the preparation of other functional appendixes. The Memphis District also assisted the Plan Formulation Task Force in developing the fundamental plan for the region, and preparing the Plan Formulation Appendix. The District provided an experienced planner for regular attendance at Plan Formulation Task Force work sessions in Vicksburg. This planner was assigned responsibility for coordination of the formulation of alternative plans and the recommended plan. He also authored substantial portions of the Plan Formulation Appendix.

The Vicksburg District assisted in the coordination and preparation of the Regional Climatology, Hydrology and Geology Appendix, and had primary responsibility for preparation of the Inventory of Facilities Appendix. The District provided basic data and narrative for WRPA's 4, 5, 6, and 7 portions of the Economics; Regional Climatology, Hydrology and Geology; Inventory of Facilities; Flood Problems; Navigation; and Municipal and Industrial Water Supply Appendixes. The District authored substantial portions of the Plan Formulation Appendix and provided basic

data for the Vicksburg District portion of the framework plans. An invaluable contribution to the total study effort was made by the Vicksburg District in providing technical expertise in hydraulics, economics, biology, and planning to the Plan Formulation Task Force.

The New Orleans Distict chaired the Navigation Subcommittee, coordinated preparation of the Navigation Appendix, authored portions of the Plan Formulation Appendix, provided an experienced planner for regular attendance at Plan Formulation Task Force work sessions in Vicksburg, and prepared the Coastal and Extuarine Resources Appendix. The District provided the basic inputs mentioned in the preceding paragraph covering WRPA's 8, 9, and 10, and also cooperated in the preparation of other functional appendixes. A major contribution to the total study effort by the New Orleans District was its management of a WRPA 9 pilot study, which established many of the procedures used later in the Study.

The U. S. Department of Agriculture participated through the Soil Conservation Service, Forest Service, and Economic Research Service. The Soil Conservation Service had overall responsibility for studies conducted by the three agricultural agencies, and served as the Departmental representative on the Coordinating Committee.

The Soil Conservation Service chaired the Land Use and Management Subcommittee, and had prime responsibility for authorship of appendixes on land resources and sediment and erosion. The SCS worked closely with the Water Damage Control Subcommittee in preparing the Flood Problems Appendix and had responsibility as a study element leader under that Subcommittee for preparation of the Land Drainage Appendix. Working again as a study element leader under the MIA Subcommittee, SCS also authored the Irrigation Appendix. SCS made substantial contributions to the total study effort in providing an almost unmeasurable mass of working data dealing with subregional breakdowns of land use by various classifications of cover and use. A representative of the SCS also served as an active member of the Environmental Committee and the Plan Formulation Task Force Executive Committee.

The Forest Service provided an inventory of the regions's forest resources in terms of present and potential physical characteristics, productivity, and management levels; and an inventory of the use of the timber supply by forest-based enterprises and related industries and their contribution to the present and prospective economic activity and employment in the region. Further participation included an appraisal of the present and projected water problems and needs relative to National Forests and forest-based industries and an appraisal of the impact of water resource development projects upon the National Forest and other forest land resources sector of the region's economy.

The Economic Research Service participated in the development of demographic and economic projections for the region. Additional major

responsibilities included projections of agricultural production, income, employment, and land use within the region, and drafting of substantial portions of the Land Resources and Economics Appendixes.

The Department of Commerce was represented by the Bureau of Domestic Commerce, the National Weather Service, Bureau of Economic Analysis, Maritime Administration, and the National Marine Fisheries Service. The Bureau of Domestic Commerce (formerly Business and Defense Services Administration) coordinated the preparation of information on industrial water use and the refinement of existing studies on the industrial water supply needs.

The National Weather Service (formerly Environmental Science Services Administration) authored a major portion of the Regional Climatology, Hydrology and Geology Appendix. A comprehensive description of the climate of the region and a description of the present National Weather Flood Warning Service in the region were included along with an analysis of future needs for this service in coordination with other flood control programs.

The Bureau of Economic Analysis (formerly Office of Business Economics) assisted the Economics Subcommittee in preparing the Economics Appendix, and in interpreting the national economic projections prepared jointly by the Bureau of Economic Analysis and the Economic Research Service. The national economic projections were disaggregated for the region and criteria were developed for incorporating the concepts of regional development and environmental quality programs into the framework plan.

The Maritime Administration participated with the Navigation Subcommittee in identifying project factors of ocean and inland water transportation pertaining to the "intermodel" cargo movement system which will have a direct import on present and future navigational requirements in the region. This included the development and analysis of current data regarding ocean and inland waterway use of containers, lighters, barges, and shallow-draft ocean vessels valid for the region.

The National Marine Fisheries Services (formerly Commercial Fisheries of the Department of Interior) cooperated with the Bureau of Sports Fisheries and Wildlife, Department of Interior, and with the game and fish agencies of Kentucky, Tennessee, Missouri, Arkansas, Mississippi, and Louisiana in inventorying and evaluating present and future supply and demand for fish and shellfish resources within the region. The study related the importance of fish and shellfish resources to environmental quality, and projected needs for these resources.

The Department of Interior agencies which participated in the study were the Bureau of Outdoor Recreation, Bureau of Sports Fisheries and

Wildlife, Bureau of Mines, National Park Service, Geological Survey, and Southwestern Power Administration.

The Bureau of Outdoor Recreation chaired the Recreation, Fish and Wildlife Subcommittee and coordinated the preparation of the Recreation Appendix, the Archeological and Historical Resources Appendix, and the Fish and Wildlife Appendix. The Bureau inventoried the region's existing recreational resources, and estimated future needs for such resources, based on its analysis of pertinent economic and demographic projections. BOR contributed a substantial input to plan formulation by detailing a man to Vicksburg for a 6-month period at the outset of Plan Formulation Task Force activities.

The Bureau of Sports Fisheries and Wildlife inventoried the region's supply of fish and wildlife resources, estimated future demands on these resources, and authored the Fish and Wildlife Appendix as a study element under the Recreation, Fish and Wildlife Subcommittee. The National Marine Fisheries Service of the Department of Commerce cooperated with the Bureau in this effort.

The Bureau of Mines chaired the Mineral Resources Subcommittee and authored the Related Mineral Resources Appendix. Preparatory work for the appendix included an analysis of available data concerning mineral resources, annual mineral production, the number and nature of mineral installations in the region, a discussion of present water and land use for mineral extraction, and quantification of future mineral resource related water and land needs. It also included an assessment of the present and future position of the region's mineral industry relative to the local and national economy.

The National Park Service chaired a study element working under the guidance of the Recreation, Fish and Wildlife Subcommittee and had responsibility for authoring the Archeological and Historical Resources Appendix. At the outset of the study, this appendix was titled Aesthetics and Cultural, and was to cover archeology, history, aesthetics, and cultural aspects. The scope of the appendix was revised in May 1973 to elminate an overlap in aesthetic coverage. The overlap was largely occasioned by the addition of the Environmental Appendix, but also by inclusion of similar subject matter in the Recreation and Fish and Wildlife Appendixes, which were in rough draft form at that time. Additionally, the Coordinating Committee members were of the opinion that this change would allow a more comprehensive coverage of archeological and historical values.

The National Park Service also provided a broad scale analysis of factors which affect natural heritage and cultural aspects; isolated these aspects as they relate to the region as a whole; identified resource potentials of a natural or cultural nature which concern landscape matters; and cooperated with other study work groups in incorporating these values into the various study documents.

The U. S. Geological Survey (USGS) conducted studies to identify and describe the general geology and hydrology of the Lower Mississippi Region. Significant aquifers were mapped and determinations were made of potential yields of aquifers. This information was incorporated in the Regional Climatology, Hydrology and Geology Appendix, in which the USGS shared joint authorship with the Vicksburg District of the Corps of Engineers and the National Weather Service. The USGS also provided a nearly full-time participant to the Plan Formulation Task Force in the early months of its existence.

The Southwestern Power Administration participated with the Federal Power Commission (FPC) in assessing power needs; determining the potential of conventional and pumped storage hydropower sites; and evaluating the utilization of hydroelectric capacity. The Administration also assisted in the preparation of the Power Appendix.

The Department of Health, Education and Welfare was represented by the Division of Water Hygiene (formerly Public Health Service) during the early part of the study, and provided input to the Health Aspects Appendix prepared under the leadership of the Environmental Protection Agency. In 1971, the Division of Water Hygiene was moved to the Water Quality Office of the Environmental Protection Agency, but continued to cooperate in the study effort under the new organization.

The Department of Housing and Urban Development conducted studies by contract and in cooperation with other departments and agencies on the urban aspects of land use, water supply, economic development, and environmental quality. The Department also participated in the preparation of functional appendixes to which those studies relate.

The Environmental Protection Agency served as chair agency for the Municipal, Industrial, and Agricultural Water Supply and Water Quality Subcommittee, which was responsible for preparation of the Municipal and Industrial Water Supply, Water Quality and Pollution, and Health Aspects Appendixes. Its Water Quality Office authored the Water Quality and Pollution Appendix, which presents quantified present and future BOD and bacterial pollutants, an assessment of the state of the art of contemporary methods of pollution control, and a definition of existing and future water pollution problem areas throughout the region.

The Federal Power Commission was responsible for the preparation of the Power Appendix. The Commission projected power loads in market areas available to absorb hydroelectric power from potential projects, determined the usability of potential hydropower, and projected needs for cooling water supply for steam-electric generation.

The Department of Transportation assigned two reserve Coast Guard officers to tours of duty with the Plan Formulation Task Force and also participated in review of the various study reports.

The Department of Labor did not participate in the Comprehensive Study other than to attend some of the early Coordinating Committee meetings.

STATE PARTICIPATION

The States of Arkansas, Illinois, Kentucky, Louisiana, Missouri, Mississippi, and Tennessee participated in the study by conducting public involvement meetings, providing basic data, assisting in the preparation of the Environmental Appendix, and reviewing reports.

The State of Arkansas Division of Soil and Water Resources served as the coordinating agency for the State, and the Director of that agency represented the State on the Coordinating Committee. Other State personnel served on the individual work committees and subcommittees. Arkansas chaired the Environmental Committee until June of 1972 and coordinated preparation of the ad hoc Environmental Committee report.

Study efforts in the State of Illinois were coordinated through the Chief Waterway Engineer of the Department of Public Works and Buildings. This Department represented the State on the Coordinating Committee and all other committees. The participation of the State did not include any public meetings and was otherwise relatively minor due to the extremely small portion of that State lying within the region.

The State of Kentucky representative on the Coordinating Committee and other study committees was the Director, Kentucky Division of Water. The State actively participated in the public involvement program and the review of reports.

In Louisiana, the study was coordinated through the Chief Engineer, Louisiana Department of Public Works, who served as a member of the Coordinating Committee. Personnel from other agencies represented the State on many of the subcommittees. Louisiana conducted public meetings and assisted with the preparation of the Environmental Appendix.

Mississippi was represented on the Coordinating Committee and the many work committees by the Water Engineer of the Mississippi Board of Water Commissioners. The State chaired the Environmental Committee after June 1972, coordinated the preparation of the Environmental Appendix, and provided a full-time staff engineer to the Plan Formulation Task Force during the first six months of its operation.

Representatives of the State of Missouri took part in the activities of the Coordinating Committee and most of the committees and subcommittees. The Publicity Committee and the Laws and Regulations Subcommittee were chaired by Missouri. The Executive Director, Water Resources Board, Department of Business and Administration, coordinated the study activities for the State of Missouri through June 1974, after which time the director of the newly organized Department of Natural Resources served as Missouri's representative.

The State of Tennessee representative on the Coordinating Committee was the Deputy Director of Urban and Federal Affairs. Other State personnel served on the work committees and assisted in the review of reports. Tennessee participated in the public involvement program and assisted in preparation of the Environmental Appendix.

PROCEDURES

GENERAL

The overall purpose of the Lower Mississippi Region Comprehensive Study was to provide a broad-scale analysis of water and related land resource problems, and to furnish general appraisals of the probable nature, extent, and timing of measures for their solution. The study was therefore a preliminary or reconnaissance type investigation detailed only to the extent necessary to provide a broad guide to the best combination of uses of the water and related land resources of the region to meet foreseeable needs.

Consideration in the planning procedure was given to all geographic areas within the Lower Mississippi Region and to all apparent purposes served by the conservation, development, and use of the water and related land resources. This included consideration of: (a) the timely development and management of these resources as essential aids to the economic development and growth of both the region and the Nation, (b) the preservation of resources, where appropriate, to maintain the quality of the natural and social environments, and (c) the well-being of the people as the overriding determinant in such planning. Concern with intraregional water and related land resources and their uses was paramount. Interregional aspects were considered superficially where natural hydrologic connections were involved, as in the cases of surface water inflows from the Upper Mississippi Region and from the White, Arkansas, and Red River Basins.

The framework plan developed from the study was priced in general terms, but a detailed comparison of benefits and costs was not developed; nor were any specific projects proposed. However, priorities were established for subsequent detailed studies in areas with urgent water and related land problems which appear to warrant specific project planning and formulation.

STUDIES

Studies of resource availability, use, problems, and needs included the broad-scale analysis of 10 subregions approved by the Coordinating Committee at its third meeting on 16 January 1970. These subregions, termed water resource planning areas (WRPA's), were:

WRPA 1 - The main stem of the Mississippi River, extending to and including the levees or to the river's top bank where levees do not exist.

WRPA 2 - The St. Francis Basin, St. Johns-New Madrid Floodway, Lower White and Bayou Meto Basins, including the Arkansas River below Pine Bluff, Arkansas.

WRPA 3 - The drainage basins in west Kentucky, west Tennessee, and extreme northern Mississippi, and the Cairo, Illinois, area.

WRPA 4 - The Yazoo River Basin.

WRPA 5 - The Ouachita River Basin, and the Red River below Hot Wells, Louisiana.

WRPA 6 - The Boeuf and Tensas River Basins.

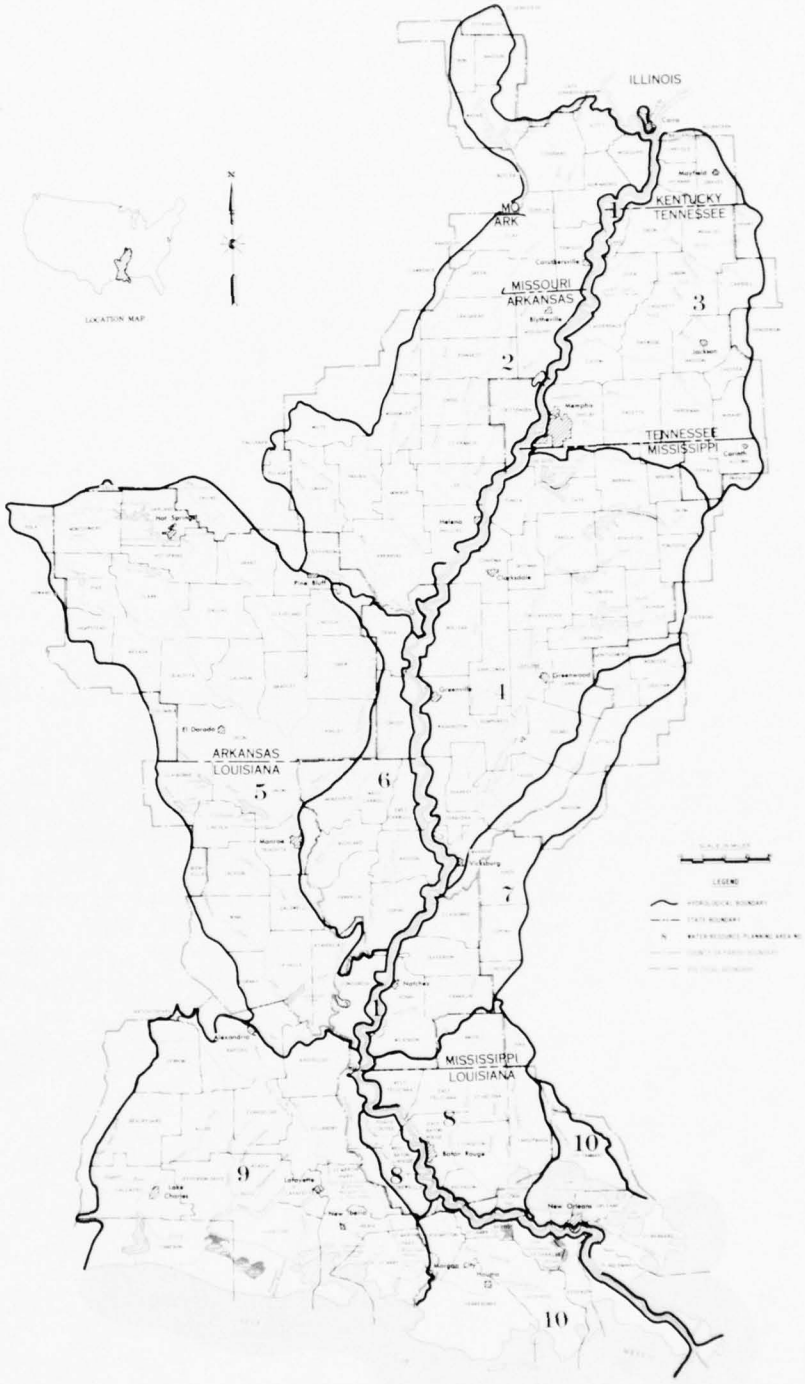
WRPA 7 - The Big Black River Basin and basins of southwest Mississippi streams that drain into the Mississippi River.

WRPA 8 - The Baton Rouge area, including the drainage area of streams that flow into Lake Pontchartrain except for the Tchefuncta River and streams to the east.

WRPA 9 - The Louisiana coastal area from the east limits of the Atchafalaya Floodway to the east hydrologic boundary of the Sabine River Basin.

WRPA 10 - The New Orleans area, including the Tchefuncta River area, and the area east of the Atchafalaya Floodway.

In the assembly of study data and information pertinent to these planning areas, hydrologically defined boundaries were used in basic resource studies and functional studies, and political (county line) boundaries were used for convenient manipulation of statistical data in economic studies. Both the hydrologic and county line boundaries of the planning areas are delineated on figure 3.



LOWER MISSISSIPPI REGION
COMPREHENSIVE STUDY

LOWER MISSISSIPPI REGION

FIGURE 3

Basic Resource Studies

Basic resource studies were undertaken to define availability of water and related land resources within the area of study. The studies included Climatology, Hydrology, Geology, and Land Resources.

Climatology

Climatology studies were based primarily upon the subject matter of readily available literature including published reports of the U. S. Weather Bureau. These studies defined climatic controls which interact in various combinations to produce observed values and changes in the climatic elements of the Lower Mississippi Region, and give it a humid subtropical climate with abundant precipitation. The climatic controls of primary interest included the geographic and topographic setting, the seasonal locations and intensity of the semipermanent anticyclone of of the southern North Atlantic Ocean, the types and frequency of air masses, and the effects of linear weather systems such as fronts, squall lines, and easterly waves. Two of the major climatic elements evaluated were precipitation and air temperature. Others were humidity, winds, evaporation and evapotranspiration, sunshine and solar radiation, clouds and fog, and atmospheric pressure. Study output largely in the form of charts, graphs, and tables supported by explanatory text was coordinated with hydrology and geology studies and was incorporated in Appendix C, Regional Climatology, Hydrology and Geology.

Surface Water Hydrology

Studies of surface water hydrology, as in the case of climatology studies, were based largely upon the subject matter of readily available literature including published reports and other data of the U. S. Geological Survey and Corps of Engineers. Streamflow data from key reporting stations for annual runoff (cubic feet per second) were compiled primarily from the Geological Survey's Water Supply Papers, and reflected conditions of regulation and use under 1973 levels of development.

In general, the surface water supply of the region is comprised mostly of streamflow from sources outside the region, with smaller amounts supplied by precipitation falling within the boundaries of the region and by withdrawals of water from the region's subsurface aquifers. The major inflow is from the Ohio and Upper Mississippi Regions, which contribute a mean flow of approximately 292.1 billion gallons per day. These inflows together make up about four-fifths of the region's total surface water supply.

The remaining one-fifth, which is supplied primarily by precipitation falling within the boundaries of the region, amounts to about 80.3 billion gallons per day. This is equivalent to about 16.4 inches of surface runoff per year from the region's interior drainage area of 102,400 square miles. It is also equivalent to approximately one-third of the region's average annual precipitation, which ranges from less

than 50 inches in the extreme northern portion to more than 60 inches in the coastal portion.

Much of the surface water which enters the region returns to the atmosphere by means of evaporation and evapotranspiration; some is stored in ground water aquifers, lakes, and surface reservoirs; and some is consumed by man and other life forms. The remainder passes out of the region as surface water runoff via the Mississippi River and numerous coastal streams.

For study purposes it was assumed that the region's long-term supply of water in the form of precipitation is constant, but variable in space, seasonably, and from year to year, with changes from acts of man affecting the water only after it reaches the ground. Study outputs largely in the form of maps, charts, graphs, and tables, supported by explanatory text in Appendix C, Regional Climatology, Hydrology and Geology, were coordinated with the climatology and geology studies and with functional studies as appropriate. The output provided guidance in determining the quantity of water available for use within the region, and served as a point of departure for evaluating proposed actions which could modify the hydrologic system of the region.

Geology

Geologic studies, based in large measure upon published reports of the Geological Survey and upon the assumption that the Lower Mississippi Region is a single, large, complex hydrologic system, provided a broad, general description of the occurrence and movement of ground water within the study area. This included a general description of the location and makeup of the region's aquifers (the geologic units that contain and transmit the water), and the quantity and quality of water available from the aquifers.

The optimum yields of water from each aquifer in each water resource planning area were estimated, based upon specified conditions of average drawdown and average annual recharge. Those estimates provided a general guide to the availability of ground water to meet potential withdrawals for municipal, industrial, and other purposes. The interrelation of ground and surface water supplies in the region was described, and needs for additional data were outlined, along with management considerations pertinent to the use and development of the ground-water resource.

The geology studies were coordinated with the climatology and hydrology studies and with functional studies, as appropriate. Outputs consisting of maps, charts, graphs, and tables were incorporated in Appendix C, Regional Climatology, Hydrology and Geology. These were supplemented by explanatory and supporting text.

Land Resources

The land resources studies were concerned with both the availability and use of the basic land resource which comprises 62.4 million acres of the region's total area of 65.5 million acres. Present uses of the land resources were investigated and analyzed, and predictions were made about future land-use requirements for producing the region's share of national needs for food and fiber. The estimates of future land needs for crop production were predicted on the assumption that foreseeable improvements in present management levels will provide for increased yields and more efficient utilization of space. Those for timber production were based on an assumed continuation of present forest land management levels.

The studies were based in large measure upon existing source material such as the U. S. Department of Agriculture "Conservation Needs Inventory" (1967), Forest Service inventories, research publications, and river basin and watershed work plans, with reconnaissance-type investigations being made where necessary. Additional inputs to the land resources studies were obtained from economic base studies and functional studies of resource problems and need; and output on current projected land use was furnished for use in the functional studies and plan formulation studies. Pertinent study findings were presented in Appendix F, Land Resources.

Economic Studies

Economic studies were conducted to obtain basic information for functional studies and plan formulation. They described the present and past population and employment trends of the region and the Nation. Inputs to the Economic study element were obtained primarily from national economic projections by the Bureau of Economic Analysis and the Economic Research Service. The inputs included projection of population, employment, earnings, income, and production of goods and services at the national level.

The national trends and projections of economic and demographic changes as defined by national study groups guided the Economics Subcommittee in developing two sets of projections for the Lower Mississippi Region. One of these, based upon a direct "economic area" breakdown of the national forecasts, suggests that the future economic growth of the region will follow historic trends in that it will continue to lag behind the overall rate of national economic growth. The other assumes an accelerated rate of regional economic growth, at least equal to the projected national rate. This latter set of projections guided the formulation of plans emphasizing the Regional Development Objective, whereas the former set guided the formulation of plans emphasizing the National Income Objective.

To apply the national forecast to the Lower Mississippi Region, "economic area" projections of the national study groups were disaggregated in such a way that the data could be reaggregated by multi-county areas whose political or economic boundaries closely approximated the hydrologic boundaries of the 10 water resource planning areas delineated for the study region. Using the county-line boundaries, projections were developed for each planning area for population, employment, production, and personal income.

The population projections were broken into rural and urban categories for each of the water resource planning areas. The population projections emphasizing regional development were based on employment projection for major industry groups. Indices of production were developed for selected manufacturing industries and production was projected for agriculture, forestry, mining, electric power, and manufacturing.

Functional Studies

The functional studies included Related Mineral Resources, Power, Municipal and Industrial Water Supply, Irrigation, Water Quality and Pollution, Navigation, Recreation, Fish and Wildlife, Flood Problems, Agricultural Land Drainage, Sediment and Erosion, Coastal and Estuarine Resources, Health Aspects, Archeological and Historical Resources, the Environment, and an Inventory of Facilities. These studies presented an inventory of existing water and related land resource uses and problems, determined the magnitude of needs associated with the future use and development of the resources, and outlined potential measures and single-purpose plans to meet the identified net needs.

The inventory covered all recognized uses of the water and related land resources within the hydrologic confines of the region. The selected base year for the inventory was 1970, with future needs projected to 1980, 2000, and 2020. The translation of economic and demographic projections (with alternative emphasis on National Income and Regional Development) into corresponding net needs for water and related land resources was coordinated between the Economics Subcommittee and the other Subcommittees responsible for the functional appendixes. The methodologies of the various subcommittees are described in their respective appendixes.

The potential measures and single-purpose plans outlining ways of meeting needs were not presented in the functional appendixes. They were, however, presented separately to the Plan Formulation Task Force, and their competitive and corollary influences were analyzed in the formulation of the framework plan. The final plan, alternatives, and related cost data are presented in Appendix T, Plan Formulation.

Related Mineral Resources

Mineral resource studies quantified the mineral resource base of the region, based on available mineral resource data from production records, reserve data, geologic information, and broad assumptions. They also quantified historical production and value of mineral commodities, and provided corresponding projections for the period 1969-2020. The projections included future land and water requirements for the mineral industry. Study findings were summarized in the form of tables and supporting narrative in Appendix G, Related Mineral Resources.

Power

Power studies determined past power requirements and provided estimates of future power requirements. Existing thermal and hydroelectric resources were inventoried, and needs for additional power supply and potential electric projects were estimated. Load projection to 1990 for the principal market area of the Lower Mississippi Region were derived from statistical data prepared by the South Central Regional Advisory Committee (composed of representatives from every segment of the Electric power industry) in cooperation with the Federal Power Commission for use in the 1970 National Power Survey.

The data for the market area were trended to the years 2000 and 2020, and projections of energy and peak load needs were developed for each planning area of the region to estimate future cooling water needs. Study findings in the form of charts, graphs, tables, and supporting narrative were summarized in Appendix R, Power.

Municipal and Industrial Water Supply

Water Supply studies included the collection of basic data on municipal, industrial, and thermoelectric withdrawals, and projections to 2020 of the water needs for these purposes. The studies of municipal and industrial water supply were based largely upon existing information and data, and particularly upon a survey and reports prepared by Gulf South Research Institute (GSRI), Baton Rouge, Louisiana, for use by the Corps of Engineers in a Water Import Study for West Texas-Eastern New Mexico. Water requirements for thermal power generation were determined by the Federal Power Commission by application of water use factors developed for power generation facilities of all types.

Municipal water use was developed for Standard Metropolitan Statistical Areas (SMSA) and non-SMSA categories. Industrial water use was analyzed at the Standard Industrial Classification three-digit level, and data were aggregated to the two-digit level for reporting purposes. Water use data for both municipal and industrial purposes were developed and reported as intake, consumption, and return flow. The data were presented in Appendix K, Municipal and Industrial Water Supply.

Irrigation

Irrigation studies provided an inventory of fresh water withdrawals for crop irrigation, livestock and poultry production, and rural domestic uses. They also provided estimates of future water needs for these purposes. The studies were based in large measure upon the subject matter of readily available literature including the latest irrigation guide of the individual States involved in the Study, and including other published reports, such as irrigation project plans, experiment station bulletins, National Weather Service data, and the publication "Drought and Water Surplus in Agricultural Soils of the Lower Mississippi Valley Area" by C. H. M. Van Bavel. Tables and supporting narrative describing the results of the studies were presented in Appendix H, Irrigation.

Water Quality and Pollution

Water quality and pollution studies were conducted to describe present conditions of water quality and man-made and natural pollution, estimate future conditions of water pollution to the year 2020, and describe the state of the art of present day methods of controlling pollution. Calculations of specific pollution loadings were limited in scope to bacterial and biodegradable wastes because of a general lack of information on other pollutants. The study did, however, describe other pollutants in general terms and also discussed the present day methods of handling such pollutants. Study findings were summarized in Appendix L, Water Quality and Pollution.

Navigation

Navigation studies made a broad determination of the Lower Mississippi Region navigational needs for the 50-year period 1970-2020. An assessment was made of the existing waterways and their capabilities, authorized waterways and improvements, current and future vessel requirements, and current waterborne commerce. The present levels of commerce were then projected and compared to the foreseeable capabilities of the available and prospective facilities to determine future navigational needs. Results of these studies are summarized in Appendix J, Navigation.

Recreation

A recreation study outlined future needs for recreation facilities and resources within the Lower Mississippi Region through the year 2020. The study included the investigation and evaluation of existing and potential recreation resources in the region. It also included the examination of demographic and socioeconomic characteristics such as income, occupation, place of residence, education, age, gender, and leisure time, which have a significant impact on recreation needs. Study findings were summarized in Appendix N, Recreation.

Fish and Wildlife

This functional study assessed the existing situation regarding fish and wildlife resources in the region, and quantified the future need for fish and wildlife habitat in terms of acreages of land and

water and in terms of water withdrawals. Background needs for a certain number of man-days of fish and wildlife related activity (for example, hunting or fishing) were translated into these units of resource requirements as a part of the study. Appendix Q, Fish and Wildlife, presents a summary of the study findings.

Coastal and Estuarine Resources

The Coastal and Estuarine Resources study provided a description of the estuarine environment at the southern end of the region and quantified future needs for the estuary. The overall objective of the study was to define the present condition of the estuary and provide inputs to plan formulation with a view to maintenance of the integrity of the estuarine zone for fish and shellfish production, fish and wildlife propagation, and environmental values.

Environmental characteristics defining the coastal and estuarine area's present conditions were determined from analysis of available data. The analysis included delineation of the geological, hydrological, ecological and developmental characteristics of the area and the establishment of relationships between those characteristics and the nature of water and related land resource problems identified through other functional studies.

Identification of the location, extent, and magnitude of erosion and subsidence problems in coastal and estuarine areas was based primarily on pertinent data derived from the subject matter of readily available literature; estimation by individuals with a working knowledge of the area involved; comparison of time-separated photos, maps, and surveys, and visual reconnaissance surveys. Needs for protection of shorelines and estuarine areas from erosion and subsidence were developed by identifying areas suitable for satisfying developmental demands in the interest of preserving recreational, aesthetic, cultural, fishing, and wildlife resources. Findings of the studies were summarized in Appendix O, Coastal and Estuarine Resources.

Flood Problems

Studies of flood problems in the region were accomplished by a joint effort of the Departments of Agriculture and Army. In general, upstream watersheds with a land area of 250,000 acres or less were studied by the Department of Agriculture, while principal streams with headwater drainage of 250,000 acres or more were studied by the Army. Within the area of study, flood plain lands subject to damages occupy 19.4 million acres in upstream watersheds and more than 16 million acres along principal streams. The susceptible acreage along principal streams is in part subject to three types of flooding: headwater, backwater, and tidal (hurricane) flooding.

The magnitude of flood problems in the region was expressed in terms of average annual flood damages in upstream watersheds and along principal streams, including damages to urban and built-up areas,

agricultural developments, and other miscellaneous developments. Estimates of average annual flood damages reflected current use and development of flood plain areas for the economic and demographic year 1970, adjusted for the average annual benefits derived from flood control projects then existing or under construction with a scheduled completion date prior to January 1973. Projections of potential average annual flood damages to the year 2020 were based on the assumption that growth and development of flood plain areas will occur at about the same rate as the general growth and development in the respective water resource planning areas. Study output largely in the form of tables and supporting narrative was assembled in Appendix E, Flood Problems.

Agricultural Land Drainage

Studies of land drainage problems provided a current and projected inventory of regional lands that have a drainage problem (wetness hazard), and provided an overview of the impacts of land drainage on agricultural development, land utilization, fish and wildlife, and other elements. The main source of information for determining soils with a drainage problem was the Department of Agriculture Conservation Needs Inventory. Such soils in each water resource planning area were identified by Land Resource Area, Land Capability Unit, and major land use for projecting future drainage needs. The current and future drainage problems and needs identified by the studies were summarized in Appendix I, Agricultural Land Drainage.

Sediment and Erosion

Sediment and erosion studies provided an appraisal of existing and potential sediment and erosion problems in the Lower Mississippi Region, and provided information about the destructive forces of these processes on the land resource. The effects of sediment and erosion on agriculture, municipal and industrial water supplies, reservoirs, flood problems, navigation channels, recreation, fish and wildlife, health, and aesthetics were evaluated; and the sediment and erosion damages under 1970 conditions of development were expressed in monetary terms, and projected to the year 2020.

An examination and analysis of existing source material provided the basis for determination of current erosion and sediment yields and damages and trends for some projections. Reconnaissance-type investigations were made where necessary to supplement information and data from the subject matter of readily available literature. All land areas affected by sheet erosion, gully erosion, flood plain scour, or road bank erosion were identified. Streambanks affected by erosion were also identified. The study findings were presented in Appendix S, Sediment and Erosion.

Health Aspects

A study of the health aspects of water resources development in the Lower Mississippi Region provided a broad overview of the health of man relative to water resources development, directly through drinking water

and recreational water, and indirectly through insects and other vectors which breed on the water and land of the region.

In recognition of the established institutional framework for public health activities, the study was oriented toward problem evaluation on a statewide basis, rather than a hydrologic area basis. Some of the qualitative health needs identified by the study included: the improvement of State epidemiology programs; expanded State programs to provide health surveillance and technical assistance to water supply systems; improved protection of water supply sources from waste discharges; protection of water supply systems from natural disasters; revised water quality criteria and comprehensive State programs to protect the health of water contact recreationists; and improved vector control programs, including the establishment of vector abatement districts. A narrative discussion of the study findings was presented in Appendix M, Health Aspects.

Archeological and Historical Resources

A study of the region's history and prehistory as presently known provided a broad assessment of the resource potential of a cultural nature. The assessment included limited identification of various types of surviving archeological resources, and identification of major historic sites, events, and locations. Study output largely in the form of maps and tables supported by narrative material was summarized in Appendix P, Archeological and Historical Resources.

The Environment

Studies of the natural environment were directed to the objective assessment of the needs of the Lower Mississippi Region relative to the conservation, preservation, and restoration of certain natural resources in order to maintain and enhance the quality of the environment for the enjoyment and well-being of present and future generations. The assessment provided a broad overview of certain land and water components of the natural environment, both in terms of historical perspective and in terms of the existing situation. It also provided a glimpse of the future in terms of environmental needs projected to the year 2020. These needs were categorized by: open and green speces; scenic rivers and streams; lakes; beaches and shores; wilderness areas; wetlands; unique geological and botanical systems; unique ecological systems; and bottomland hardwoods. Other environmental needs such as those associated with air and noise pollution were recognized, but their evaluation was beyond the scope of the environmental studies. A summary of study findings was presented in Appendix U, The Environment.

Inventory of Facilities

An inventory of facilities, presented in Appendix D, was prepared to provide a reference publication describing both natural and man-made water-related facilities in the region. Facilities in five different categories were described, and the report included specific data about

individual projects as well as generalized information. The five categories were: flood control; navigation; recreation, fish and wildlife; power; municipal, industrial, and agricultural water supply and sewage treatment; and archeological and historical facilities.

Correlation

Economic and demographic projections developed in the economic studies served as a common base for the functional studies to insure compatibility among identified resource needs, especially those associated with food and fiber production. The functional studies were further correlated through common input data from basic resource studies and through certain necessary exchanges of data, where the outputs of some functional studies provided required inputs to others.

Review

Each appendix for the Lower Mississippi Region Comprehensive Study was reviewed at three different stages of development. The first review was made at the subcommittee level, based on subcommittee working papers assembled in the form of a rough draft report. The second and third reviews, both on official printings of the study documents, were made at the Federal-State level.

Subcommittee Review

In the initial review stage, each subcommittee chairman was responsible for the reproduction and internal subcommittee review of all appendixes prepared under his jurisdiction. He was also responsible for resolving any conflicts which emerged during the review. Distribution of the initial subcommittee review drafts included three copies of each report to the chairman of the Plan Formulation Committee, who, in turn, circulated the drafts to appropriate members of the Plan Formulation Committee or Plan Formulation Task Force as required to insure consistency and uniformity in the total study effort. In addition to the drafts themselves, copies of all subcommittee review comments thereon were generally supplied the chairman of the Plan Formulation Committee.

After consideration of internal subcommittee review comments and resolution of conflicts, if any, the subcommittee chairmen satisfied themselves that their appendix drafts were in suitable form (finished, polished, complete reports) for reproduction, and submitted two copies each to the Plan Formulation Committee Chairman for pre-printing review and approval. The chairman of the Plan Formulation Committee reviewed the "print-ready" appendixes for conformance with the objectives of the study, and provided copies to the chairman of the Report Preparation

Subcommittee to insure conformance with the published Report Preparation Guidelines for the study. Required revisions, if any, were then made, and the appendixes were officially printed in draft form and made available to all study participants for review and comment.

Draft Review

Each subcommittee determined who was responsible for reviewing its particular appendix, and the various subcommittee chairmen submitted a review list to the Plan Formulation Committee for approval. The individual lists, containing the names of each reviewer (Federal, State, and other) and their requested number of copies of each study document, were combined in a single coordinated report review list for dissemination of the reports. Where there were no requests to the contrary, draft copies of the appendixes and the main report were transmitted directly from the printing plant (Waterways Experiment Station) to those responsible for reviewing and commenting thereon. Letters for transmitting the appendixes to appropriate agencies were furnished by the subcommittees.

In line with subcommittee review procedures, each subcommittee which prepared an appendix was responsible for incorporating comments, resolving conflicts, and revising its appendix during the draft review stage. Representatives in Federal and State field offices and other study participants generally submitted their review comments on draft reports to responsible study element leaders, subcommittee chairmen, and the Plan Formulation Committee Chairman, with the subcommittee chairmen being responsible for forwarding comments to subcommittee members. However, members of the Coordinating Committee had the option of screening and consolidating comments from agencies or States they represented. Where this option was elected, the member of the Coordinating Committee so advised the appropriate agencies and submitted an official consolidation of agency or State comments, including any from his higher authority. The comments were submitted to the chairman of the Plan Formulation Committee, who disseminated the consolidated comments to the appropriate subcommittee chairman and study element leader to be considered along with other comments.

The submission of copies of all review comments to the Plan Formulation Committee assured one central location where all comments could be assembled for comprehensive review of all study documents prior to the issuance of orders for final printing. In the interest of achieving overall consistency and uniformity among the study documents, the Plan Formulation Committee chose to defer comment on any individual report until all related reports within a compatible grouping were in hand. Five groupings established for Plan Formulation Committee review were: (a) Group 1 - Land Resources; Economics; Regional Climatology, Hydrology and Geology; Inventory of Facilities; and Related Mineral Resources; (b) Group 2 - Power; Municipal and Industrial Water Supply; Water Quality and Pollution; and Navigation; (c) Group 3 - The Environment; Archeological and Historical; Recreation; Health Aspects; Fish and Wildlife; and

Coastal and Estuarine; (d) Group 4 - Flood Problems; Irrigation; Drainage; and Sediment and Erosion; and (e) Group 5 - History of Study; Plan Formulation; and the Summary Report.

Groups 2 through 5 were reviewed in the order in which they became available after Group 1 was reviewed and essentially finalized. The overall review preceded in general accordance with the following steps:

Step 1. A form letter was sent to each member of the Plan Formulation Committee for the review of each report with a deadline for its return, along with a statement to the effect that if no answer was received, concurrence with that review document as written would be assumed. Simultaneous review of all documents within a group was accomplished to the extent practicable.

Step 2. Comments requiring additions, deletions, or revisions of report documents were submitted to subcommittee chairmen for appropriate action.

Step 3. Assistance was given the subcommittee chairmen in resolving conflicts arising as a consequence of Plan Formulation Committee comments.

Aside from this step by step review of the draft reports, the Plan Formulation Committee helped coordinate and advise in the incorporation of comments when required and requested to do so by subcommittee chairmen or study element leaders. In the process, the Plan Formulation Committee repeatedly emphasized that the study documents would be reproduced only twice and that the draft review would provide the only opportunity, other than subcommittee review, to incorporate revisions. Because of this limited opportunity for revision, it was essential that all conflicts be recognized early and dealt with.

The Plan Formulation Committee had overall responsibility for insuring that no conflicts were overlooked or ignored, but took the responsibility for resolving conflicts only when requested to do so. Conflicts that could not be resolved by the Plan Formulation Committee were addressed to the Coordinating Committee with a view to resolving all conflicts before changes were incorporated into final field level appendixes. In addition to helping in the resolution of conflicts, the Coordinating Committee participated in the draft review process by furnishing five copies of the drafts of the Plan Formulation Appendix and Summary Report to the Water Resources Council for information and comment.

Recommended revisions to appendixes resulting from review comments were written by the subcommittees and were subject to concurrence of all concerned, including the Plan Formulation and Coordinating Committees. After subcommittee concurrence, the subcommittee chairmen submitted final revisions to the chairman of the Plan Formulation Committee, who, after approval, submitted them to the Coordinating Committee for final

approval. When the revisions were approved, and the appendixes revised, the subcommittee chairmen forwarded their documents to the Report Preparation Subcommittee Chairman for final printing at a time designated by the chairman of the Plan Formulation Committee.

Field Level Review

The Plan Formulation Committee in conjunction with the Coordinating Committee developed a list of State and Federal agencies to make a 45-day field level review. This review applied to all study documents, with major emphasis on the plan formulation appendix and the Main Report. At the time of preliminary printing, 30 sets of the Main Report and Plan Formulation Appendix were transmitted to the Water Resources Council for advance information.

The 45-day review enabled State and Federal agencies to make official field level comments without committing either the Federal agencies, bureaus, or offices, or the States with respect to later official comments. At the end of the 45-day review period on the Main Report and Plan Formulation Appendix, the Coordinating Committee members were requested to furnish letters of endorsement, with or without qualifications. When all field level comments and endorsing letters were in hand, the Main Report and Plan Formulation Appendix were officially transmitted to the Water Resources Council through the Mississippi River Commission. Errata sheets, based on the field level comments, were prepared for the entire body of study documents, and distributed to all study participants.

APPROACH TO PLANNING

FRAMEWORK PROGRAM

The desired end product of the Study was a formulated multiple-objective framework program that would provide a general guide to the best use of water and related land resources to meet foreseeable needs and public desires as identified by the study. The Plan Formulation Task Force analyzed the study findings of specialty groups, compared alternative solutions to problems identified by the study, and formulated a program designed to allow for the most logical allocation of the resource base. The alternatives ranged from single-purpose measures to the recommended multiple-purpose, multiple-objective framework program, which was tailored to fit both the overall needs of the region and the needs of its divisible water resource planning areas.

PLAN FORMULATION TASK FORCE

The Plan Formulation Task Force was composed of an interdisciplinary team of professionals with a wide range of knowledge and ability in water resources planning and management. The group drew upon their own knowledge and upon that of other professionals from Federal and State agencies in determining procedures and methodology, and in making judgment relative to alternative measures and to the recommended framework program and priorities. Final decisions of the Task Force were tempered by perception of public desires and objectives.

OBJECTIVES

Numerous objectives - National, State, and local - were pursued by the Plan Formulation Task Force in evaluating alternative plans for the conservation, use, and development of the region's water and related land resources. The recommended framework program reflects full consideration of these objectives, and the objectives are discussed in detail in subsequent paragraphs of this report.

National Objectives

Three explicit national objectives were adopted for the study. These were National Income, Regional Development, and Environmental Quality. A social well-being objective was implicit in each of these.

The National Income objective was to promote maximum contributions to the Gross National Product resulting from capitol investment in facilities to provide water and related land for municipal, industrial, agricultural, and rural domestic uses; for water quality control, flood control, navigation, power, and minerals production; for land stabilization, drainage and watershed protection; for outdoor recreation, fishing, and hunting; and for environmental and aesthetic and cultural purposes.

The Regional Development objective was to promote maximum contributions to the regional economy resulting from capital investment in water and related land resource facilities to provide a more diversified regional economic base, increased regional income and employment, and improved income distribution and quality of services within the region.

The Environmental Quality objective emphasized the conservation and preservation of cultural and environmental resources through: (a) the preservation or enhancement of open and green spaces, wild rivers, lakes, beaches, shores, wilderness areas, and related areas of unique beauty; (b) the protection of areas having archeological, historical, or scientific value; (c) the protection and improvement of water quality, including pollution from all forms of waste, drainage, and head, and (d) the prevention of erosion and restoration of eroded areas with emphasis on treatment of watersheds, mined areas, and critical areas of erosion, such as gullies, stream banks, and construction sites.

State and Local Objectives

The national objectives, with varying emphasis on regional development, environmental quality, and social well-being, applied in general to the States and to local areas within the States. An indication of local emphasis on each objective was obtained from the public involvement program. Explicit State "goals" outlined by the State of Missouri, and generally applicable to the other States, are quoted below:

Goals - State of Missouri:

a. Development and management (of water and related land resources) to assure a supply adequate to meet seasonal long-range requirements for domestic, municipal, industrial, agricultural, fish and wildlife, recreational, power, navigation, and quality control purposes from surface or ground-water sources or from a combination of the two.

b. Contribution to the establishment, diversification, and stabilization of a local economic base having capability to sustain acceptable living standards within the community and providing sufficient employment opportunities to dampen out-migration.

c. Implementation of land-use practices that effectively reduce siltation and loss of the land base through irresponsible practices associated with farming, mining, construction, forestry, and other control actions of man.

d. Improvement of water quality through control of municipal and industrial waste discharge, agricultural pollution, acid mine drainage, and littering to permit and encourage additional use of the available water supply at any location and at any period of time.

e. Maintenance of an environment that offers a diversity of recreational and aesthetic experience in keeping with the regional or local resource capability.

f. Retention of those basic features which contribute to the historic uniqueness and character of the State and its several regions.

g. Application of the multiple-use concept to water and related land resources in a manner that will permit utilization of the resource base in an efficient and balanced manner to serve the greatest number of people.

Goals - State of Mississippi:

In addition to these goals, others were expressed in a position paper entitled "Objectives and Goals for Land and Water Resource Development, Yazoo-Mississippi Delta." The paper was prepared by the Delta Council, a development-oriented Association of Landowners and other business interests from the Mississippi portion of the region. It was submitted in connection with the Study's Public Involvement Program, and supposedly represents public attitudes in the Mississippi Delta area of the region. Pertinent excerpts from the paper begin with the following paragraph and end on page 50.

> In looking to the future, it is important that the conservation, development and efficient utilization of our soil and water resources be recognized as being of paramount importance to the long-range development of the entire area, the State and the Nation. The effective utilization of natural and human resources demands that developmental plans, including those for land and water, be prepared and coordinated as a whole rather than as a patchwork of plans for separate agencies and for separate purposes.
>
> In carrying out this policy, the following long-range guidelines are suggested:
>
> (1) That major flood control works within the Lower Mississippi Valley, of which the Yazoo-Mississippi Valley is a part, be continued to include mainline levee protection from overflows of the Mississippi and its tributaries. Within the Yazoo-Mississippi Delta, every effort should be made to complete already authorized programs to provide

protection from headwaters, backwaters and from the interior streams;

(2) The major reservoirs already constructed in the upland areas to reduce flooding in the Alluvial Valley be maintained and expanded, if necessary;

(3) That major interior drainage works of improvement be planned and implemented by the U. S. Corps of Engineers;

(4) That upstream works of improvement of the U. S. Department of Agriculture, Soil Conservation Service, be implemented and coordinated in a timely manner with downstream works proposed by the Corps of Engineers;

(5) That it be necessary to provide those who prepare and make use of such plans for the implementation of such programs with all the information and knowledge that is required for intelligent discussions and decision making;

(6) That every opportunity be taken to utilize the services of State, Federal and local agencies and organizations in line with their scope and responsibilities toward the attainment of the needs and realization of opportunities.

(7) That Water Management Districts be organized as designed by existing or amendatory legislation as a means of expediting action programs for the successful initiation and completion of plans designed to fill needs and permit the realization of opportunities in the fields of soil and water resource development. . .

Land use is a continuing state of change. Basically, land should be devoted to its highest economic use consistent with maximum benefits over a long period of time. Under varying conditions, this could be for cropland, improved pastures, woodland, recreational areas, highways, airports, water impoundments, industries, or urban development.

Since most of the land in the Delta area is owned by individuals and companies, the determination of how the land will be used and for what purposes will be made by individual landowners. Decisions should be reached on the basis of economics and after full investigation of all alternatives. . .

Conversion of woodland for pasture and cropland has taken place in the Delta over the past 20-year period, as flood control, drainage, and watershed development measures were increased. While soil, within itself, is not a factor that would limit the use of land in the Delta to woodland on a permanent basis, there are other factors that should also be considered. Under prevailing economic conditions, it is probably more feasible to use much of the land that has been cleared for field crops and pasture. It is evident, however, that

many acres of woodland which should have remained in trees have been converted to cropland. Primarily, these represent areas subject to frequent overflow or areas which cannot be adequately drained. Some of these areas have been cleared on a speculative basis. . .

In 1957, 1,419,000 acres of land in the alluvial plain were in forests and in 1967 there were 1,003,000 acres of commercial Delta forests remaining. The fact that the rate of land clearing has accelerated in recent years is cause for concern. A very high percentage, if not all, of the existing forest area should remain in trees. . .

Landowners should seek professional advice in reaching their decision on whether to clear land or to maintain it in forests. Qualified professional sources are available from which such information may be obtained without cost. More information regarding management practices for bottomland hardwoods, disease and insect control, reproduction and the development of superior trees is urgently needed. Funds for research in southern hardwoods should be sharply increased.

Factors that should enter into decision making regarding land clearing include land elevation, flood protection, drainage, the stand and species of trees existing on the land, soil type, increases in the tax rate on cropland as compared to woodland, and costs of converting woodland to cropland in relation to potential returns.

The following basic criteria should be considered:

1. Land should remain in trees where the cost of clearing and drainage, plus the expected returns from timber, recreation, wildlife, and other related uses over an extended period, would exceed the average expected returns from field crops and pasture for a similar period.

2. All State and Federal lands that are presently in woodlands or are best suited to woodlands, including 16th Sections, should remain in woodland.

3. Land should remain in trees that is owned and/or leased for the multipurpose use of timber, wildlife, and recreation. Consideration might be given to higher leasing rates for hunting and other purposes such as recreation in order to justify the retention of these areas in woodland.

4. Lands owned or leased by the Mississippi Game and Fish Commission and managed as open hunting and fishing areas should remain in woodland.

5. All timber areas adjacent to drainageways, bayous, lakes, streams, rivers, etc., should be maintained. Such wooded areas, even though they may be narrow and small in

size, are so interspersed throughout the general area of the Delta that they can serve effectively as windbreaks and also provide natural beauty, recreation opportunities and habitat for wildlife. In the future, consideration will need to be given to planting trees and/or shrubs for windbreaks in the more open areas where wind erosion is already becoming a problem. This is especially true where fields are laid out in long, uninterrupted rows, where farmers plow most of their land in the fall, where there is inadequate cover for soil protection, and where large areas are in summer fallow.

6. Woodland areas close to expanding towns and cities should be preserved and improved for future parks, playgrounds, and natural areas. This may necessitate purchase of land for public use. Long-range planning and continuing administration of such areas are highly desirable.

7. Consideration should be given to leaving all batture lands between the levees and the river channel, not heretofore cleared, in woodland. Such land should remain under private ownership. Owners, lessees and lessors of such lands should be encouraged to carry out appropriate timber management practices for increased production and profit.

8. Intermittent water areas such as swamps and brakes that support timber stands composed of bald cypress and water tupelo should be maintained. These areas often serve a multipurpose use of timber production and fish and wildlife habitat.

9. Many low-lying areas not susceptible to drainage or complete flood protection should be maintained in trees. The Corps of Engineers can furnish information concerning frequency of overflow and drainage problems for many of these areas.

10. Trees should be maintained on areas that are moderately sloping to steep; also, areas adjacent to bayous, streams, lakes, etc., that are subject to severe erosion. Some of these areas run up to 12 percent slope and should definitely not be cleared for crop production. These areas are subject to severe erosion and may produce sediment which will render drainage channels and downstream structures less effective.

11. Where possible, floodways constructed by the Corps of Engineers should be maintained in woodlands.

It should be clearly recognized that major drainage channels by themselves will not assure proper flood protection in the Delta. The major works of improvement proposed by the Corps of Engineers in the Alluvial Valley must be correlated with upstream drainage systems, a responsibility of the U. S. Department of Agriculture, Soil Conservation Service. The interdependence of the two programs requires the planning of resource development projects on a coordinated basis. The development of our economy in the Delta is dependent upon the amount of flood control

provided by both small watershed projects and major drainage channels.

Recent studies by the Soil Conservation Service indicate the need for improvement of more than 4,000 miles of existing small drainage channels. This does not include major flood prevention channels planned by the Corps of Engineers or the on-farm drainage needs to be installed by private landowners. These channel improvements are needed to assure the protection and the proper development of the area and are necessary in establishing other needed conservation treatment measures.

The flooding and drainage problem in the eastern portion of the Delta is aggravated by the streams in the upland or Bluff Hills which drain directly into the relatively flat Delta area. Approximately one-third of the land flooded in the Delta is caused from runoff from these upland streams. The problem caused by flooding from these Hillside tributaries is particularly serious because of the intensity and the velocity of runoff. In addition, the sediment produced by the highly erodible upland soil pollutes Delta streams with heavy loads of silt and sand and fills up the channels. This, in turn, adds to the flooding hazard and increased problems associated with channel operation and maintenance by local drainage districts. Heavy loads of silt and sand also fill up lakes and streams and are detrimental to fish and wildlife.

In Mississippi, 50 watersheds have been approved for operations under the Soil Conservation Service's Small Watershed Program (P. L. 566) covering 3.6 million acres. Sixteen other watersheds are in the planning process. It is not strange to find that the majority of those watersheds in Mississippi that have made application for assistance through the watershed programs are in the same location as the 300 drainage districts organized in the early 1900's. State laws have been revised to permit a number of separate drainage districts to work together on a watershed basis. Thus, there is some hope, through the utilization of a coordinated watershed approach, for correcting mistakes that were made more than 50 years ago.

In the Yazoo-Mississippi Delta, assistance consists primarily of rehabilitation of old existing channels with outlets coordinated with the projects of the U. S. Corps of Engineers. More than 90 percent of the channels in watershed plans in the Delta area are old ditches. Only in rare cases are new channels needed.

In the Yazoo-Mississippi Delta, 14 P.L. 566 watershed projects have been approved for operations covering approximately 760,000 acres of land. Four other watersheds have been approved for planning covering 260,000 acres and applications have been made for planning and assistance on four other watersheds covering approximately 557,000 acres.

While this may seem to indicate that considerable progress is being made in dealing with upstream land and water problems in the Yazoo-Mississippi Delta, this rate of progress is not commensurate in meeting the needs of the people who make their living off the land which contributes so much to the economy of the Delta. In reality, the people of the area are faced with a multiplicity of complex problems, not the least of which is paying taxes on land for anticipated improvements while waiting for benefits to accrue from the installation of those project measures that will provide them with some degree of relief from their flooding and drainage problems.

In highly developed flatland areas, the only means of achieving such relief is through channel improvements. Other means, such as mainline levee protection and major flood control reservoirs in upland areas, have already been constructed. The ultimate goal -- maximum economic development through the proper utilization of the natural and human resources of the area -- cannot be achieved without the efficient utilization of our land and water resources.

Needed improvements can be accomplished in this area without undue losses to fish, wildlife and scenic resources. Present day knowledge and expertise are available to incorporate offsetting measures and to mitigate any losses that occur through such improvements. In fact, work already accomplished has improved recreational potentials, reduced erosion and has contributed to an increase in game population. It should be recognized that nothing is more destructive to wildlife than floods and lingering backwaters. Such conditions are also highly detrimental to people who are trying to make a living on the land.

Agriculture is of tremendous importance to the Delta area and to the State of Mississippi with returns from agriculture in Mississippi in 1970 estimated at almost $1.3 billion. The value of the Mississippi cotton crop alone in 1970 amounted to approximately $340 million. The Delta area produces about 70 percent of the cotton grown in Mississippi, all of the rice and 70 percent of the soybeans. Beef cattle production is becoming more important and catfish farming along with vegetable production are growing enterprises.

Irrigation is used on many farms and water for supplemental irrigation during the crop growing season is of prime importance. With more intensive farming methods irrigation will be even more important in the future and any long-range plan for the area should provide for adequate supplies of water for irrigation as well as for municipal, industrial, and recreational uses. While the U. S. Geological Survey has made some water resource surveys in the area, county by county studies are needed to provide information on both ground and surface water quantity and quality. . .

While the Delta area will continue to be one of the major

agricultural sections of the Nation, a concentrated effort is being made to develop industrial job opportunities for area citizens and steady progress has been made in that direction. . . .

Plans for the future should include industrial parks to provide for industrial growth in areas best suited for industrial development. Plans should also include expansion of harbor facilities at Greenville and Vicksburg with added industrial fills at both locations and attention should be focused on harbor developments at Greenwood, Belzoni, Yazoo City and at other points on the Yazoo River. The possibility of harbor development and industrial sites at Rosedale, Friars Point and Tunica should be a part of any long-range plan. . .

The Delta area is facing problems that are prevalent in much of the Nation. Population and other socioeconomic changes, including greater amounts of leisure time, are causing demands for outdoor recreation to grow rapidly. At the same time, expanding urban areas are threatening natural assets that should be preserved for public enjoyment if future recreational needs are to be accommodated.

Natural resources of the area include many lakes and streams, as well as numerous Indian mounds that are of great historical significance.

Long-range goals for the area should include actions aimed at securing and developing park space and the administration of recreation programs that will be intended for communities broader in base than municipalities but short of State-wide in scope. Goals should also be aimed at preserving natural areas, including some of the remaining cypress brakes, with outstanding recreational potentials for future public use.

Numerous oxbow lakes on the western side of the area, as well as other lakes scattered throughout the Delta, now provide excellent fishing and water recreational opportunities. Plans for the future should include programs to guard against the pollution of lakes and streams from industrial and municipal wastes. Low-water weirs strategically located in rivers and streams would improve fish habitat and recreational potentials.

Most of the forested areas within the batture are now being managed for recreation, as well as for timber production. Game population in these areas is at an all-time high. Hunting clubs and private landowners should work closely with the Mississippi Game and Fish Commission to maintain favorable game population and, where possible, improve game habitats and food supplies.

The reservoirs constructed by the Corps of Engineers, Arkabutla, Sardis, Enid, and Grenada reservoirs, represent one of the largest fresh-water recreational areas in the United States. More than five million people each year visit these

reservoirs for fishing, camping, sailing, water skiing and picnicking. Long-range plans should include the development of additional facilities and recreational potentials at these reservoirs.

Many of the 16th Sections (school lands) within the area contain sizable woodland areas. These wooded 16th Sections are already being managed by the State Forestry Commission for timber production but could also be used for managed hunting areas. Long-range plans for the development of recreational potentials should fully explore the possibility of utilizing forested acreage on 16th Section lands for managed, public hunting and outdoor recreation.

Also, some of the low, poorly drained wooded areas could be utilized for green tree reservoirs and the development of duck hunting potentials. The utilization of such areas, together with the development of resting and feeding areas for waterfowl, offers great potential for capitalizing on the location of the Yazoo-Mississippi Delta on the Mississippi Flyway. Proper planning, built around the area's natural resources and strategic location, holds great promise for development.

PLANNING PROCEDURE

Planning Areas

The Lower Mississippi Region was divided into 10 hydrologically defined water resource planning areas, as shown on figure 3 (page 27), to facilitate study refinement. Six of these areas included major tributaries to the Mississippi River below the mouth of the Ohio River. Three included major coastal streams that drain to the Gulf of Mexico, and the other included the main stem of the Mississippi River below the mouth of the Ohio River.

Data Compilation

In the assembly of data and information pertinent to the planning areas, the hydrologic boundaries were used both in measuring water and related land resource availability and in formulating the framework plan. The political (county line) boundaries were used for convenient manipulation and interpretation of statistical economic data.

The framework program was formulated on the basis of resource supplies reported in the basic resource appendixes and needs reported in the functional appendixes. The estimate of future resource problems and needs contained in the functional appendixes were, in turn, based primarily on economic and demographic projections reported in Appendix B, Economics. This common base provided for compatibility among the reported needs, especially those associated with food and fiber production.

Resource Needs

Gross requirements, present use, and net needs in connection with water and related land resources were measured for each single-purpose use in each water resource planning area of the region. Gross requirements were defined as the total demand upon the resource at any given moment. Present use was defined as the developed supply or abated portion of the gross requirements as of economic and demographic year 1970. Net needs were considered equal to the arithmetical difference between gross requirements and present use, with a plus denoting surplus. These needs were derived for each of the projection years, 1980, 2000, and 2020. Short-term needs were defined as those arising by 1980. Long-term needs were those defined as those arising by 2020. Because of the broad-scale nature of the study, the needs generally were not localized to specific geographical sites within any given planning area.

Potential Solutions

Opportunities for potential development of the available land and water resources in the region were analyzed to determine the extent to which resource needs satisfaction could be attained for the three planning objectives: National income, regional development, and environmental quality. Alternative solutions to identified problems and needs were considered in terms of their physical capability, economic feasibility, legal and institutional constraints, public acceptance, and multipurpose compatibility; and the most effective and least costly solutions were sought for each need. In connection with each potential solution, consideration was given to the effects of irreversible and irretrievable commitments of resources, and it was recognized that the development of water resources for the satisfaction of some needs will diminish the amount of land available for the fulfillment of other needs.

Plan Formulation

Alternative single-objective programs emphasizing each of the objectives, without neglecting the others, were developed for each water resource planning area for subsequent blending into single-objective regional programs. Three such programs were formulated. One emphasized the satisfaction of needs primarily through contributions to national income, with secondary contributions to regional development and environmental quality; another emphasized regional development; the other placed major emphasis on alternatives to improve the quality of the natural environment. These single-objective programs were, in turn, blended into the final multi-objective framework program for the region. The composite plan was time phased to be responsive to both short-term (1980) needs and long-range (2020) needs.

PUBLIC INVOLVEMENT

PURPOSE

The public involvement effort made in the framework study of the Lower Mississippi River Region was designed to inform the public of study developments and to actively involve the public in the planning process. To direct and coordinate this effort, a Public Involvement Task Force was organized under the Publicity Committee. The Publicity Committee was composed of a representative from the State of Missouri as Chairman, and representatives from the Department of Housing and Urban Development and the State of Louisiana. The Public Involvement Task Force, chaired by the Chairman of the Publicity Committee, was composed of a representative designated by each member of the Coordinating Committee, and organized at the direction of the Coordinating Committee in October 1971. The Task Force was responsible for developing an action program for the involvement of the public in the study effort, and providing the Plan Formulation Committee information regarding the public's desire on study goals and objectives as near January 1, 1972, as possible.

APPROACH

The public involvement effort was designed to accomplish two primary goals, that of disseminating information to the public and that of gathering information from the public. The conclusion was that to have effective public involvement it is necessary to have this two-way flow of information, for in order to participate meaningfully the public must be adequately informed.

In the design of the public involvement effort it was also considered imperative that the States spearhead the program in their respective areas; thus local people could better relate to the study if the State rather than the Federal role could be emphasized.

The program for public involvement was designed in two phases. The objective of Phase I was to gather information pertaining to public desires relating to study goals and objectives in order to assist the Plan Formulation Committee in the establishment of these goals and objectives.

Phase II was conducted when data concerning basic needs and problems had been assembled. The objective of this phase was to present the relative magnitude of these needs and potential conflicts which could arise in their solution to the people of each WRPA for their reactions, and give them the opportunity to indicate priorities.

Phase I

Plan

At the outset of Phase I two primary problems confronted the Task Force. The first was the identification of "the public" and the second was, once having identified the public, how to obtain meaningful public participation, particularly in the short amount of time available.

The statement has been made that there is no such thing as "the public" but that there are in fact many publics, the alignment and constituency of which changes depending upon the issue in question. The term publics can be defined as encompassing a "wide range of groupings extending from loosely structured aggregates of individuals who share either sets of similar economic, occupational, and social interests or similar concerns about a common geographic area to highly structured organizations with specific issue positions and influence strategies."1/

The appropriate publics are much more easily identified when specific issues are involved, particularly those of a local nature, than

1/ Warner, Katherine P., Public Participation in Water Resources Planning, National Water Commission, Washington, D. C., 1971.

when dealing with a study such as the Lower Mississippi Region Comprehevsive study which is rather nonspecific and attempts to address itself to every facet of water and related land resource conservation, management, and development. The decision was made that for the purpose of determining the public desires pertaining to study goals and objectives, "the public" constituted a general cross section of the region's population.

In regard to the second problem, that of obtaining meaningful public participation, it was agreed that it would be futile to approach any group of people with a general question as to the goals and objectives toward which they felt the Lower Mississippi Region Comprehensive Study should be directed. Many professional planners have a difficult time comprehending the scope of this type of study, much less the average individual. It was concluded that there must be some sort of vehicle or instrument to which people could respond. A number of alternatives were discussed, including public opinion questionaires and suggested lists of goals and objectives on which people could state their reactions, either orally or in writing. These alternatives were ruled out as it was recognized that the public in general, including the leaders of most units of government, did not have a sufficient awareness of the concepts considered in this type of study to give meaningful opinions of criticisms relating to study goals and objectives. It was further recognized that to acquaint the public with this study to a sufficient degree would require far more time and resources than were available.

The Public Involvement Task Force decided that a way in which to obtain meaningful indications of goals and objectives which would be acceptable to the public would be to make a survey of basic attitudes toward various parameters to which the study would be addressed, including attitudes toward economic growth and development, recreational development, the preservation of natural areas, development of water resources for such things as flood control, and navigation, and the degree to which State, Federal, and local units of government should exercise control over natural resources. The premise was that if the attitudes toward water resource management could be extracted from a significant sample of the basin population, the Plan Formulation Committee would have a reasonable indication as to public preferences regarding ultimate goals and objectives.

Somewhat basic to the theory of attitude measurement is the concept that opinions and attitudes, while being identical in the minds of most people and are often used interchangeably, are not in fact one and the same thing. An individual's opinion on a particular subject or issue is that which he will state when questioned on that particular subject or issue. It is formed as a result of a relatively rational analysis of his understanding of the information available to him. The problem arises in that an individual's actions are not always consistent with his

expressed opinion, as has been shown in a number of studies.2/ Thus, the discrepancy often noted between "what a person says" and "what a person does" becomes a problem of some magnitude in attempting to predict an individual's reaction to a particular issue based upon his expressed opinion. For example, an individual may express the opinion that the environment should be made as aesthetically pleasing as possible and then vote against a bond issue for the construction of a needed sewage treatment plant or throw cans, bottles, or other litter or debris out his car window as he drives along the highway.

An individual's attititude, on the other hand, may be defined as his "thoughts, feelings, and disposition to act toward some aspect of his environment with some degree of consistency."3/ 4/ In other words, we might say that an individual's attitude toward a particular issue is the resultant of the summation of all psychological forces which influence the individual's actions relating to that issue. His attitude reflects his biases and prejudices to a greater degree than does his expressed opinion. Thus, if an individual's attitude can be measured it should be a much more reliable predictor of his probable reaction in relation to a particular issue than his opinion would be.

Among several approaches to the measurement of attitudes contained in the literature the two considered most adaptable for this type of situation were the Thurstone and Likert Scales.

The Thurstone Type Scale is based upon what is referred to as the "Law of Categorical Judgment." In the Law of Categorical Judgment it is assumed that the psychological continuum, or attitude continuum, of an individual can be sub-divided into ordered categories. Statements relating to the various categories are obtained and analyzed, and in final form the attitude scale is presented to an individual and he indicates those statements with which he agrees or disagrees 5/ 6/ relating to the particular subject for which attitude measures are desired. These statements are then evaluated by a panel of judges who sort the statements into several categories on a single continuum ranging from extremely

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2/ Anastasi, Anne, Psychological Testing, The MacMillan Company, Toronto, 1968.

3/ Fishbein, M., Readings in Attitude Theory and Measurement, John Wiley and Sons, New York, 1967.

4/ Sawyer, R. N., and Harbaugh, T. E., "A Methodology for the Construction of Attitude Measuring Instruments," Journal of the American Water Resources Association, Vol. 6, No. 3, June 1970, pp. 401-406.

5/ Op. cit., Sawyer, R. N., and Harbaugh, T. E.

6/ Thurstone, L. L., and Chave, E. J., The Measurement of Attitude, University of Chicago Press, Chicago, Ill., 1929.

favorable to extremely unfavorable with relation to the issue in question. Each of the categories are assigned a numerical value. The assigned values usually range from 1 (extremely favorable) to 11 (extremely unfavorable). Those items which appear in a wide range of positions along the continuum as sorted by the judges are considered ambiguous and are discarded or revised. Those items which tend to be rated similarly by the judges are retained for inclusion in the attitude scale. In the utilization of a Thurstone Scale the respondent is asked to mark those statements with which he agrees. His attitude score is the summation of the scale values of the statements marked.

The Likert Type Scale is constructed by the compilation of a number of statements thought to pertain to an attitude in question. There are five possible responses to each item, ranging from strongly agree (SA) through agree (A), undecided (U) and disagree (D) to strongly disagree (SD). The categories are rated 1 through 5 respectively, with the response of strongly agree rated as 1 and disagree strongly rated as 5. An individual's total score represents the summation of ratings for all items answered.

Initially a large number of items are used in the development of a Likert Scale. To reduce the number of items an internal consistency analysis should be performed on the responses of a standardization group. In this analysis items which do not discriminate between high and low scores are discarded and items that show a discrimination between high and low scores are retained for use in the finished product.7/ 8/

The Likert Scale is more easily adaptable to the measurement of multiple attitudes than is the Thurston Scale. Therefore, the Likert Scale was selected for use in this project due to the fact that attitudes in several areas generally pertaining to water resource management and development were desired.

Implementation

A number of statements were compiled by the Public Involvement Task Force which were thought to relate to attitudes regarding economic development, industrial development, recreation, structural control of water resources, governmental control of resources, and the preservation of the natural environment. Each statement was edited and typed on a card. The statements were then ordered by a random number sequence. The Public Opinion Survey instrument was not standardized due to the critical nature of the time schedule. Therefore the further use of this particular instrument would require additional research and standardization. An abbreviated version of the instrument is presented on pages 71, 72, and 73.

7/ Op. cit., Fishbein, M.

8/ Op. cit., Sawyer, R. N., and Harbaugh, T. E.

The representatives of the various States assumed the responsibility of distributing and collecting the data in their respective States. The methods used varied somewhat from State to State, however, these variations were caused primarily by the varying institutional arrangements and political considerations existing in the different states.

The State of Arkansas arranged a series of public meetings through local Economic Development Areas with their portion of the region. The instrument was given to those in attendance at these meetings and the completed responses were collected at that time. The instrument was also distributed among employees of various State agencies with responsibilities in the water resources field. A total of 372 responses were obtained in Arkansas.

Due to the limited area involved, the States of Illinois and Kentucky did not participate in this particular phase of the public involvement program. The State of Louisiana distributed the instrument by mail to area district offices or police area offices for distribution within their respective areas. A total of 98 responses were obtained in Louisiana.

In the State of Mississippi there was some opposition to the use of what was termed as "a subtle psychoanalysis" of the people within the Mississippi portion of the region. Instead of using the attitude scale, the State of Mississippi elected to provide a position paper on the goals and objectives desired by the people within the delta area. The paper was prepared by the Delta Council, which is an association of landowners and other business interests from the Mississippi portion of the region. It was considered by the Public Involvement Task Force member from Mississippi that the position adopted by the Delta Council was representative of public attitudes in that region. A comparison of the position paper with the results of the attitude scale tended to confirm this assumption as the objectives outlined are to a large degree consistent with the attitudes indicated by an analysis of the scale. Excerpts from the position paper are presented on pages 43 through 50 of this appendix.

The State of Missouri had organized a Citizens Advisory Committee composed of 30 citizens representing a broad range of interests within the Missouri portion of the region during the initial phase of the study. Ten copies of the instrument were mailed to each member of the Citizens Advisory Committee with a request that they distribute these among many varied interests as possible. Of the total number of 300 distributed, 53 responses were obtained.

The State of Tennessee also made a distribution of the instrument by mail. The exact mechanism for this distribution is not known. A total of 66 responses was obtained in Tennessee.

A total of 491 responses was received from the entire Lower Mississippi Region. The responses represent a very small percentage of the total population for the region, which was 6,293,233 as of the 1970 census.

Results

The average response of all respondents for each item was obtained by the formula:

$$A = \frac{\sum_{i=1-5} n_i R_i}{N}$$

where: A = average response;

i = continuum point;

n_i = number of respondents under continuum point i;

R_i = numerical rating for continuum point i; and

N = total number of respondents.

A computer program was developed which tabulated the total responses, computed the average response for each item and the number of responses under each point in the continuum for each item, and the correlation matrix for all items in the scale. A computer run was made on the total number of responses received and a separate run was also made for each State. The data from the State of Louisiana was obtained too late to be included in the total run and therefore is reflected only in the individual run for the State of Louisiana.

In the computer analysis, it was assumed that all individuals sampled were employed persons. The respondents were categorized by occupation according to the breakdown used in the County and City Data Book published by the U. S. Department of Commerce. The occupational categories as used were agriculture; construction; manufacturing; transportation; communication and other public utilities; wholesale and retail trade; finance, insurance, and real estate; educational services; public administration; and other. The assumption was made that the distribution of occupations within the region would be reflected in the percentage distribution of occupations within the sample. The total number of people in each occupation category in the area sampled, the percentage distribution, the theoretical number of respondents in each occupation category, and the actual number of respondents in each occupation category are shown in table 3.

The average response to each item was adjusted to reflect the response which should theoretically have been observed had the sample been truly representative as defined in the preceding paragraph. This estimate for each item was made by the formula:

$$A_{ad} = \frac{\sum_{i=1-9} A_i T_i}{N}$$

where: A_{ad} = adjusted average

i = occupation category

A_i = average response in occupation category i;

T_i = theoretical number of respondents in occupation category i; and

N = total number of respondents

In this calculation, where there were no responses within an occupational category for a particular State, it was assumed that the average response in that category was equal to the average response in that category for the overall region. A comparison of the average responses to each item based on raw and adjusted data is shown in table 4. The validity of the adjustment may be questioned in some instances; i.e., as in the case of the manufacturing category in Arkansas where a sample size of three people is expanded to a theoretical representation of 72.

Related items were grouped together, and were assumed to measure the factors toward which most of the items within the group were directed. The factors used were development (reservoirs, channels, levees, etc.), tourism (i.e., desirability of attracting tourists), preservation of the environment, the desirability of industry, and the local control of natural resources (as opposed to State or Federal control). The items within each factor and their correlation to the factor (positive or negative) are shown in table 5. Responses to the items within each factor were averaged after adjustments were made to convert negative correlations to equivalent positive correlations. This was done by subtracting the responses to negatively correlated items from 6. Thus, if a response to a negatively correlated item within a factor were 5 (disagree strongly), the response actually indicates strong disagreement with the factor, or a positive response of 1 (strongly agree). Therefore, the above mentioned subtraction equates the response to a negatively correlated item to that of a positively correlated item.

The results of this analysis for all factors and for all computer runs are shown in table 6. As can be seen from an examination of table 6,

Table 3 - Distribution of Occupations

State and Occupational Category	Number of Persons	Percent of Total	Number of Persons Sampled	Adjusted Distribution
ARKANSAS				
Agriculture	66,172	23.3	52	87
Construction	15,889	5.6	3	21
Manufacturing	54,814	19.3	2	72
Transportation, Communication, and Public Utilities	15,746	5.5	2	20
Wholesale and Retail Trade	49,385	17.4	3	65
Finance, Insurance, and Real Estate	6,477	2.3	12	9
Educational Services	13,834	4.9	12	18
Public Administration	7,905	2.9	142	10
Other	53,545	18.9	144	70
Total	283,767	100.0	372	372
LOUISIANA				
Agriculture	98,650	11.6	20	11
Construction	69,501	8.1	1	8
Manufacturing	134,018	15.7	0	15
Transportation, Communication, and Public Utilities	75,149	8.8	1	9
Wholesale and Retail Trade	171,780	20.1	5	20
Finance, Insurance, and Real Estate	31,015	3.6	9	4
Educational Services	53,108	6.2	1	6
Public Administration	37,903	4.4	6	4
Other	181,799	21.3	55	21
Total	852,923	100.0	98	98
MISSOURI				
Agriculture	19,479	30.1	18	16
Construction	3,299	5.1	1	3
Manufacturing	10,326	16.0	3	8
Transportation, Communication, and Public Utilities	3,818	5.9	2	3
Wholesale and Retail Trade	11,256	17.4	10	9
Finance, Insurance, and Real Estate	1,151	1.8	2	1
Educational Services	3,641	5.6	3	3
Public Administration	1,826	2.8	7	1
Other	9,913	15.3	7	8
Total	64,709	100.0	53	52

(Continued)

Table 3 - Distribution of Occupations (con.)

State and Occupational Category	Number of Persons	Percent of Total	Number of Persons Sampled	Adjusted Distribution
TENNESSEE				
Agriculture	40,406	11.7	9	8
Construction	21,222	6.1	1	4
Manufacturing	67,879	19.6	0	13
Transportation, Communication, and Public Utilities	26,501	7.7	0	5
Wholesale and Retail Trade	69,717	20.2	2	13
Finance, Insurance, and Real Estate	12,863	3.7	5	2
Educational Services	15,218	4.4	8	3
Public Administration	15,049	4.4	18	3
Other	77,179	22.3	23	15
Total	346,034	100.0	66	66
TOTAL REGION				
Agriculture	126,051	18.2	79	89
Construction	40,410	5.8	5	28
Manufacturing	133,019	19.2	5	94
Transportation, Communication, and Public Utilities	46,065	6.6	4	32
Wholesale and Retail Trade	130,358	18.8	15	92
Finance, Insurance, and Real Estate	20,491	3.0	19	15
Educational Services	32,693	4.7	23	23
Public Administration	24,780	3.6	167	18
Other	140,637	20.0	174	98
Total	694,510	100.0	491	491

Table 4 - Comparison of Raw and Adjusted Scores

Item	Total		Arkansas		Louisiana		Missouri		Tennessee	
	Raw	Adj.	Raw	Adj.	Raw	Adj.	Raw	Adj.	Raw	Adj.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	4.31	4.30	4.34	4.49	4.45	4.45	3.98	4.05	4.39	4.46
2	2.64	2.50	2.67	2.48	2.04	2.13	2.23	2.15	2.82	2.45
3	2.87	2.89	2.96	2.78	2.89	2.96	2.66	2.77	2.55	2.96
4	2.34	2.45	2.26	2.07	1.87	2.16	2.68	2.78	2.56	2.40
5	2.56	2.52	2.64	2.55	1.78	2.06	2.08	2.40	2.53	2.52
6	4.51	4.51	4.54	4.68	4.57	4.59	4.13	4.11	4.61	4.72
7	4.12	4.31	4.08	4.43	4.55	4.42	4.28	4.25	4.24	4.46
8	2.63	2.49	2.64	2.38	2.37	2.54	2.79	2.70	2.42	2.32
9	2.43	2.28	2.42	2.06	2.27	2.39	2.57	2.49	2.36	2.09
10	2.29	2.50	2.31	2.56	2.54	2.59	2.40	2.47	2.15	2.47
11	2.10	2.09	2.06	1.99	2.04	1.95	2.08	2.08	2.35	2.18
12	4.35	4.32	4.35	4.40	4.37	4.41	4.26	4.02	4.42	4.47
13	1.52	1.67	1.52	1.79	1.42	1.51	1.58	1.50	1.48	1.59
14	3.49	3.46	3.51	3.62	3.21	3.49	3.26	3.16	3.59	3.63
15	1.48	1.42	1.48	1.25	1.23	1.21	1.57	1.49	1.45	1.37
16	3.38	3.18	3.30	2.92	3.08	3.11	3.74	3.54	3.52	3.32
17	2.32	2.28	2.38	2.23	2.01	2.05	1.96	1.83	2.26	2.28
18	3.61	3.53	3.63	3.18	3.79	3.76	3.40	3.42	3.62	3.71
19	3.40	3.47	3.43	3.55	3.65	3.62	3.41	3.35	3.14	3.26
20	4.26	4.29	4.25	4.41	4.10	3.92	4.19	4.09	4.38	4.50
21	3.52	3.37	3.49	4.02	3.95	3.89	3.70	3.61	3.56	3.89
22	3.56	3.46	3.59	3.34	3.43	3.72	3.08	3.10	3.79	3.73
23	2.95	2.91	2.99	2.78	2.10	2.31	2.94	3.05	2.71	2.60
24	2.79	3.03	2.79	2.92	3.36	3.23	2.94	3.03	2.70	3.08
25	3.97	3.86	4.02	4.00	3.92	3.92	3.68	3.67	3.89	4.12
26	4.08	4.20	4.11	4.32	4.25	4.23	4.09	4.09	3.86	4.20
27	3.33	3.41	3.29	3.43	3.73	3.49	3.51	3.31	3.36	3.54
28	3.74	3.53	3.81	3.64	3.35	3.26	3.89	3.78	3.26	3.06
29	1.78	1.92	1.80	1.82	1.68	1.74	1.74	1.92	1.71	2.04
30	3.97	4.12	3.92	4.15	4.31	4.06	4.15	4.04	4.08	4.32
31	3.74	3.83	3.78	4.16	4.03	4.14	3.55	3.45	3.67	3.70
32	2.71	2.80	2.69	2.77	3.12	3.02	2.92	2.78	2.64	2.94
33	2.28	2.29	2.29	2.40	2.00	2.02	2.30	2.23	2.17	2.08
34	3.56	3.73	3.50	3.83	3.84	3.72	3.79	3.65	3.68	3.84
35	2.64	2.91	2.62	2.76	2.97	3.19	2.74	2.86	2.68	2.88
36	2.95	2.75	2.97	2.57	2.47	2.34	2.81	2.80	2.94	2.61
37	2.21	2.19	2.22	2.11	1.73	2.08	2.32	2.30	2.08	1.99
38	2.87	2.65	2.84	2.52	2.49	2.55	2.70	2.62	3.14	2.68
39	3.35	3.46	3.33	3.50	3.59	3.62	3.28	3.24	3.55	2.75
40	2.61	2.42	2.61	2.26	2.16	2.22	2.58	2.58	2.62	2.41
41	3.67	3.62	3.65	3.74	3.52	3.63	3.75	3.50	3.70	3.62

Table 4 - Comparison of Raw and Adjusted Scores (con.)

Item	Total		Arkansas		Louisiana		Missouri		Tennessee	
	Raw	Adj.	Raw	Adj.	Raw	Adj.	Raw	Adj.	Raw	Adj.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
42	3.53	3.70	3.49	3.92	3.94	4.20	3.81	3.72	3.51	3.71
43	3.70	3.92	3.66	4.13	4.02	4.07	3.89	3.74	3.76	4.11
44	3.62	3.43	3.70	3.55	2.77	2.86	3.19	3.19	3.52	3.04
45	4.14	4.17	4.13	3.81	3.78	3.98	4.02	3.97	4.26	4.42
46	2.14	2.14	2.18	2.24	1.90	1.87	2.04	2.05	1.95	1.89
47	1.88	1.85	1.88	1.81	1.72	1.64	1.96	1.96	1.85	1.64
48	3.84	3.80	3.84	3.60	3.26	3.47	3.77	3.85	3.88	4.06
49	3.58	3.51	3.53	3.42	3.17	3.12	3.53	3.50	3.89	3.89
50	3.67	3.75	3.66	3.86	3.59	3.50	3.77	3.65	3.65	3.81

Table 5 - Factors

Tourism		Water Resource Development		Preservation		Industrial Development		Local Control of Resources	
Item	Correlation	Item	Correlation	Item	Correlation	Item	Correlation	Item	Correlation
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	-	5	+	7	+	10	-	2	+
3	-	7	-	8	-	17	+	14	-
9	+	8	+	10	+	21	-	24	-
10	-	9	+	19	+	27	-	25	-
18	-	10	-	21	+	30	-		
31	-	16	+	24	+	32	-		
37	+	17	+	27	+	36	+		
		21	-	30	+	37	+		
		23	+	35	+	39	-		
		27	-	36	-	40	+		
		30	-	39	+	42	-		
		31	-	42	+	43	-		
		34	-	43	+	44	+		
		36	+	44	-	48	+		
		37	+	48	-				
		42	-						
		43	-						

Table 6 - Attitude Rating Toward Factors

State and Category	Tourism	Water Resource Develop-ment	Preser-vation	Industrial Development	Local Control of Resources
ARKANSAS (N=372)					
Raw	2.52	2.59	3.12	2.83	2.59
Adjusted	2.49	2.29	3.38	2.57	2.49
Agriculture	2.42	2.33	3.55	2.49	2.11
Construction	1.95	2.02	3.52	2.53	2.67
Manufacturing	2.36	1.76	3.72	2.17	2.38
Transportation, Communication, and Public Utilities	2.07	2.29	3.16	2.37	2.25
Wholesale and Retail Trade	2.62	2.33	3.11	2.75	2.92
Finance, Insurance, and Real Estate	1.62	2.16	3.40	2.50	2.60
Educational Services	2.63	2.33	3.52	2.43	2.36
Public Administration	2.52	2.62	3.01	2.90	2.71
Other	2.45	2.74	3.06	2.99	2.65
LOUISIANA (N=98)					
Raw	2.32	2.17	3.55	2.35	2.38
Adjusted	2.36	2.19	3.51	2.42	2.37
Agriculture	2.42	2.18	3.82	2.29	1.93
Construction	2.57	2.17	4.18	2.00	1.50
Manufacturing	--	--	--	--	--
Transportation, Communication, and Public Utilities	2.00	2.41	3.31	2.66	3.12
Wholesale and Retail Trade	2.45	2.44	3.13	2.49	2.65
Finance, Insurance, and Real Estate	2.39	1.99	3.47	2.28	2.75
Educational Services	2.42	1.76	3.68	1.93	2.50
Public Administration	2.21	2.19	3.47	2.27	2.25
Other	2.31	2.17	3.50	2.39	2.47
MISSOURI (N=53)					
Raw	2.70	2.48	3.28	2.66	2.59
Adjusted	2.66	2.52	3.23	2.72	2.57
Agriculture	2.83	2.45	3.46	2.45	2.14
Construction	1.71	1.94	3.56	2.33	2.75
Manufacturing	2.67	2.69	3.27	3.00	2.50
Transportation, Communication, and Public Utilities	2.93	3.47	2.28	3.60	2.38
Wholesale and Retail Trade	2.47	2.33	3.21	2.55	3.18
Finance, Insurance, and Real Estate	2.78	2.29	3.69	2.27	2.25
Educational Services	2.29	2.63	2.89	2.87	3.42
Public Administration	2.84	2.54	3.14	2.63	2.82
Other	2.80	2.40	3.33	2.52	2.57

(Continued)

Table 6 - Attitude Rating Toward Factors (con.)

State and Category	Tourism	Water Resource Development	Preservation	Industrial Development	Local Control of Resources
TENNESSEE (N=66)					
Raw	2.58	2.52	3.16	2.75	2.66
Adjusted	2.40	2.33	3.39	2.55	2.40
Agriculture	2.65	2.49	3.47	2.72	1.63
Construction	1.86	2.00	3.68	2.26	2.50
Manufacturing	--	--	--	--	--
Transportation, Communication, and Public Utilities	--	--	--	--	--
Wholesale and Retail Trade	1.71	1.55	4.18	1.60	2.00
Finance, Insurance, and Real Estate	3.00	3.07	2.57	3.37	2.90
Educational Services	2.55	2.47	3.12	2.77	3.06
Public Administration	2.40	2.31	3.29	2.54	2.72
Other	2.72	2.69	2.95	2.92	2.88
TOTAL REGION (N=491)					
Raw	2.55	2.57	3.14	2.81	2.60
Adjusted	2.49	2.43	3.30	2.68	2.53
Agriculture	2.54	2.25	3.52	2.56	2.07
Construction	1.89	2.00	3.60	2.44	2.65
Manufacturing	2.50	2.27	3.45	2.67	2.45
Transportation, Communication, and Public Utilities	2.41	2.88	2.94	2.98	2.31
Wholesale and Retail Trade	2.40	2.34	3.32	2.46	2.97
Finance, Insurance, and Real Estate	2.41	2.41	3.21	2.71	2.65
Educational Services	2.56	2.42	3.30	2.75	2.71
Public Administration	2.52	2.58	3.05	2.85	2.72
Other	2.62	2.73	3.01	2.97	2.68

there appears to be no clear-cut directive from the public in regard to any of the factors considered. The same general conclusion can be drawn using either the raw or adjusted data. The numerical ratings change slightly when the data is adjusted to reflect the correct percentage distribution among the occupational categories in the sample, but not to the extent that the overall result is significantly altered.

In the examination of the attitude indicated by an individual item, it should be remembered that the chance that the responses are not indicative of the true attitude through a misunderstanding of the item is greater than in the analysis of a factor of grouped items. A misunderstanding of an item within a factor grouping is largely offset by the responses to the other items. The joint probability that a significant number of items in a factor grouping were not properly understood is much smaller than the probability that a single item was not understood.

Conclusions

Due to the critical nature of the time schedule imposed, the Likert Type Scale used to measure public attitudes was not standardized before its use. In view of this the results obtained must be regarded as somewhat suspect and used with caution. Based upon the analysis of the results, the following conclusions are drawn:

1. An overall review of the responses to the attitude scale indicates that the people of the Lower Mississippi River Region are inclined to favor that water and related land resource management be directed toward the realization of economic returns, in a manner which will, to the extent possible, protect the environment. This seems to be consistent with results obtained in a survey conducted in Minnesota regarding the Upper Mississippi River, in which it was found that Minnesotans do not desire to curtail their uses of energy to improve environmental quality.9/

2. The results of this survey should be regarded as one tool among others, including the personal knowledge of individuals who work in close association with the people of each particular State, in the determination of the public's attitude toward basic goals and objectives.

3. The instrument has yielded useful information provided that it is used with extreme caution in recognition of the fact that nothing was known of the reliability and validity of the scale at the outset.

4. Some indication of the instrument's validity is demonstrated in that the attitudes measured are in general agreement with impressions formed of local attitudes by Federal and State agency representatives

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9/ Boron, N. J., Cecil, E. J., and Tideman, P. I., "A Survey of Attitudes Toward the Mississippi River as a Total Resource in Minnesota," Bulletin 55, University of Minnesota, St. Paul, Minnesota, 1972.

who have been in contact with the people of the region regarding water and related land resource planning, management, and development.

5. Considerable research should be done before the instrument is ready for general use, particularly in relation to its reliability and validity. Also, in the analysis done so far, several items did not appear to contribute to the conclusions drawn, indicating the possibility that the instrument could be considerably shortened and still yield the same information. A detailed factor analysis would be the first step in this research.

6. It would be very useful, particularly in more detailed planning efforts, to have a number of scales developed which would measure attitudes in more specific facets in the general water resource field, such as water pollution control, scenic rivers, flood control, etc. Perhaps a series of Thurstone Type Scales would be more easily and reliably adapted for this purpose than the Likert Type Scale.

In the planners' efforts to obtain information regarding public attitudes and preferences, the public meeting has been the most widely used vehicle for public contact. Other methods which have been used include workshop sessions and consultation with elected public officials. In all of these methods there is a question as to whether or not the views of the public in general are reflected. Many groups, or "organized publics," question the degree to which elected officials represent the viewpoint of their constituency. The usual experience associated with public meetings and the workshop sessions is that a number of individuals and organizations which represent the more or less extreme points of view on the continuum between development and preservation appear and express their particular points of view. It would seem that the "average individual" is too apathetic to take the trouble to make his views known, or else he trusts the professional planners and his elected representatives to arrive at the best solution. The true situation is probably the combination of both. Perhaps the greatest value of an instrument of this type to the planner is to reach the people between the two extremes.

Phase II

Plan

The Phase II definition of "the public" was somewhat different from the Phase I definition. Whereas in Phase I an attempt was made to reach as wide a cross section of the region's population as a whole as possible, the public involvement effort in Phase II was directed primarily toward those sectors of the public which tend to be the most instrumental in plan implementation and could provide the planners with more specific input information. While the Phase II meetings were open to the public at large, elected officials, business and community leaders, and

officials of Levee and Drainage Districts, Soil and Water Conservation Districts, Conservation Organizations, etc., were specifically invited by letter.

The detailed plan for the implementation of Phase II is contained in Public Involvement, Consultant Report, Lower Mississippi Region Comprehensive Study prepared by Russell F. Enzie, Robert N. Sawyer, Arlan R. DeKoch and T. E. Harbaugh. The consultant report is not included among the body of published documents for the Study, but copies may be obtained from the President, Mississippi River Commision, at the cost of reproduction.

Implementation

The first step in the implementation of Phase II was a workshop training session held at the offices of the Memphis District, Corps of Engineers, on September 28 and 29, 1972. The purpose of the training session was for the State personnel who would be involved in conducting the public meetings to meet with the consultant team. The objectives of the session were to review in detail the plan for Phase II and make such revisions and recommendations as necessary, and to insure that everyone involved was thoroughly familiar with the plan. All States were represented at this session with the exception of Arkansas and Illinois.

A total of 11 public meetings were held in the Lower Mississippi Region. The locations were as follows: Arkansas - Jonesboro, Forrest City, and Pine Bluff; Kentucky - Mayfield; Louisiana - Lafayette and Monroe; Mississippi - Grenada; Missouri - Fredericktown and Malden; and Tennessee - Memphis and Jackson. Attendance at these meetings ranged from fair to poor, and public reaction ranged from receptive to hostile, depending upon the circumstances and location.

Unfortunately, the implementation of the planned public meetings was not as uniform as had been hoped. In some cases, the presentation suggested by the consultant team as a guide only was apparently used verbatim as a "canned" presentation. Discussions at the training session and subsequent correspondence had attempted to emphasize that the presentation should be restructured to fit the specific meeting place and natural style of the presenter to avoid the appearance of a "canned" presentation. The suggested series of pre- and post-meeting invitations, public notices, and press releases was not consistently adhered to. In one instance, those in attendance got the unfortunate impression from the advance notices that the study was a completed Corps of Engineers study rather than an incomplete ongoing interagency effort. This situation created a hostile audience when the subject matter of the meeting was not consistent with the expected subject.

Despite the hitches which developed in the implementation, useful data were gathered, using an abbreviated version of the instrument in

Phase I. The instrument consisted of a three-page series of written statements and questions entitled "Water and Land Resources Public Opinion Survey." On the first page, this note prefaced the statements: The following statements have been prepared to help determine what people think about water and related land resources. The best answer to each statement below is your personal opinion. Many different points of view are covered. You may agree strongly with some statements, disagree just as strongly with others. Whether you agree or disagree with any statement, you can be sure that many people feel the same way that you do. Indicate your opinion on the following items by circling the choice that best expresses your view. Please mark every one."

1. Tourists irritate me.

2. Landowners should have control over their individual natural resources.

3. I dislike campers on my land.

4. I would like to see more people move into this area.

5. Barges and tugs pollute the river and should be banned from this area.

6. Dams and electrical generating plants should be banned from this area.

7. Industry pollutes the streams.

8. We need a supply of water to use in time of drought.

9. Recreation is not an important aspect of our natural resources.

10. We should do more to preserve our water resources.

11. State agencies should have control over all local natural resources.

12. Adequate water supply is essential.

13. Tourists usually destroy the natural environment.

14. Agriculture and related business should be our main source of income.

15. Everyone profits as industry moves into an area.

16. Continued use of herbicides and pesticides poses a major threat to continued life on earth.

17. Towns and cities should have the privilege of disposing of treated wastes in our rivers.

18. Pleasant scenery should be appreciated by more people.

19. Our rivers will play a major role in cultural development.

20. We don't need more water reservoirs.

21. The natural environment should be preserved at all costs.

22. It would be a good idea to try to attract more tourists to this area.

23. It would be a good idea to do more channeling work on the rivers.

24. The farmers of the area are doing a good job in controlling erosion.

25. The environment always suffers when industry moves into an area.

26. Tourists and campers help keep our streams clean.

27. The environmental problem is a hoax.

28. Adequate control is now being exercised over strip mining operations.

Questions on the last page of the instrument were included in the survey primarily to determine the extent to which the citizenry felt it had profited from the public involvement meetings. The questions were as follows:

1. To what extent were you able to express your opinions about local and State water-land-environmental problems in this meeting?

2. To what extent do you think local-State-State-Federal planning agencies will take into account the opinions and preferences of local people expressed here at this meeting?

3. How much new information about local and State environmental needs did you get from this meeting?

4. How much new information about local and State water needs did you get from this meeting?

5. How much new information about local and State land usage needs did you get from this meeting?

6. Overall, do you think the meeting was of benefit to you?

7. Do you think there should be more meetings of this kind?

8. How did you hear about this meeting?

Possible responses to the first six questions ranged from 1 to 11, with a response of 1 indicating great extent and a response of 11 indicating no extent. There was only a possible yes or no answer to the seventh question, whereas newspapers, radio, television, letter, friend, or others were possible responses to the last question.

Results

A total of 194 persons responded to the Water and Land Resources Public Opinion Survey described above. Their responses are summarized in tables 7 and 8.

In preparing table 8, responses of 1, 2, 3, and 4 were treated as great extent; 5, 6, and 7 as neutral; and 8, 9, 10, and 11 as no extent. Four of the items had about an equal number of responses in each of the three categories. The four items were concerned with the amount of new information presented at the meeting and the extent to which public opinion is taken into account by local-State-Federal planning agencies. The other items indicate that those attending felt free to express their opinions and that there should be more meetings of this type. In addition, the responses indicate that letters are by far the most effective way of encouraging people to attend these meetings. Only 15 percent of those attending heard about the meetings from radio, T.V., and newspapers.

The public opinions expressed during the second phase public involvement meetings were not analyzed by States. The decision to exclude this analysis was dictated by: (1) a lack of sufficient data in each State; and (2) a lack of consistency of data from State to State due to the employment of different data-gathering procedures.

Table 7 - Public Opinion Survey on Water and Land Resources, Lower Mississippi Region

Issue	Public Opinion[1/] SA	A	U	D	SD
Tourists irritate me.	7	11	10	45	30
Landowners should have control over their individual natural resources.	33	25	19	19	4
I dislike campers on my land.	15	30	25	21	8
I would like to see more people move into this area.	16	33	21	19	11
Barges and tugs pollute the river and should be banned from this area.	4	4	17	43	32
Dams and electrical generating plants should be built on our rivers.	17	39	20	17	9
Industry pollutes the streams.	18	50	18	12	3
We need a supply of water to use in time of drought.	35	50	6	6	3
Recreation is not an important aspect of our natural resources.	4	7	4	38	47
We should do more to preserve our water resources.	54	41	4	1	0
State agencies should have control over all local natural resources.	8	17	12	32	31
Adequate water supply is essential.	64	32	2	2	0
Tourists usually destroy the natural environment.	3	23	20	45	9

1/ Public opinion expressed as percentage of sample population strongly agreeing (SA), agreeing (A), undecided (U), disagreeing (D), or strongly disagreeing (SD) with an issue. Sample population consisted of a total of 194 people.

Table 7 - Public Opinion Survey on Water and Land Resources, Lower Mississippi Region (con.)

Issue	Public Opinion				
	SA	A	U	D	SD
Agriculture and related business should be our main source of income.	14	24	12	40	10
Everyone profits as industry moves into an area.	9	30	16	37	8
Continued use of herbicides and pesticides poses a major threat to continued life on earth.	14	22	23	24	17
Towns and cities should have the privilege of disposing of treated wastes in our rivers.	3	29	12	22	35
Pleasant scenery should be appreciated by more people.	38	51	9	2	2
Our rivers will play a major role in cultural development.	28	51	13	6	2
We don't need more water reservoirs.	3	8	17	40	32
The natural environment should be preserved at all costs.	13	25	23	28	10
It would be a good idea to try to attract more tourists to this area.	14	46	24	12	3
It would be a good idea to do more channeling work on the rivers.	21	33	20	15	12
The farmers of the area are doing a good job in controlling erosion.	6	30	25	31	8
The environment always suffers when industry moves into an area.	5	19	20	45	12
Tourists and campers help keep our streams clean.	2	5	22	58	13
The environmental problem is a hoax.	0	5	38	31	24
Adequate control is now being exercised over strip mining operations.	0	5	38	31	24

Table 8 - Public Opinion Survey on Public Involvement Meetings
Lower Mississippi Region

Item	Public Opinion		
	Great Extent	Neutral	No Extent
To what extent were you able to express your opinions about local and State water-land-environmental problems in this meeting?	50	33	16
To what extent do you think local-State-State-Federal planning agencies will take into account the opinions and preferences of local people expressed here at this meeting?	28	36	36
How much new information about local and State environmental needs did you get from this meeting?	39	26	35
How much new information about local and State water needs did you get from this meeting?	41	32	27
How much new information about local and State land usage needs did you get from this meeting?	38	35	27
Overall, do you think the meeting was of benefit to you?	54	24	22

1/ Public opinion expressed as percentage of sample population profiting from meetings to the given extent. Sample population consisted of a total of 194 people. Of those, 80 percent felt there should be more meetings of the type attended. Forty-three percent heard about the meetings from a letter. The remainder heard from other sources as follows: Newspaper, nine percent; radio, 5 percent; T.V., 1 percent; friend, 26 percent; other, 17 percent. However, it is noted that the total region population is 6,293,233; thus, the 194 people sampled represent a very small percentage of the total population.

CHRONOLOGY OF EVENTS

CHRONOLOGY OF EVENTS

GENERAL

In February 1968, the Water Resources Council requested that the Mississippi River Commission establish an ad hoc State-Federal Work Group to develop a brief preliminary plan of study and budget estimates for the framework study which had been authorized in the Flood Control Act of 1966. The Council suggested that each State in the Lower Mississippi Region and the Federal Departments of Agriculture; Army; Health, Education and Welfare; and Interior; and the Federal Power Commission should be given an opportunity to participate. It suggested further that the Federal Departments of Commerce, Housing and Urban Development, and Transportation might also have an interest in the study. The terms of reference provided at that time by the Council stipulated that field leadership of the study would be provided by a Coordinating Committee including one representative from each State and Federal Department involved, and that the President of the Mississippi River Commission would represent the Department of the Army and chair the Coordinating Committee.

Field representatives from the Water Resources Council, and from most of the States and Federal Departments ultimately involved in the study, participated in an ad hoc work group meeting in April 1968. The work group tentatively resolved questions of study scope and clarified areas of responsibility; and task groups to prepare specific subject segments of the comprehensive study were informally organized. In addition, a four-member committee, composed of a representative from each of the Federal Departments of Army, Agriculture, and Interior, and a single member representing the collective States, was appointed to coordinate the preparation of a preliminary plan of study. The assembled preliminary plan of study, outlining study organization, procedures, agency responsibilities, and funding requirements was formally submitted to the Water Resources Council in July 1968.

The Mississippi River Commission was notified in May 1969 that Federal funds for initiation of the study would be included in the fiscal year 1970 budget. In this notification, the Water Resources Council requested the Coordinating Committee, which prepared the Preliminary Plan of Study, to accomplish the study and prepare a report in accordance with the WRC Guidelines for Framework Studies, October 1967, and other supplemental guidance. Accordingly, the Mississippi River Commission proceeded to make arrangements for an initial meeting of the Coordinating Committee. A synopsis of that meeting and subsequent Coordinating Committee meetings is given in the following paragraphs; and a tabulation of principal study events is given in table 9.

Table 9 - Summary of Major Events for the Lower Mississippi Region Comprehensive Study

EVENT	COMPLETION DATE
Chief of Engineers, Assign Responsibility for Study to Mississippi River Commission	Oct 1967
First Ad Hoc Federal - State Group Meeting	Apr 1968
Submit Preliminary Plan of Study	Jul 1968
Submit Coordinated Budget for Study	Jul 1968
Study Coordinating Committee Established	Apr 1969
First Coordinating Committee Meeting	Jun 1969
Established Study Subcommittees	Jun 1969
Second Coordinating Committee Meeting	Aug 1969
Plan Formulation Committee Established	Aug 1969
Third Coordinating Committee Meeting	Jan 1970
Established Ad Hoc Publicity Committee	Jan 1970
Fourth Coordinating Committee Meeting	Mar 1970
Fifth Coordinating Committee Meeting	Aug 1970
Establish Ad Hoc Environmental Committee	Aug 1970
Sixth Coordinating Committee Meeting	Mar 1971
Submitted Detail Plan of Study	Apr 1971
Report Preparation Guidelines Approved	May 1971
Published Public Information Brochure	Jun 1971
Establish Public Involvement Task Force	Sep 1971
Seventh Coordinating Committee Meeting	Sep 1971
Establish Plan Formulation Task Force	Nov 1971
Complete Phase 1 Public Meeting	Jan 1972
Eighth Coordinating Committee Meeting	May 1972

Table 9 - Summary of Major Events for the Lower Mississippi Region Comprehensive Study (con.)

EVENT	COMPLETION DATE
Complete Initial Draft of Appendix R, Power	Oct 1972
Complete Initial Draft of Appendix G, Related Minerals	Nov 1972
Ninth Coordinating Committee Meeting	Nov 1972
Complete Initial Draft of Appendix K, Municipal and Industrial Water Supply	Mar 1973
Complete Phase II Public Meetings	Mar 1973
Complete Initial Draft of Appendix E, Flood Problems	Apr 1973
Complete Initial Draft of Appendix B, Economics	May 1973
Complete Initial Draft of Appendix M, Health Aspects	Jun 1973
Complete Initial Draft of Appendix L, Water Quality	Nov 1973
Complete Initial Draft of Appendix C, Regional Climatology, Hydrology, and Geology	Dec 1973
Complete Initial Draft of Appendix F, Land Resources	Dec 1973
Tenth Coordinating Committee Meeting	Jan 1974
Complete Initial Draft of Appendix I, Agricultural Land Drainage	Feb 1974
Complete Initial Draft of Appendix J, Navigation	Feb 1974
Complete Initial Draft of Appendix D, Inventory of Facilities	Feb 1974
Complete Initial Draft of Appendix O, Coastal and Estuarine	Feb 1974
Complete Initial Draft of Appendix S, Sediment and Erosion	Mar 1974
Eleventh Coordinating Committee Meeting	Apr 1974
Complete Initial Draft of Appendix Q, Fish and Wildlife	May 1974
Complete Initial Draft of Appendix H, Irrigation	May 1974

Table 9 - Summary of Major Events for the Lower Mississippi Region Comprehensive Study (con.)

EVENT	COMPLETION DATE
Complete Initial Draft of Appendix T, Plan Formulation	Jul 1974
Complete Initial Draft of Appendix N, Recreation	Jul 1974
Complete Initial Draft of Appendix P, Archeological and Historical Resources	Jul 1974
Complete Initial Draft of Appendix U, The Environment	Jul 1974
Twelth Coordinating Committee Meeting	Aug 1974
Complete Initial Draft of Main Report	Aug 1974
Complete Initial Draft of Appendix A, History of Study	Sep 1974
Complete Final Print of Appendix G, Related Mineral Resources	Sep 1974
Complete Final Print of Appendix M, Health Aspects	Sep 1974
Complete Final Print of Appendix O, Coastal and Estuarine Resources	Sep 1974
Complete Final Print of Appendix R, Power	Sep 1974
Complete Final Print of Appendix B, Economics	Oct 1974
Complete Final Print of Appendix C, Regional Climatology, Hydrology and Geology	Nov 1974
Complete Final Print of Appendix F, Land Resources	Nov 1974
Complete Final Print of Appendix H, Irrigation	Nov 1974
Complete Final Print of Appendix I, Agricultural Land Drainage	Nov 1974
Complete Final Print of Appendix K, Municipal and Industrial Water Supply	Nov 1974
Complete Final Print of Appendix L, Water Quality and Pollution	Nov 1974
Complete Final Print of Main Report	Nov 1974

Table 9 - Summary of Major Events for the Lower Mississippi Region Comprehensive Study (con.)

EVENT	COMPLETION DATE
Complete Final Print of Appendix S, Sediment and Erosion	Nov 1974
Complete Final Print of Appendix T, Plan Formulation	Dec 1974
Complete Final Print of Appendix E, Flood Problems	Jan 1975
Complete Final Print of Appendix D, Inventory of Facilities	Feb 1975
Complete Final Print of Appendix J, Navigation	Mar 1975
Complete Final Print of Appendix P, Archeological and Historical Resources	Mar 1975
Complete Final Print of Appendix U, The Environment	May 1975
Complete Final Print of Appendix N, Recreation	Jun 1975
Complete Final Print of Appendix Q, Fish and Wildlife Resources	Jul 1975
Complete Final Print of Appendix A, History of Study	Jul 1975
Submit to Water Resources Council, Main Report and Appendix T	May 1975

COORDINATING COMMITTEE MEETINGS

The initial meeting of the Coordinating Committee was held in Vicksburg, Mississippi, on 17 June 1969. The primary purpose of this meeting was to discuss the study objectives, organization, funding requirements, and agency assignments.

Objectives outlined for the Lower Mississippi Region Comprehensive Study were: (1) To provide a broad-scaled analysis of water and related land resource problems within the region; (2) to furnish general appraisals of the probable nature, extent, and timing of measures for their solution; (3) to develop a listing of detailed studies required in the future; and (4) to determine requirements for a future basic data collection program to compile data on streamflow, water quality, economic indicators, and geographic and geological mapping needed to evaluate water resource developments. These objectives were in part related to those of a parallel study concerned with the feasibility of diverting surplus Mississippi River flows to water-deficient areas in west Texas and eastern New Mexico. The parallel study, known as the West Texas and Eastern New Mexico Water Import Study, was described for the benefit of the Coordinating Committee, since much of the information to be developed on water needs was intended for use in both studies.

Agreement was reached on the allocation and use of initially budgeted Federal funds, with development of a detailed Plan of Study being the agreed upon major effort in fiscal year 1970. Primary responsibility for coordinating and compiling the detailed Plan of Study was assigned to the Mississippi River Commission. The agency assignments were generally in accordance with those submitted by the ad hoc Work Group in the preliminary plan of study.

At the second meeting of the Coordinating Committee, held on 4 August 1969 in Memphis, Tennessee, the Committee considered budgetary matters and the appointment of subcommittee chairmen and members. The fiscal year 1971 budget submission was reviewed and approved, subject to revision of study-cost estimates upon completion of the detailed plan of study. The importance of early appointment of subcommittee chairmen and members was recognized, and the Committee agreed that the names of individuals to act in these capacities would be furnished the Mississippi River Commission within one month for dissemination to all concerned agencies.

A representative of the Mississippi River Commission discussed the urgent need for action on the part of the Economics Subcommittee. It was suggested that this subcommittee get together on an informal basis to discuss projections made by the Office of Business Economics for certain basic parameters reflecting future growth of the Lower Mississippi Region.

The Department of Agriculture recommended the creation of two subcommittees that had not previously been considered. These consisted of a Plan Formulation Subcommittee and a Report Preparation Subcommittee, both to be chaired by the Mississippi River Commission, with membership to be approved by the Coordinating Committee. When formed, the plan formulation group was given full committee status in line with its assigned responsibility of total study management.

The third meeting of the Coordinating Committee was held in New Orleans, Louisiana, on 16 January 1970. Early discussion centered upon a State of Missouri recommendation for an orientation program for all participants in the comprehensive study. This program was adopted as a function of the proposed Plan Formulation Committee which was being organized to coordinate and direct the efforts of the various specialty groups who would develop basic input data for the study. Also adopted were several minor changes in the preliminary makeup of the specialty groups, with each group being positively charged with the responsibility for environmental quality considerations in their individual studies.

Guidelines for preparation of the detailed Plan of Study, a generalized outline for preparation of study appendixes, and an activities sequence diagram were distributed for review. The plan formulation group was given the responsibility for preparation of the detailed Plan of Study, using input to be submitted by the individual specialty groups. A need for preparing general guidelines to insure format consistency among study appendixes was recognized, and the Report Preparation Subcommittee was given that responsibility. Needs for a History of Study Appendix and a Glossary of Terms were also recognized, and the latter was added to the study segments to be prepared.

The designated chairman of the economics special group summarized the types of economic information available for the comprehensive study, and submitted that the first function of the Economics Subcommittee would be to examine preliminary data from the Office of Business Economics. Additional functions tentatively outlined for the Economics Subcommittee included the development of any special types of economic information needed by individual participating agencies; data on predicted growth trends of individual industries by specific areas; information about probable effects of local or regional development programs; and evaluation of alternatives for regional development, including measurements of primary and redevelopment benefits. A regional subarea breakdown based on county line boundaries to facilitate evaluation of statistical data, was approved for limited use in the economic base study. A standardized base map using hydrologic boundaries of the region was approved for use by other specialty groups. The adopted county line boundaries superimposed on the hydrologic boundaries are shown on figure 3.

Publicity was the last major topic of discussion. The Committee prepared to publicize its future meetings and open them to the general public. Information pamphlets, movies, and public meetings were discussed as possible mechanisms for informing and involving the general public in the study. A suggestion that the individual States be given responsibility for public involvement in the study was adopted; and an ad hoc Publicity Committee, composed of representatives from the States of Missouri and Louisiana and from the Federal Department of Housing and Urban Development, was appointed.

The fourth meeting of the Coordinating Committee was held in Memphis, Tennessee, on 24 March 1970. Topics of discussion, other than the usual budgetary matters, were: Program Objectives, Environment, Publicity, and Water Supply Studies.

Program objectives were outlined by the chairman of the Economics Subcommittee. These were: (a) National Income, (b) Regional Development, and (c) Environmental Quality. Projections or conditional economic forecasts for separate programs emphasing these objectives were to be provided by the Economics Subcommittee.

Agreement was reached on basic assumptions for the national income program for the region. Those assumptions, based on national economic forecasts endorsed by the Water Resources Council, applied to income, population, productivity, and employment by major industry. It was recognized that base line projections using the agreed upon assumptions would reflect a continuation of past growth trends, which show economic growth of the Lower Mississippi Region lagged behind the rest of the Nation. Thus it was agreed that base line projections for the National Income objective should be analyzed to determine which local resources offer an opportunity for accelerated growth, and that a separate set of projections should be developed for a Regional Development program.

The projections for the Regional Development program were to reflect five principal objectives: (a) increased regional income approaching the national average; (b) increased regional employment approaching the national average; (c) diversification of the economic base of the region so that the economic activity will not be dependent so much on one or two crops or industries; (d) improved quality of service, particularly educational help, recreation, and related facilities; and (e) increased income distribution to abolish hunger and possible poverty. Studies of eight specific industries to serve as supporting data for Regional Development projection were proposed. These included studies of the agricultural economy, forest and mineral resources and industries, and the power, recreation, transportation, manufacturing, and service industries. Agencies with special expertise in each of these respective sectors of the economy were designated to accomplish the studies.

Environmental quality aspects of the comprehensive study were summarized by a representative from the Bureau of Sports Fisheries and Wildlife, Department of Interior. Discussion of these aspects failed to provide a firm consensus of opinion about the content and timing of environmental studies, but it was agreed that a complete review of the environmental question would be made by the Plan Formulation Committee, with a firm recommendation to be made at the next Coordinating Committee meeting.

Public involvement aspects were summarized by a representative from the State of Missouri. As a member of the ad hoc Publicity Committee, the representative suggested that the study be coordinated through citizens advisory groups in each of the seven States involved. These groups, each composed of 20-40 community leaders representing various interests such as local planning groups, levee and drainage districts, and fish and wildlife conservationists, would be formed in lieu of conducting public hearings. They would provide information on local views and desires, and on local reactions to study proposals. The suggestion was adopted as a first step in the public involvement program, with individual States being given the responsibility for organizing the citizens advisory groups.

Questions about the development and use of information on water supplies were resolved, with the understanding that there would be a minimum of duplicated effort between the Lower Mississippi Region Comprehensive Study and the West Texas and Eastern New Mexico Water Import Study. The Business and Defense Administration of the Department of Commerce was given responsibility for preparing data on current and projected industrial water supply, including the coordination of available information from the States and other sources. Responsibility for matching projected supplies with projected demands was given to the Plan Formulation Committee.

At the fifth meeting of the Coordinating Committee held at Jackson, Mississippi, on 19 August 1970, the Committee reviewed study progress and considered proposals for environmental studies. Reports from the cooperating States and Federal Departments were accompanied by a report from the ad hoc Publicity Committee and by a Plan Formulation Committee report on both the detailed Plan of Study and a proposed plan for an environmental program.

The States all expressed a continuing interest in the study and a willingness to assist, especially in the collection of basic data, informing the public of the study effort, and providing input to the various specialty groups. The Federal Departments reported that they were proceeding with the collection of basic data and related specialty group activities to develop study input on agriculture, commerce, power, public health, urban development, recreation, fish and wildlife, mining, climatology, geology and groundwater, water quality, historical and

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LOWER MISSISSIPPI REGION COMPREHENSIVE STUDY. APPENDIX A. HISTO--ETC(U)
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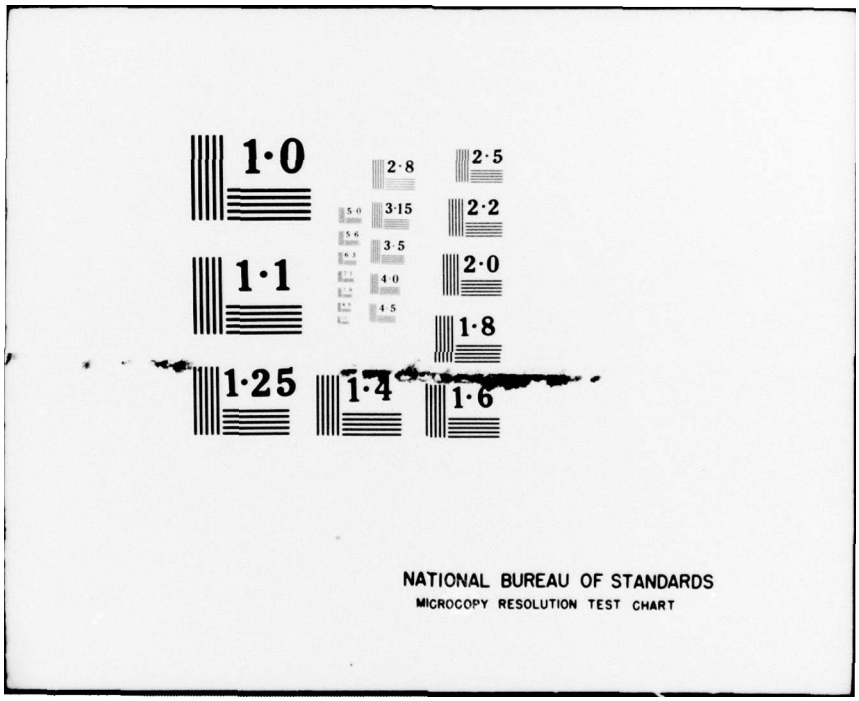
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cultural sites, economics, navigation, water damage control, laws and regulations, and transportation.

The report from the ad hoc Publicity Committee outlined the status of efforts to involve local interests in the comprehensive study. The leadership role in this effort was provided by the State of Missouri, which had furnished a letter to selected local interests requesting their participation in the study. As a follow-up to the letter, a meeting was being planned to present to the Missouri group the organization of the study effort and some of the early findings. In addition, the State of Missouri suggested that similar meetings be held about every 6 months to bring the local interests up to date, and to offer them an opportunity to respond. The other States had been furnished a copy of the Missouri letter, and indicated that a similar approach would be taken in their areas of the region.

A proposed Plan Formulation Committee outline for the detailed Plan of Study was reviewed, and a tentative schedule for submitting a finalized study plan to the Water Resources Council was adopted. The proposed approach to program formulation consisted of the development of a National Income program, a Regional Development program, and an Environmental Quality program, with the recommended program expected to be a combination of the three. In this approach, the well-being of the people was to be made an integral part of each of the three formulated programs, rather than formulating a fourth program for that specific purpose.

To handle Environmental Quality aspects of the study, an ad hoc Environmental Committee was organized under the chairmanship of the State of Arkansas. Membership included the States of Louisiana, Mississippi, and Missouri, and the Federal Departments of the Army, Agriculture, Interior, and the Environmental Protection Agency. Additionally, the State of Missouri agreed to chair the Laws and Regulations Subcommittee, which was to provide an update of abstracts of State water laws, compact agreements, and related information.

The sixth meeting of the Coordinating Committee was held at Memphis, Tennessee, on 30 March 1971. It was reported by the Plan Formulation Committee that a pilot study was underway to determine and pre-test study mechanisms, and to provide guidance in solving potential coordination problems. The ad hoc Environmental Committee reported that it was about to complete a narrative description of specific natural environmental features of the region and maps showing: (a) all Government-rural lands, parks, and places under some form of control, (b) features such as scenic rivers that should be preserved, restored, or enhanced, and (c) land use areas delineating uplands, deltas, and other land forms. Presentation of this information to the Plan Formulation Committee would fulfill the intended role of the ad hoc Environmental Committee, but it was agreed that the group, although inactive, should not disband, pending further study developments.

Requirements for an Environmental Impact Statement for the Comprehensive Study were considered, with the conclusion being that such a statement would not be needed before the first draft of the report. Preparation of a statement for the pilot study was considered, but not acted upon.

A draft of a proposed information pamphlet designed for public distribution to describe the purpose, scope, and organization of the study was distributed for review and comments. A proposed news release announcing the initiation of the Comprehensive Study was also distributed, and the State representatives were urged to have it published in their local newspapers.

It was reported that the detailed Plan of Study had been completed and would be officially submitted to the Water Resources Council in April 1971. Copies were distributed to those present. A recommendation that all appendixes and the main report be designated as being prepared under the supervision of the Lower Mississippi Region Comprehensive Study Coordinating Committee was adopted.

The seventh meeting was held at New Orleans, Louisiana, on 30 September 1971. A newspaper reporter from the State Times, New Orleans, Louisiana, was present, along with four representatives of the general public. Major topics of discussion were publicity, public involvement and environment.

A suggestion was made that Coordinating Committee meetings and other meetings open to the public be followed by a press conference or question and answer period for the benefit of the public and representatives of the press. The newspaper reporter suggested that subcommittee activities would probably provide more information of interest to the local people, and proposed an investigation of the desirability of opening those meetings to the public. Discussion of the proposal led to the conclusion that open subcommittee meetings could be unduly confusing to the public because information discussed at those meetings would be subject to changes or additions upon review by the Coordinating Committee.

A representative from the Water Resources Council summarized the Council's desire for active public participation in all studies, beginning early and continuing throughout. He stressed the need for a structured public involvement program containing more than just announcements, newspaper items, or formal public hearings, and suggested workshops as a possibility for a "mutual exchange" program. The Missouri representative indicated that the public involvement effort to be most effective must be primarily the responsibility of the States. He indicated further that the Citizens Advisory Committee approach was proving beneficial in Missouri, but stressed the need to select a committee which represents a true cross section of the public. Reports from other State representatives indicated that the efforts were being made to involve economic

development districts in Arkansas, and that the Governor of Louisiana had appointed a Water Resource Commission through which information was being disseminated. The Federal Departments of the Army and Interior offered the assistance of their trained public affairs people, and it was suggested that the Coordinating Committee appeal to public service organizations, and radio and public service programs for coverage.

The Plan Formulation Committee recommended the formation of an ad hoc Public Involvement Task Force, chaired by and working under the guidance of the Publicity Committee, and composed of one member from each State and an advisor from each Federal agency. The Task Force was organized and given the responsibility for determining (a) public objectives relative to water and related land resources development in the Lower Mississippi Region, and (b) public opinion relative to the combination of measures best able to satisfy their objectives.

Maps prepared by the ad hoc Environmental Committee to show unique areas meriting possible preservation for environmental purposes were reviewed. Copies of the ad hoc Committee report were requested for distribution through the Coordinating Committee. Consideration was again given to the need for an Environmental Impact Statement. It was concluded that the statement, if required by the Water Resources Council, could be prepared from information to be presented in the completed report on the study.

The eighth meeting of the Coordinating Committee was held at Memphis, Tennessee, on 9 May 1972. Reports from representatives indicated that questionnaires designed to obtain information on public goals and objectives had been widely distributed in Arkansas, Louisiana, Missouri, and Tennessee, but had not been circulated in Illinois, Kentucky, or Mississippi. Public involvement meetings and conferences were being conducted in Mississippi to obtain the desired information. A guarded conclusion from about 500 questionnaires returned to the Public Involvement Task Force was that economic and structural development was preferred by the public. To further the public involvement effort, the Task Force adopted a plan of action for structuring the program to include a series of informal meetings to obtain further information on public attitudes and to disseminate information on study findings.

Reports from Federal Departments responsible for specialty group activities indicated that studies to develop basic data and projections of water and related land resources needs in the region had been completed. They indicated further that appendixes incorporating the data were in varying stages of preparation, with some virtually complete in draft form. To cover subjects not included in previously planned appendixes, three new appendixes were added to the study.

The new appendixes consisted of a History of Study Appendix, Legal and Institutional Appendix, and Environmental Appendix. Responsibility

for preparing the Legal and Institutional Appendix was accepted by the Department of Interior, contingent upon active assistance from a group composed of a representative from each State and from each of the other Federal agencies. The ad hoc Environmental Committee was converted to a permanent committee and assigned responsibility for the Environmental Appendix. The Mississippi River Commission assumed responsibility for authoring the History of Study Appendix.

Procedures for reviewing and printing the study appendixes were outlined and approved. It was agreed that there would be a concurrent Plan Formulation Committee and internal subcommittee review of each appendix prior to printing to insure consistency in format. It was also agreed that there would be only two printings of each appendix.

At the ninth meeting, held at Jackson, Mississippi, on 16 November 1972, the Coordinating Committee heard status reports on State and Federal agency activities and viewed a slide presentation developed for the public involvement program. The States, with the exception of Mississippi and Illinois, reported that they were actively engaged in conducting public involvement meetings both to inform the public about the Study and to obtain their views. No public meetings were planned in Illinois because of the relatively small area of that State included in the Lower Mississippi Region. The State of Mississippi elected to disseminate and gather study information through involvement in civic club meetings rather than public meetings.

The Committee recognized that several subcommittee appendixes and related activities were not being completed as originally scheduled, generally due to unavoidable manpower problems in some of the State and Federal agencies. It was agreed that efforts would be accelerated to have all appendixes and the main report printed in draft form by the scheduled study completion date of 30 June 1973. Allowance was made to carry on the study beyond that date to provide for review and possible revision of the draft reports, final printing and field level review, and preparation of an Environmental Impact Statement.

The tenth meeting was held in New Orleans, Louisiana, on 10 January 1974. This meeting had twice been delayed in 1973 due to the flood emergency and other reasons. Status reports by State and Federal agency representatives stressed the difficulty of making report reviews in specified time frames, but indicated that most deadlines had been and would continue to be met.

The Chairman of the Plan Formulation Committee reported that a first draft of several sections of the Plan Formulation Appendix had been circulated for review during the previous month. Comments on these sections of the appendix had generally been favorable and it was hoped to have the remainder of the appendix draft completed by 1 March 1974. The significant features of the drafted appendix sections were reviewed

with visual aids used to demonstrate information regarding freshwater withdrawals and land use. Upon request of the Plan Formulation Committee Chairman, the Coordinating Committee endorsed a Plan Formulation Committee proposal to revise the format of the Plan Formulation Appendix to eliminate detailed WRPA discussions and emphasize regional programs. In addition, the Coordinating Committee endorsed a proposal to allow the Chairman of the Environmental Committee to retitle Appendix U, "The Environment." (Several alternative titles for Appendix U were later considered, but the original title of the appendix was retained.)

The eleventh meeting of the Coordinating Committee was held in Memphis, Tennessee, on 4 April 1974, primarily to approve several report appendixes for final printing. Concern was expressed that specified review periods for some reports had elapsed almost before draft reports were received. It was made clear to those concerned that review periods began with the receipt of a report, rather than the date of transmittal. Questions regarding the methodology used in certain aspects of the Navigation Appendix were raised, and the Chairman of the Navigation Subcommittee agreed to resolve any questions relating to that appendix after the meeting.

The Chairman of the Plan Formulation Committee reported on the Plan Formulation Appendix, providing details on the rationale for selecting the recommended framework program. The following appendixes were recommended by Subcommittee Chairmen and Work Group Leaders for final printing: Economics; Land Resources; Power; Minerals; Health Aspects; Municipal and Industrial Water Supply; Water Quality and Pollution; Flood Problems; Regional Climatology, Hydrology and Geology; Navigation; and Coastal and Estuarine. All were approved for final printing subject to the Committee Qualifications that:

1. The Plan Formulation Committee Task Force would coordinate any revisions required between the meeting and printing time, with all changes to be discussed with Chairmen or Work Group Leaders before being made;

2. The Flood Problems Appendix would not be readied for final printing until the specified review time had elapsed and any further comments received had been satisfactorily incorporated or resolved; and,

3. The Navigation Appendix would not be printed until satisfactory resolution of questions raised by the Department of Transportation.

At the twelfth meeting of the Coordinating Committee in Jackson, Mississippi, the Chairman of the Plan Formulation Committee gave a report on the Plan Formulation Appendix and Main Report, and summarized the highlights of the final framework program for the Region. He also reviewed progress on the preparation of the draft Environmental Impact Statement (EIS) and final public information brochure for the Study.

After subcommittee reports were given on several appendixes, the Coordinating Committee endorsed the final printing of those appendixes, subject to resolution of all comments between the time of approval and final printing. The Coordinating Committee also approved a recommendation that the Plan Formulation Committee Task Force be given blanket approval to take steps necessary to finalize and print all the study documents, subject to completion of the draft review and the satisfactory resolution of comments. It was agreed that the resolution of problems would be handled by telephone or mail unless circumstances dictated a Coordinating Committee meeting for that purpose.

The Coordinating Committee discussed plans for streamlining the remaining study effort and unanimously agreed that all study appendixes should be printed in limited supply for information and use by study participants and others. The Committee formalized plans for forwarding the Plan Formulation Appendix, History of Study Appendix, Main Report, and EIS to the Water Resources Council after the 45-day Field Review.

It was generally agreed that a critique of the Lower Mississippi Region Comprehensive Study should be prepared and incorporated in one of the study documents. The resulting critique is given in the next section of this appendix.

CRITIQUE

The Lower Mississippi Region Comprehensive Study spanned a period of approximately 4 years, with the effective work accomplished in about 2 years. This is partly because a considerable amount of time was initially absorbed in the process of organizing and developing an overall understanding of the job to be done. Also, there were setbacks and considerable losses in efficiency caused by changes in study personnel and other delaying factors.

Major problems stemmed from the presupposition of solutions in needs determinations. This made it extremely difficult for the central planning group to objectively evaluate or array needs in an order of priority. Moreover, it made necessary the time-consuming recomputation or adjustment of needs projections. Valuable time was also spent in correlating data with different base years, and there was considerable confusion as to what constituted municipal and industrial water supply uses because some industrial water supplies were included in municipal uses. Similar discrepancies occurred in wastewater data, and such data were too scanty to permit meaningful study or analysis of inorganic pollutants.

To avoid most of the pitfalls encountered in the Lower Mississippi Region Comprehensive Study, State and Federal agencies should give comprehensive planning a high priority and make work assignments accordingly. Personnel assigned to comprehensive studies as managers and plan formulators should have experience in the broad aspects of planning and should be available for the entire duration of the studies. Funding at the State level should provide for sufficient qualified personnel where full-time participation is required.

Compact study organizations and reports should be stressed. The number of documents for future comprehensive studies should be limited to about six, including a main report and basic economic, hydrology, lands, needs, and plans appendixes. The various functional elements, such as fish and wildlife, mineral resources, flood problems, etc., should be chapters within these appendixes. Report writing should begin immediately upon completion of the Plan of Study (POS), and all necessary changes in draft reports should be carefully and fully coordinated among the participating State and Federal agencies. The study organization should include the necessary number of committees to have a separate committee responsible for each study document. These committees should be chaired by members of a central plan formulation staff. There should also be an executive committee, limited in membership, with responsibility for making ordinary decisions within guidelines set by the coordinating committee or other similar committees of study participants.

The executive committee should meet often and represent all study participants; it should not only have a firm understanding and commitment on funding at the inception of a study, but should also have firm control over the distribution and use of all study funds. The committee should be chaired by the full-time study manager responsible for coordinating and monitoring work on a day-to-day basis and for maintaining liaison between all study participants and specialty groups.

The study manager's staff should include at least three full-time professionals, whose knowledge spans a broad range of disciplines. It should also include a full-time technical writer, editor, and illustrator to assure effective presentation of study results and to maintain quality control over all documents prepared for publication. Initial efforts of the study manager and his staff - even prior to preparation of the POS - should be directed to the formulation of a detailed study rationale and methodology.

Aside from these and other potential improvements in the field level approach to comprehensive studies, the Water Resources Council should assume a more active role in all phases of such studies. Increased involvement by the Water Resources Council should include research and development of effective public involvement programs. It should also include study of the units and type of data collected by all data-gathering agencies. Such study should include consideration of compiling and publishing all data to coincide with the 10-year census intervals, regardless of the intervening frequency of data collection.

National economic projections prepared for the Water Resources Council for use in comprehensive studies should be carried on in a complete spirit of objectivity, reflecting only trends indicated by data. The projections should not assume future utilization of resources which preclude priority decisions in the planning effort. The projections should be available at the beginning of a study and not changed thereafter.

WATER RESOURCES PLANNING AREAS