PLANNING STATUS REPORT

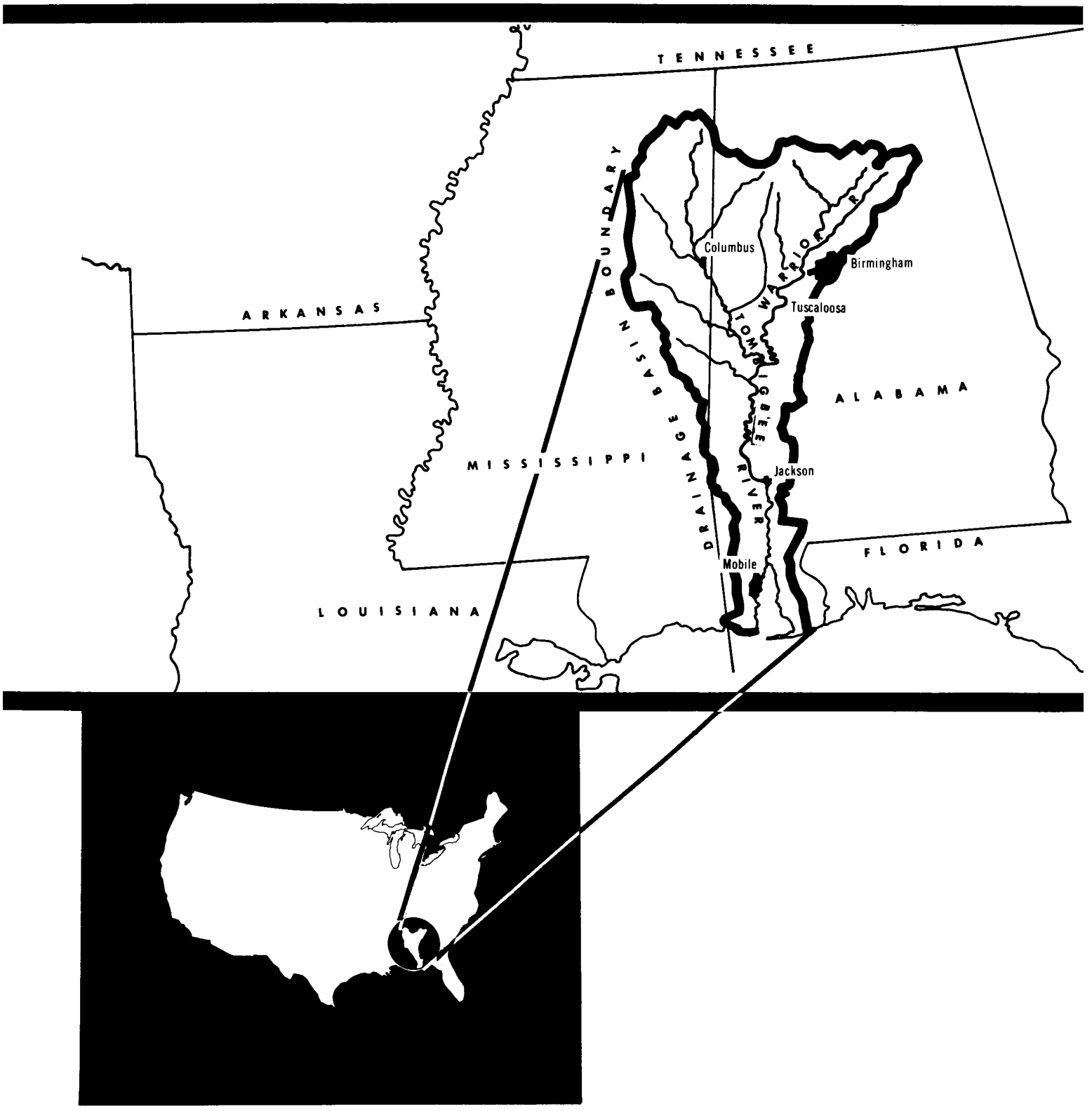
WATER RESOURCES APPRAISALS FOR HYDROELECTRIC LICENSING

This is one of a series of revised Planning Status Reports for major river basins in the United States. The original reports, which were prepared several years ago, are being revised as part of a program of Water Resources Appraisals for Hydroelectric Licensing. The revised reports provide updated information on water resources for use by the Federal Energy Regulatory Commission and its staff when considering hydroelectric licensing and other work. The reports present data on water resource developments, existing and potential, and on water use by existing and projected steam-electric generating facilities. The reports also summarize past and current planning studies. The information presented in these reports was abstracted from available sources and involved no new analyses. Information is current as of December 1980 unless otherwise indicated. The report is a staff effort which was not prepared for adoption or approval by the Commission, and does not commit or prejudice later Commission action.

FEDERAL ENERGY REGULATORY COMMISSION
OFFICE OF ELECTRIC POWER REGULATION

Originally Issued 1964—Revised February 1981

THE TOMBIGBEE-WARRIOR RIVER BASIN AREA



DESCRIPTION OF THE BASIN

The Tombigbee-Warrior River basin is located in western Alabama and northeastern Mississippi. The area covered by this report also includes the Mobile River and the coastal area between the Perdido and Pascagoula River basins. The total area is approximately 22,116 square miles, of which about 16,536 are in Alabama and 5,580 are in Mississippi. The north and south length of the area is in excess of 300 miles and its width varies from 160 miles at the upper portion to about 30 miles near the coast. A stream profile, figure 1, and a basin map, figure 2, are included at the end of this report.

The coastal area surrounds Mobile Bay and drains 716 square miles. Mobile Bay is a relatively large shallow bay with an overall area of 400 square miles and an average natural depth of 9 to 10 feet. Shaped like a gunstock, for which it was once named, it is about 30 miles long and varies in width from eight miles at the northern end to 20 miles in the southern portion. There are two natural openings at the southern end of the bay. One opening is southward through the main pass into the Gulf of Mexico and the other is westward through Pass Aux Herons into Mississippi Sound. The shoreline on the west and north sides of Mobile Bay is generally low and marshy, while that on the east side is considerably higher.

The Mobile River is 45 miles in length and connects Mobile Bay with the Tombigbee and Alabama Rivers. It flows south as a single channel for about 5 miles, before entering the delta and branching into several distributary streams. The flood plain of the river ranges from 6 to 11 miles in width and from 5 to 30 feet above mean sea level. A series of flat topped hills separate the Mobile basin from the Pascagoula River basin to the west and Perdido basin to the east. The Mobile River drains an area of 1,343 square miles, not including the drainage from the Alabama and Tombigbee-Warrior Rivers.

The Tombigbee River begins in Itawamba County in northeast Mississippi. It flows southeasterly for 267 miles to its junction with the Warrior River near Demopolis, then southerly for 175 miles to the junction of the Alabama and Mobile Rivers. Principal tributaries to the Tombigbee River are the Warrior, Sucarnoochee, Noxubee, Sipsey, and Buttahatchie Rivers. The terrain varies from hilly in the upper basin to the flatter lands of the coastal plains. Tidal effects extend up Tombigbee to the Coffeeville Lock and Dam. The Tombigbee drainage area, excluding the Warrior, is 13,783 square miles.

The Warrior River is the principal tributary to the Tombigbee River. Above Tuscaloosa, Alabama it is locally known as the Black Warrior River. The river is formed by the confluence of the Mulberry and Locust Forks about 20 miles west of Birmingham. From its origin, the Warrior flows southwesterly 174 miles to its confluence with the Tombigbee River near Demopolis. The drainage area of the Warrior River basin is 6,274 square miles.

The upper Warrior River basin is in the rugged topography of the Appalachian plateau where ridge elevations run from 500 to 1000 feet above sea level with river gorges approximately 200 to 400 feet deep. The fall line, where the Appalachian plateau meets the coastal plain, crosses the basin just north of Tuscaloosa. Below the fall line, the topography is characterized by gently rolling hills ranging from 225 feet above mean sea level to 100 feet at Demopolis.

DESCRIPTION OF THE BASIN

The climate in the Tombigbee-Warrior River basin ranges from subtropical near Mobile to temperate in the northern part of the basin. The average annual rainfall is approximately 53.4 inches, varying from 67.6 inches at Mobile to 51.8 inches at Aberdeen, Mississippi. The rainfall in the southern portion of the basin is among the highest in the United States. Flooding generally occurs on the Tombigbee River about once in ten years with intense local flooding several times a year.

The average annual runoff on the Tombigbee River at Coffeeville is 21.5 inches and the average daily discharge is 29,220 cubic feet per second. The maximum recorded flow at Coffeeville was 290,000 cubic feet per second, occurring April 22, 1979.

Principal cities within the basin are Mobile, Tuscaloosa, Bessemer, Demopolis, and Birmingham in Alabama, and Columbus, Tupelo, and West Point in Mississippi. The population of the basin was about 1,750,000 in 1970 and increased to about 1,890,000 in 1978. The distribution of the 1978 population was 1,610,000 in Alabama and 280,000 in Mississippi.

The city of Mobile is an important port of entry and outlet for the timber and agricultural lands of southern Alabama. Mobile is also an important commercial and industrial center. Most of the land around the Tombigbee River is used for agriculture, however, lumbering is also important. Recently, the basin has experienced an influx of light industry. With the construction of the Tennessee-Tombigbee Waterway, the trend of industrial growth is likely to continue.

The area around the Warrior has been influenced by an abundance of natural resources. Mineral deposits include coal, iron ore, limestone, and dolomite. The Warrior River basin also has extensive woodlands, fertile soil, and abundant water supply. It is a highly industrialized area, with steel and iron production in the Birmingham Bessemer area, and coal production in the upper basin. Pulp and paper, textiles, chemicals, and food processing industries in the basin place large demands on the region's water supply.

EXISTING WATER RESOURCE DEVELOPMENTS

The first recorded water resource development in the area is Mobile Bay and Harbor. Mobile was established by the French in 1711 and served as capital and supply port for the virgin Louisiana Territory. It has remained an important port and trade center through the years. The original Federal project for improving the navigation channels in Mobile Bay was adopted by Congress in 1826. Many improvements of the harbor have occurred to maintain the growth of the port. The project now being maintained was authorized by the River and Harbor Act of 1930 and modified in 1935, 1937, 1940, 1945, and 1954. The existing project provides for a 42- by 600-foot channel across Mobile Bay, a 40- by 400-foot channel up Mobile Bay, a 40-foot channel 500 to 775 feet wide up the Mobile River, and several channels and turning basins in the port area. The total length of channels is about 42 miles. The project was completed in 1965. During 1977 Mobile Harbor handled nearly 35,944,000 tons of commerce.

EXISTING WATER RESOURCE DEVELOPMENTS

The Gulf Intracoastal Waterway was adopted, in general, by the Rivers and Harbor Act approved in 1828. An Act of 1912 covered the section between Mobile Bay and Mississippi Sound. The opening of the land cut from Mobile Bay to Perdido Bay was authorized by the Rivers and Harbor Act of 1930. The existing project provides for a waterway 12 feet deep and 125 feet wide at mean low water from Perdido Bay to Mobile Bay, and a 12-foot by 150-foot wide channel from Mobile Bay through Mississippi Sound as authorized by the River and Harbor Act of 1950 and prior acts. The project was completed in 1957. In 1977, 7,930,000 tons, mainly petroleum products, crude oil, asphalt, coal, chemicals, grain and grain products, and marine shells moved between Mobile, Alabama and Pensacola, Florida. About 24,795,800 tons of materials moved over the segment between Mobile Bay and New Orleans.

The original project for the improvement of the Warrior River was adopted by an Act of Congress approved in 1975. The present Federal project for the Black Warrior (Warrior above Tuscaloosa), Warrior, and Tombigbee Rivers was authorized by several Congressional Acts from 1884 to 1945 to provide a navigation channel nine feet deep and 200 feet wide, where practicable, from Mobile to points on the Mulberry, Sipsey, and Locust Forks a few miles above Port Birmingham, a total distance of 463 miles. The original system of 17 dams and 18 locks was constructed between 1895 and 1915. It consisted of four locks and dams (Nos. 1, 2, 3, and 4) on the Tombigbee River between Jackson and Demopolis, six locks and dams (Nos. 5 through 10) on the Warrior River between Demopolis and Tuscaloosa, and seven dams (Nos. 11 through 17) and eight locks on the Black Warrior River between Tuscaloosa and Port Birmingham, the last dam having a double lift lock. The locks were generally 52 feet wide and 285 feet long and varied in lift from nine feet at Lock No. 2 to 21 feet at Lock No. 16 with a double lift of 61 feet at Lock No. 17.

With various authorizations of Congress, the modernization of the project has proceeded. In 1937, the first improvement consisted of 12 foot crest gates at Dam No. 17 (J.H. Bankhead) with the lock lift raised to 72 feet. The lock and dam is currently being rehabilitated and modernized under the authority of the Secretary of the Army to reconstruct existing navigation structures when necessary. In 1970, the spillway was strengthened to meet present day standards. Construction of a new lock was completed in 1975. The new lock will have a maximum lift of 69 feet in a single operation.

Construction of Holt Lock and Dam began in 1962 and was open to traffic in 1966. Locks & Dams No. 13, 14, 15, and 16 were eliminated by this Project. Warrior Lock and Dam was open to river traffic in 1957 and completed in 1962, eliminating Locks No. 8 and 9. Demopolis Lock and Dam was open to navigation in 1954 but not completed until 1962, eliminating Locks No. 4, 5, 6 and 7. Coffeeville, formerly Jackson, was open to river traffic in August 1960 and completed in 1965. The project included a cutoff channel in a bend in the river 18 miles downstream, bypassing old Lock No. 1, and dredging the intervening channel. Old Locks No. 2 and 3 were eliminated.

The Tennessee-Tombigbee Waterway Project was authorized in the Rivers and Harbor Act of 1946 and provides for a navigable waterway connection between the Tombigbee and Tennessee Rivers. Construction was initiated in 1972 and is scheduled for completion in September 1986. The waterway will extend from the Demopolis Lock and Dam, on the Black Warrior-Tombigbee Waterway, to the Pickwick

Reservoir near the common boundary of Alabama, Tennessee, and Mississippi. The project will involve deepening 148 miles of the Tombigbee River above Demopolis by open channel work and building four new locks and dams; building a channel 44 miles long with five locks and dams, running roughly parallel to the East Fork of the Tombigbee River; and building the 40 mile long divide section, including one high lock and dam. The total length will be 232 miles.

The river section will be 9 feet deep and the canal and divide section will be 12 feet deep. The channel bottom width will be 300 feet except in the divide section where it will be 280 feet. The 10 locks will have chamber dimensions of 110 by 600 feet and have a total lift of 341 feet. The waterway will be a run-of-river system, with reservoirs mostly within the original river banks and with no storage for the regulation of river flows.

Construction was initiated at the Gainsville Lock and Dam in the fall of 1972 and completed in January 1977. The upper pool was raised in 1978, and the dredging below the dam is essentially complete. Dredging is underway in the Gainsville pool. Aliceville, Columbus, and Aberdeen Locks and Dams are currently under construction. Locks A, B, and C are underway. Test excavations in the canal section, as well as initial excavation for the Bay Springs Lock and Dam are well underway. Table 1 shows existing and authorized locks and dams in the Tombigbee-Warrior River basin.

Table 1

Navigation Locks and Dams
Tombigbee-Warrior River Basin

Project	River	River Mile 1/	Pool Elevation Lower	Pool Elevation Upper	Controlling Depth (ft)	Year Completed
Coffeeville (Jackson)	Tombigbee	117	0	33	13.0	1960
Demopolis	Tombigbee	213	33	73	13.0	1954
Gainsville	Tombigbee	263	73	109	15.0	1977
Aliceville	Tombigbee	308	109	136	15.0	1979 2/
Columbus	Tombigbee	339	136	163	15.0	1981 2/
Aberdeen	Tombigbee	371	163	190	15.0	1981 2/
Lock A	Tenn-Tom Waterway	386	190	220	15.0	1981 2/
B	Tenn-Tom Waterway	392	220	245	15.0	1981 2/
C	Tenn-Tom Waterway	402	245	270	15.0	1982 2/
D	Tenn-Tom Waterway	415	270	300	15.0	1984 3/
E	Tenn-Tom Waterway	422	300	330	15.0	1984 3/
Bay Springs	Tenn-Tom Waterway	428	330	414	15.0	1983 2/
Warrior	Warrior	261	73	95	13.2	1957
W.B. Oliver	Warrior	338	95	124	12.0	1939
Holt	Warrior	347	124	187	13.0	1966 4/
J.H. Bankhead	Warrior	366	187	255	14.0	1915 4/

1/ *Navigation mileage from foot of Government Street, Mobile, Alabama.*
2/ *Under construction, scheduled completion date.*
3/ *Scheduled completion date.*
4/ *New lock was open to navigation in 1975.*

EXISTING WATER RESOURCE DEVELOPMENTS

There are 8 existing storage reservoirs, primarily for recreation and water supply, in the basin as shown in table 2. The installed hydroelectric capacity in the basin is 242,625 kilowatts and the average annual generation is 584,700 megawatt-hours. Data on these plants are summarized in table 3. The storage reservoirs and hydroelectric powerplants are shown on figures 1 and 2.

Table 2

Existing Storage Reservoirs[1/]
Tombigbee-Warrior River Basin

Name	Owner[2/]	Stream		Drainage Area (sq mi)	Storage Capacity			
		Name	Mile		Flood Control[3/]	Hydro Power (1,000 ac-ft)	Other	Total
Lewis Smith	A.P. Co.	Sipsey Fork	14	944	281	394[5/]	996	1,671
J.H. Bankhead[4/]	A.P. Co.	Black Warrior R.	156	3,969	-	26[5/]	154	180
Holt Lock & Dam[4/]	A.P. Co.	Black Warrior R.	135	4,213	-	3.2[6/]	-	3.2
Inland Lake	C. of B.	Blackburn Fork	NA	69	-	-	NA	72
Highland Lake	H.L.C.	Blackburn Fork	NA	29	-	-	NA	9
Forest Ingram Lake	F.I.P.	Brindley Creek	NA	17	-	-	NA	5
Lake George	C. of C.	Bridge Creek	NA	5	-	-	NA	5
Bayview Lake	U.S. Steel	Village Creek	NA	69	-	-	NA	49
Upper Bear Creek	TVA	Bear Creek	NA	11	-	-	NA	37
Lake Nicol	C. of T.	Yellow Creek	NA	23	-	-	NA	7
Lake Tuscaloosa	C. of T.	North R.	6	418	-	-	NA	325
			Totals		281	423.2	1,150	2,363.2

NA - Not available

1/ Includes existing navigation locks and dams with hydropower installed, and storage reservoirs with storage capacity of 5,000 acre-feet or greater.

2/ A.P. Co. - Alabama Power Company; C. of B. - City of Burmingham; H.L.C. - Highland Lake Company; F.I.P. - Forest Ingram Poultry; C. of C. - City of Cullman; C. of T. - City of Tuscaloosa; TVA - Tennessee Valley Authority.

3/ Does not include surcharge storage.

4/ Private powerplant constructed at Federal lock and dam.

5/ Three-foot drawdown in navigation pool.

6/ Operates as a run-of-river project; one foot of drawdown is allowed. There is 600,000 acre-feet available from upstream storage.

Table 3

Existing Hydroelectric Powerplants
Tombigbee-Warrior River Basin

FERC Project Number	Plant Name	Owner	Stream		Drainage Area (sq mi)	Power Pool Elev. (ft)	Gross Head (ft)	Installed Capacity (kW)	Average Annual Energy (MWh)	Year Installed
			Name	Mile						
2165	Lewis Smith	A.P. Co[1/]	Sipsey Fork	14	944	510	232	157,500	248,200	1961
2165	J.H. Bankhead	A.P. Co.	Black Warrior R.	156	3,969	255	68	45,125	170,400	1963
2203	Holt Lock & Dam	A.P. Co.	Black Warrior R.	135	4,213	186	61	40,000	166,100	1968
						Totals		242,625	584,700	

1/ A.P. Co. - Alabama Power Company.

The Alabama Power Company's Lewis Smith project on the Sipsey Fork provides the only flood-control storage capacity in the basin. It is operated under a Federal Energy Regulatory Commission license as Project No. 2165. Under Article

33 of the license, the storage capacity between elevation 510 (maximum power pool) and elevation 522 (the crest of the spillway) must be made available for flood control use. During flood periods, when reduction of flow is necessary in view of downstream conditions, the licensee is required to restrict the outflow as specified by the Corps of Engineers down to a minimum of 2,100 acre-feet each 24-hour period. After passage of the flood peak downstream the licensee must evacuate the flood storage at a maximum rate of 21,200 acre-feet each 24 hours when pool elevations are between 522 and 513, and up to 10,600 acre-feet each 24-hour period when pool elevations are between 513 and 510. There is approximately 281,000 acre-feet of flood-control storage capacity between elevations 510 and 522. There is also an estimated 517,000 acre-feet of surcharge storage capacity between elevation 522 and the maximum flood pool elevation 540, which would be reached with the spillway design discharge. The flood control features of this project are operated in close coordination with the downstream navigation projects which are operated by the Corps of Engineers.

The operation data for the six operating fossil-fueled steam-electric plants use surface cooling water in the Tombigbee River basin are from the Second National Water Assessment dated December 1978. The total generating capacity shown in table 4 is 4,098 megawatts and average annual energy is 16,988 gigawatt-hours. The estimated cooling water consumption values are average values. The actual daily rates are dependent on power demand, temperature of the cooling water, and several other factors.

Table 4

Existing Steam-Electric Generation
and Cooling Water Requirements 1975
Tombigbee-Warrior River Basin

Plant Name	Owner	Owner Class	Installed Capacity (MW)	Generation (GWh)	Type Cooling	Source of Cooling Water	Cooling Water Use	
							With-drawal (mgd)	Consumption (mgd)
Barry	ALAP [1]	P[2]	1,771	6,819	OT[3]	Mobile R.	706	6
Chickasaw	ALAP	P	138	311	OT	Chickasaw R.	57	0
Gorgas 2	ALAP	P	379	1,740	OT	Warrior R.	184	1
Gorgas 3	ALAP	P	1,167	5,357	OT	Warrior R.	567	4
Greene County	ALAP	P	568	2,626	OT	Warrior R.	265	2
Tombigbee	ALEC [1]	P	75	135	OT	Tombigbee R.	22	0
Totals			4,098	16,988			1,801	13

1/ *ALAP - Alabama Power Company; ALEC - Alabama Electric Cooperative.*
2/ *P - privately-owned utility.*
3/ *OT - once through.*

STATUS OF HYDROELECTRIC LICENSING

At the present, there are three operating licensed hydroelectric plants in the river basin. A summary of the status of hydroelectric licensing is presented in table 5.

Table 5

Status of Hydroelectric Licensing
Tombigbee-Warrior River Basin

Project Name	FERC Project Number	Type of License or Permit and Status 1/	Expiration Date	Status of Project
John H. Bankhead	2165	MON	8/31/07	Existing
Lewis Smith	2165	MON	8/31/07	Existing
Holt Lock & Dam	2203	MON	8/31/15	Existing
Demopolis	2912	PO	12/01/82	Existing Lock & Dam
W.B. Oliver	3054	PO	10/01/82	Existing Lock & Dam
Gainsville	3058	PO	9/01/82	Existing Lock & Dam
Aliceville	3067	PO	9/01/82	Existing Lock & Dam
Coffeeville	3068	PO	10/01/82	Existing Lock & Dam
Warrior	3069	PO	10/01/82	Existing Lock & Dam

1/ *Type of License:*
MON - Major outstanding license non public;
PO - Preliminary permit outstanding.

License for Project No. 2165, consisting of the Lewis Smith and J.H. Bankhead developments, was issued to the Alabama Power Company in September 1957 for a period of 50 years.

In January 1957 a preliminary permit, Project No. 2203, was issued to the Alabama Power Company for a period of 36 months for maintaining priority of application for license for power facilities at the Holt Lock and Dam. In November 1959 an application for license was submitted by the Company. In August 1965, a license was issued to Alabama Power Company for 50 years.

FERC Project No. 2102 consists of two developments, known as the Smith's Ford and Upper Dam. The license was issued to the Warrior River Electric Cooperative Association in June 1955 for a period of 50 years. In April 1958 construction of an access road and clearing of the Smith's Ford dam site was commenced. The last recorded construction work was in June 1958. Construction was not initiated at the Upper Dam. The licensee was requested to advise the Commission by January 10, 1964, concerning the current status of financial arrangements respecting project construction. The licensee complied, and requested an extension until April 6, 1967, to complete construction of the project. The Commission authorized an extension of construction time to June 15, 1967, by order of January 31, 1964, amending Article 25 of the license. On June 26, 1967, Warrior River Electric Cooperative surrended the license.

A preliminary permit for Project No. 2190 was issued to the Warrior River Electric Cooperative Association for a period of 36 months, effective January 1,

1956, for the sole purpose of maintaining priority of application for license for a project to be located on the Mulberry Fork in the vicinity of Dorsey Creek. The Cooperative had not filed an application for license and the permit expired on December 31, 1958.

A preliminary permit for Project No. 2912 was issued to Alabama Electric Cooperative for maintaining priority of application for license of a hydroelectric plant at Demopolis Lock and Dam. Alabama Electric Cooperative also has three preliminary permit applications outstanding for Aliceville, Coffeeville, and Warrior Locks and Dams.

WATER RESOURCES PLANNING

Prior Studies and Reports

During the period 1873-1931 the Corps of Engineers submitted reports covering 36 preliminary examinations and surveys on the Tombigbee and Warrior Rivers or their major tributaries. More recent studies are summarized below.

Under the provisions of House Document No. 308, 69th Congress, 1st Session, the first comprehensive report of the Tombigbee-Warrior River basin was prepared by the Corps of Engineers and submitted to the Congress and published as House Document No. 56, 73rd Congress, 1st Session, in 1935. The report covered irrigation, flood control, hydroelectric power, and navigation, including a navigable connection with the Tennessee River. The Chief of Engineers drew the following conclusions in 1935: (1) Irrigation is not needed in the region; (2) extensive flood-control works were not then justified; (3) hydroelectric power could not be economically developed; (4) the improvement of the Tombigbee River above Demopolis or the extension of a waterway through its headwaters to connect with the Tennessee River system was not justified; and (5) the general plan for the most effective improvement of the Warrior, Black Warrior, and Tombigbee Rivers would be the provisions of a channel nine feet deep and 200 feet wide with locks 95 by 460 feet secured by the modifications of Lock and Dam No. 1, the construction of new and higher lifts to replace Locks and Dams No. 2 to 12, inclusive, and new Locks at Dams No. 13 to 17, inclusive, and the raising of the level of Lake Bankhead above Lock No. 17.

In a report printed in House Document No. 269, 76th Congress, 1st Session, 1939, the Corps of Engineers found that the waterway connecting the Tombigbee-Tennessee Rivers was justified, and recommended that its construction be undertaken by the Federal Government.

In response to several Congressional resolutions adopted in 1939, the Mobile District Office of the Corps of Engineers prepared an unpublished report on the Tombigbee River and Tributaries, under date of November 15, 1943. The District Engineer found that flood-control measures were needed and economically justified and recommended a plan of channel improvement for 27 tributaries. He found, however, that in the Warrior basin greatest benefits would accrue from a power and navigation development that did not include specific provision for flood control. He recommended a plan of development for the Warrior River and

tributaries that included construction of the Blountsville, Smith's Ford, Sayre, Hanby Mill, and Ryan Creek power storage developments, the Austin Creek run-of-river development, and a new Lock and Dam No. 13 power-navigation development. The plan also included the installation of power units at the existing Lock and Dam No. 17 and at Tuscaloosa (William Bacon Oliver), and at a proposed new navigation dam at Demopolis.

In 1945 the Federal Power Commission transmitted a staff report to the Chief of Engineers outlining the possibility of diverting up to 10,000 cubic feet per second from the Cumberland-Tennessee basins to the Tombigbee basin for power and other purposes. The proposal involved use of the Barkley (then called Lower Cumberland) project on the Cumberland River, a navigation channel from Kentucky reservoir through the divide into the Tombigbee River, and projects on the Tombigbee at the Narrows, Walkers Bridge, Ironwood Bluff, Amorey, Waverly, and Vienna sites that would produce some 352,000 kilowatts of power and provide for navigation and about 1,000,000 acre-feet of flood-control storage capacity.

In ensuing years the Commission staff analyzed several alternative plans based on modifications of the proposals made by the Mobile District Office in 1943, and in the Commission staff waterway plan of 1945. The major changes involved diversion from Pickwick Landing reservoir on the Tennessee River rather than from Kentucky reservoir, and the addition of a reservoir on Bear Creek, a tributary of the Tennessee, into which flood flows would be pumped for later diversion to the Tombigbee watershed.

In 1946, a Corps of Engineers report was published as House Document No. 486, 79th Congress, 2nd session. It also recommended that the Federal Government undertake the construction of the TennesseeTombigbee Waterway by diverting from the Tennessee at Pickwick Landing reservoir. The plan was adopted and authorized by the 1946 River and Harbor Act. Advanced planning was underway in 1951 when the House Appropriations Committee re-examined the project and concluded that it was not economically sound at the time.

As the result of resolutions adopted by the House Committee on Rivers and Harbors (1937), Flood Control (1939), and Public Works (1952), an Interim Report on Headwater Reservoirs, Warrior River, Alabama, was published as House Document No. 414, 89th Congress, 2nd Session, in 1957. The report recommended approval for an ultimate plan for the headwaters of the Warrior River consisting of the New Hope project on the Sipsey Fork; the Dorsey Creek project on the Mulberry Fork; the Smith's Ford project on the Locust Fork; an installation for power at existing Bankhead Lock and Dam (Lock and Dam No. 17); and power facilities at a new Lock and Dam No. 13, if and when built. The Chief of Engineers recommended approval of the ultimate plan and the authorization of the New Hope Dam and Reservoir and the powerplant at Dam No. 17, to be prosecuted by the Federal Government or by nonFederal interests under a license issued by the Federal Power Commission. The Commission's comments, dated 1954 and included in House Document No. 414, pointed out the desirability of the recommended projects for the comprehensive development of the basin. It was the Commission's opinion that the possibility of including other projects should be thoroughly investigated. It further recommended that the installation of gated spillways at the reservoir dams should be investigated at the definite project stage of study. Comments by the Bureau of the Budget, also included in House Document No. 414, pointed out that under the President's policies, and in the light of

the circumstances which have developed subsequent to the preparation of the report, that non-Federal interests should be encouraged to develop the resources of the basin under the provisions of the Federal Power Act.

Funds were provided by the Public Works Appropriation Act of 1957 for a restudy of the Tennessee-Tombigbee Waterway. This study was completed by the Corps of Engineer's District Office in Mobile, Alabama, in June 1960. This study re-evaluated the transportation and related water use benefits and prepared up-to-date cost estimates resulting in a benefit-to-cost ratio of 1.08 and recommended that planning studies be reinstated as promptly as possible. The study stated in part:

> "Water Power: The possibility of developing hydroelectric power at the proposed navigation dams using flow diverted from the Tennessee River was investigated in connection with previous survey reports on the Tennessee-Tombigbee project. These investigations indicate that improvement for hydro power would not be economically feasible due primarily to the fact that the dams proposed in those reports were of low head and would be drowned out a large percentage of the time. Although somewhat higher lift structures are proposed in the revised plan of improvement, the justification of installing power facilities appears questionable. The amount of power which could be developed has several limitations resulting from low head at most sites, drowning out in the river section, and restriction of flow diverted from the Tennessee River to limits tolerable to up-bound navigation in the divide cut and canal. Construction of higher dams than those proposed is limited by foundation conditions of the various sites and by the fact that by so doing, extensive fertile flood plains would be inundated. A detailed study of the power potentialities of the project is beyond the scope of this report; however, this will be done during the general design memorandum phase of advance engineering studies."

The Water Resources Planning Act of 1965 (P.L. 89-80) authorizes the Water Resources Council to maintain a continuing study of the Nation's water and related land resources and to prepare periodic assessments to determine the adequacy of these resources and to prepare periodic assessments to determine the adequacy of these resources to meet present and future requirements. The Council reported its first national assessment in 1968, which put into nationwide perspective estimates of present and future regional water and related land requirements and supplies. The Second National Water Assessment, dated December 1978, presents nationally consistent current and projected water use and supply information by regions and subregions for the United States. The second assessment found that significant achievements have been made in the past decade in preserving water and harnessing its power with a growing interest in water conservation and environmental protection; and that greater efforts are needed to insure careful management of our water resources and to solve the complex water and related land problems which still exist. A supplemental report to the second assessment, Water for Energy, provides information on

energy and related water requirements at the region and subregion level for the years 1975, 1985, and 2000, including cooling water requirements for steam-electric generation.

A two phase study to determine the advisability of improving Mobile Harbor was completed in 1980. Phase 1 was completed in 1969 and resulted in the authorization of the Theodore Ship Channel. Modifications were made and the project was reauthorized in 1976. The Phase 2 study considers enlarging the main ship channel and turning basin, providing an anchorage basin at the mouth, and providing a turning basin, a barge channel and a marshalling area near McDuffie Island.

Current and Future Studies

Mobile and Tombigbee Rivers - Deep Draft Study

The Corps of Engineers has conducted a survey to determine the advisability of extending the Mobile Harbor ship channel up the Mobile and Tombigbee Rivers to the vicinity of Jackson. The study also addressed the feasibility of constructing a barge channel from the Mobile River via Bayou Sara to the vicinity of the town of Saraland. These studies have been deferred pending further funding.

Tombigbee River and Tributaries

The Corps of Engineers is conducting a comprehensive survey to determine the advisability of further developing the water resources in the Tombigbee River basin, Mississippi and Alabama. This study deals primarily with the Tombigbee above Demopolis in the interests of flood control, power, and other purposes. Study completion is dependent on flood damage appraisals gathered during 1981 under the Tennessee-Tombigbee Corridor Study. Several non-structural flood control measures were considered. However, the only project considered with benefits exceeding costs was at Demopolis, but this project lacks the local support required for its development.

Black Warrior River and Tributaries

In 1963, the Public Works Committee of the House of Representatives authorized a comprehensive survey to determine the advisability of further developing the water resources of the Black Warrior River basin in the interests of flood control, power, and other uses. The study is presently scheduled for completion in 1981.

Tennessee-Tombigbee Corridor Study

The Corps of Engineers has been directed to provide a plan for the development, conservation and utilization of water and related land resources. A resolution adopted April 11, 1974, by the Committee on Public Works, U.S. House of Representatives, authorized a study of 18 counties along the TennesseeTombigbee Waterway. An earlier resolution adopted October 12, 1972, by the House Public Works Committee authorized a study of the waterways impact on Mobile and Baldwin Counties, Alabama. The most recently adopted resolution, April 25, 1978, named 16 counties to be included in the study as requested in the 1974 resolution.

Accordingly, the Chief of Engineers was given discretionary authority to add counties impacted by the development of the waterway. The study was initiated in 1977 and a final plan of study was approved in January 1980. Study goals are 1) plan for development and utilization of the water and related land resources 2) contribute to an economic development plan for the area 3) contribute to the development of human resources and 4) contribute to the maintenance and enhancement of environmental quality. Work is currently underway on all four objectives and study completion is scheduled for January 1985.

The National Hydropower Study

The U.S. Army Corps of Engineers is currently conducting a detailed assessment of the nation's hydroelectric resources as part of the National Hydroelectric Power Study authorized by section 167 of the Water Resources Development Act of 1976 (P.L. 94-587). The study is designed to provide a current and comprehensive estimate of the potential for incremental or new generation at existing dams and other water resources projects, as well as for undeveloped sites in the United States. In addition, the study will address the demand for hydroelectric power, and will investigate various related policy and technical considerations to determine the incentives, constraints and impacts of developing hydropower to meet a portion of our future energy demands. When complete in 1981, the effort will provide a more detailed evaluation of the nation's hydroelectric resources, and will serve as a framework for future planning and development of this important renewable energy source.

Wild and Scenic Rivers

The West Fork of the Sipsey Fork including its tributaries, from the impoundment formed by Lewis M. Smith Dam upstream to its source in the William H. Bunkhead National Forest, was authorized for study under the National Wild and Scenic Rivers Act, Section 5a, as amended (P.L. 93-621). The studies have been completed by the Forest Service and are being reviewed for submission to Congress. The study recommends qualified segments of the river for inclusion into the system.

POTENTIAL WATER RESOURCE DEVELOPMENTS

Developed and undeveloped sites where additional hydroelectric power facilities could be installed are shown in table 6 and on figure 2. The most likely sites for hydroelectric development are the existing lock and dam facilities. Alabama Electric Cooperative has a Preliminary Permit for Demopolis, Gainsville and Aliceville Locks and Dams, and has submitted applications for Preliminary Permits at Coffeeville, W.B. Oliver, and Warrior Locks and Dams. Of the existing storage reservoirs with no hydropower presently installed, shown on table 2, there are only two sites, Forest Ingram Lake and Lake Tuscaloosa having potential installed capacities of more than three megawatts. The other undeveloped sites, Blountsville, Austin Creek, Smiths Ford, Sayre, and Dorsey Creek, were identified by the Corps as part of the overall development of the Warrior River. However, no authorizations or definite plans have been made for additional hydroelectric development in the basin.

POTENTIAL WATER RESOURCE DEVELOPMENTS

Table 6

Potential Water Resource Developments
Tombigbee-Warrior River Basin

Project Name	Stream Name	Stream Mile	Gross Head (ft)	Drainage Area (sq mi)	Installed Capacity (kW)	Storage Capacity: Flood Control	Storage Capacity: Hydro Power (1,000 ac-ft)	Storage Capacity: Other	Storage Capacity: Total	Normal Maximum Pool Elev. 1/ (ft)	Average Annual Generation (MWh)
Blountsville (Upper Dam)	Locust Fork	502 2/	154	274	20,000	-	393	67	460	760	40,000
Austin Creek	Locust Fork	98 2/	93	295	7,300	-	NA	NA	15	606	25,000
Smiths Ford	Locust Fork	475 2/	183	575	115,200	73	508	319	900	513	84,300
Sayre	Locust Fork	36	49	872	30,800	-	NA	NA	79	335	37,000
Forest Ingram Lake	Bridley Creek	NA	NA	17	20,700	-	NA	NA	5	NA	47,000
Dorsey Creek	Mulberry Fork	53	135	550	63,000	170	420	1,505	2,095	403	61,000
Lake Tuscaloosa (North River)	North R.	6 2/	146	418	14,000	-	500	235	735	270	51,000
W.B. Oliver L & D	Black Warrior R.	338 2/	28	4,830	16,000	-	3/	-	-	124	60,000
Warrior L & D	Black Warrior R.	261 2/	23	5,800	10,000	-	3/	-	-	95	35,000
Aliceville L & D	Tombigbee R.	308 2/	27	NA	10,000	-	3/	-	-	136	27,000
Gainsville L & D	Tombigbee R.	263 2/	36	NA	15,000	-	3/	-	-	109	52,000
Demopolis L & D	Tombigbee R.	213 2/	38	15,300	30,000	-	3/	-	-	73	100,000
Coffeeville L & D	Tombigbee R.	117 2/	34	18,600	16,000	-	3/	-	-	33	55,000
				Totals	367,000	243	1,821	2,125	4,289		674,300

NA - Not available
1/ Normal Maximum Power Pool Elevation.
2/ Distance from foot of Government Street, Mobile, Alabama.
3/ Run-of-river projects with no storage for regulation of river flows.

There are no retired hydroelectric projects in the Tombigbee-Warrior River basin.

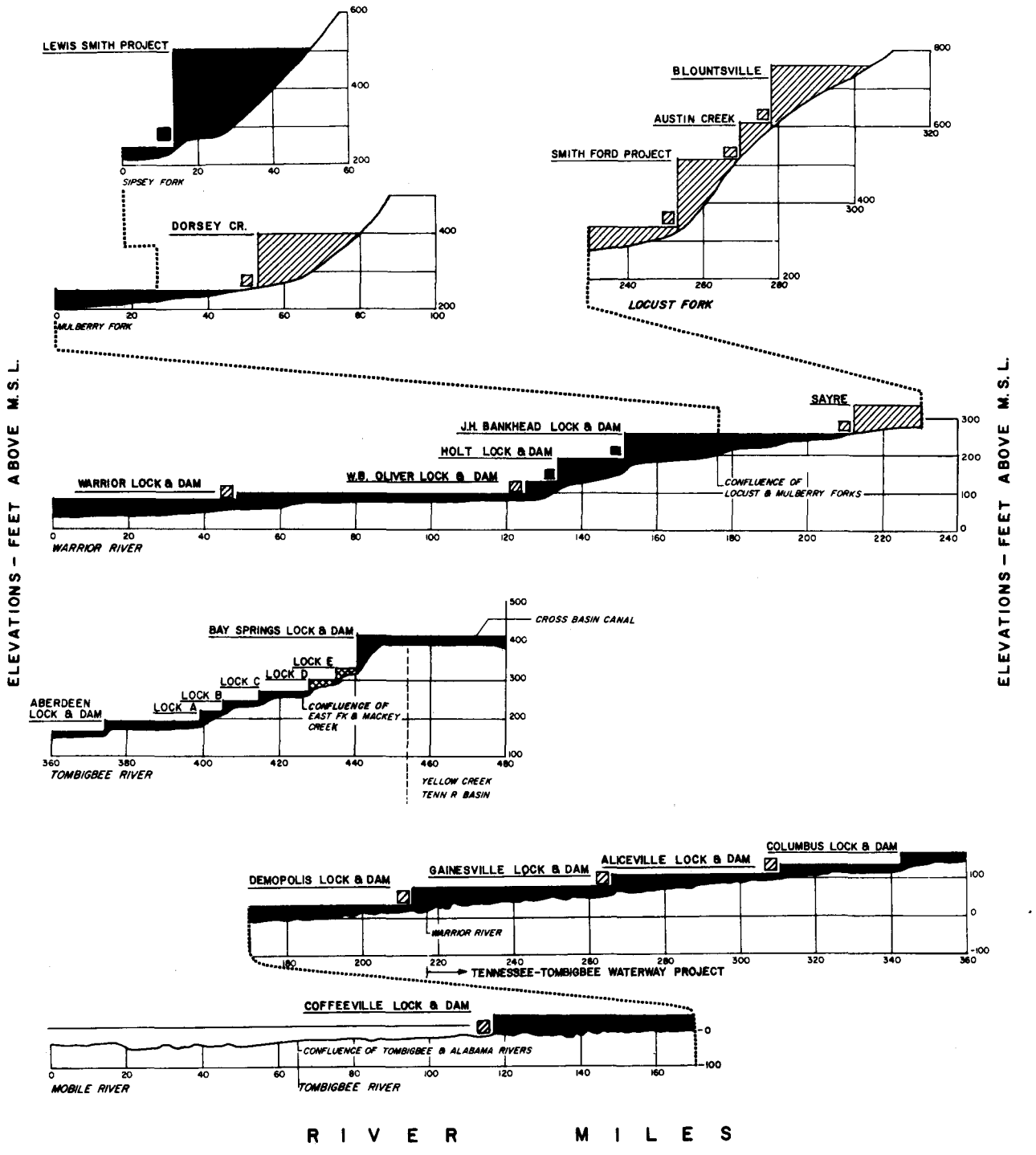
Currently, there are no rivers in the basin designated as part of the National Wild and Scenic Rivers System under Section 2a or 3a. However, in addition to the stream segment authorized for study under Section 5a (Sipsey Fork, West Fork), the Heritage Conservation and Recreation Service has identified several river segments which appear to have potential for further consideration for the National Wild and Scenic Rivers System. These segments include 96 miles of the Buttahatchie Creek, 38 miles of the Chickasaw, 90 miles of the Locust Fork, 39 miles of the Sipsey Fork and Borden Creek, and 146 miles of the Sipsey and New Rivers.

The projected steam-electric generating capacity and cooling water needs in the basin area are listed in table 7. This data is based on projections from the Second National Water Assessment of the Water Resources Council for steam-electric generating plants with installed capacities of 25,000 kilowatts or more.

Table 7

Projected Cooling Water Requirements
Tombigbee-Warrior River Basin

Year	Capacity (MW)	Generation (GWh)	Cooling Water: Withdrawal (mgd)	Cooling Water: Consumption (mgd)
1985	6,615	26,192	1,962	28
2000	6,615	11,708	878	14



LEGEND

STATUS	RESERVOIR	POWERPLANT
EXISTING OR UNDER CONSTRUCTION		
AUTHORIZED		
POTENTIAL		

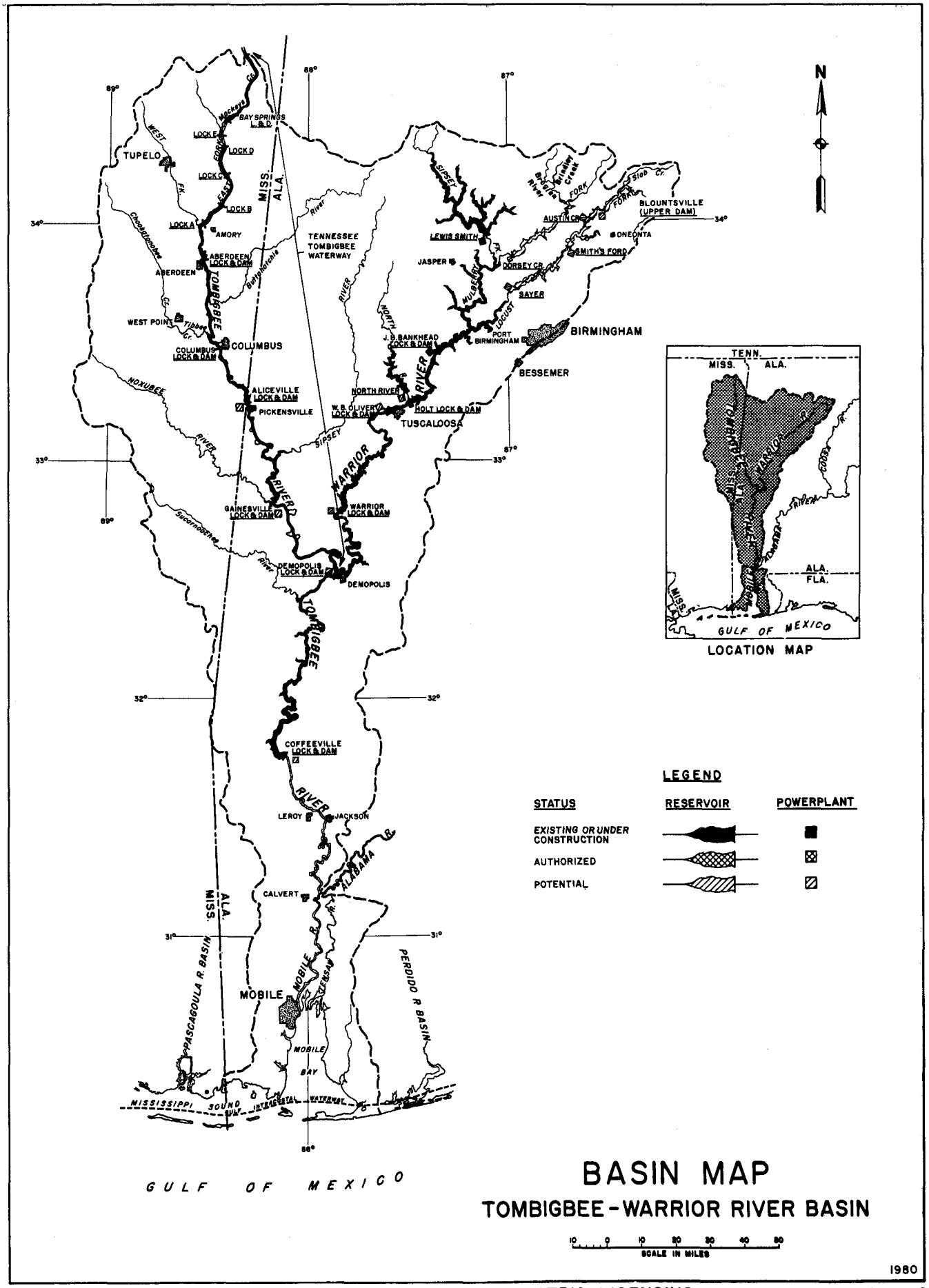
PROFILES

TOMBIGBEE-WARRIOR RIVER BASIN

1980

FERC-WATER RESOURCES APPRAISALS FOR HYDROELECTRIC LICENSING

Figure 1



FERC-WATER RESOURCES APPRAISALS FOR HYDROELECTRIC LICENSING

Figure 2

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