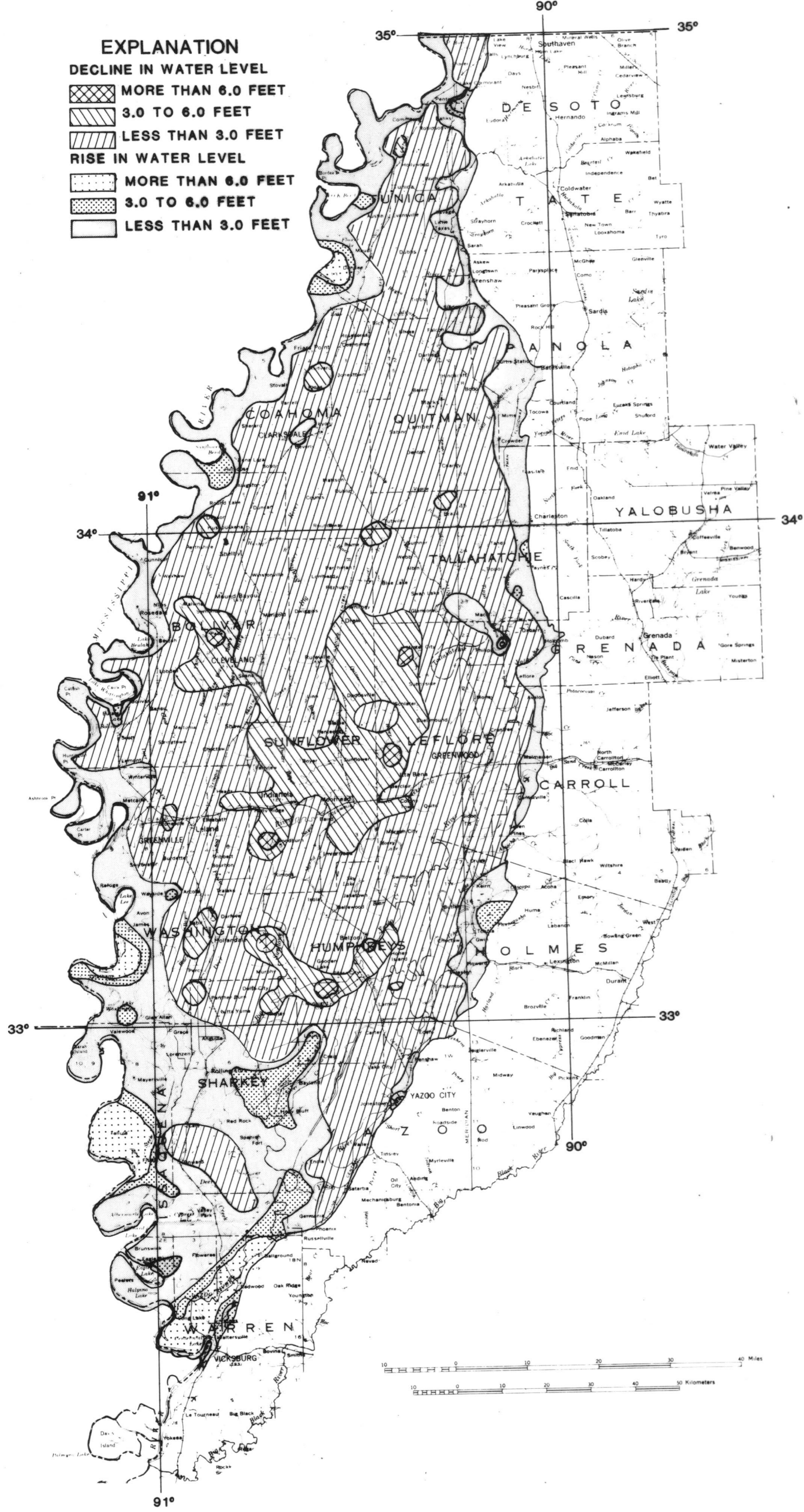


**WATER-LEVEL CHANGE
APRIL 1981-APRIL 1982**



Water-Level Change April 1981-April 1982

COUNTY	DECLINES IN WATER LEVELS			RISE IN WATER LEVELS			TOTAL
	MORE THAN 6.0 FT.	3.0 TO 6.0 FT.	LESS THAN 3.0 FT.	LESS THAN 3.0 FT.	3.0 TO 6.0 FT.	MORE THAN 6.0 FT.	
BOLIVAR		6	41	1	3	2	53
CARROLL				6			6
COAHOMA	1	16	4				21
DE SOTO		2		1	1	1	4
GRENADE		1	1				2
HOLMES	1	2	4	2	2		9
HUMPHREYS	2	4	17		1		24
ISSAQUEUA		3	6	3	2		14
LEFLORE	3	8	30	5			46
PANOLA		1	7	1			9
QUITMAN		15	5	1	1		22
SHARKEY	3	7	3	1			14
SUNFLOWER	1	11	18				30
TALLAHATCHE		2	13	4	1	1	21
TUNICA	1	13	3	3	3		23
WARREN	1	1	3	2	12		19
WASHINGTON	1	5	20	6	2		34
YAZOO	1	10	6	2			19
TOTAL	8	43	210	64	21	24	370

INTRODUCTION

The alluvial plain of the Mississippi River in northwestern Mississippi includes about seven thousand square miles of farmland in the lower part of the Yazoo River basin. "The Delta", as the area is commonly called, extends from near Memphis, Tennessee south to Vicksburg, Mississippi and is bordered on the west by the Mississippi River and on the east by the Bluff Hills.

The hydrologic maps were prepared by the U.S. Geological Survey in cooperation with the Mississippi Bureau of Land and Water Resources, using water-level measurements made in about 500 wells in the alluvial aquifer in April 1981, September 1981 and April 1982. The water-level map is based on water-level altitudes in observation wells and on some stream stages. The water-level change maps are based on changes in water levels from April 1981 through April 1982 and from September 1981 through April 1982. This report shows changes in water levels and water-level altitudes in an area where large quantities of ground water are withdrawn for irrigating rice and other crops, aquaculture, and industrial use.

ALLUVIAL AQUIFER

The aggrading Mississippi River deposited about 140 feet of clay, silt, sand, and gravel in layers to form the flood plain. The alluvial aquifer, commonly composed of about 120 feet of sand and gravel, is overlain by about 20 feet of clay and silt. Clay, silt, and fine sand, make up the upper, less permeable part of the aquifer. Sand and gravel make up the highly permeable lower part of the aquifer that ranges in thickness from less than 50 feet, to more than 150 feet. The aquifer is thin near the eastern edge of the Delta and in some areas along the Mississippi River. Because of the thickness and high permeability of the lower sand and gravel part of the aquifer, the Mississippi River valley alluvium yields large quantities of water to wells. Large irrigation wells that pump as much as 2,000 gallons per minute are common in the area.

The principal sources of recharge to the aquifer are believed to be precipitation on the land surface and infiltration from streams and lakes. The Mississippi River is the principal source of recharge in the western part of the Delta. The low water levels in April 1982 throughout the central part of the Delta may have resulted from the drought conditions that continued from the summer of 1980 through April 1982 and from heavier pumping. Water levels in wells in the alluvium respond to precipitation, changes in stream stage, and to pumping.

**WATER-LEVEL CHANGE MAP
APRIL 1981-APRIL 1982**

The water-level change map for April 1981 through April 1982 shows that ground-water levels declined over most of the area, but rose in some areas near the Bluff Hills and along the Mississippi and Yazoo Rivers. The hydrograph of the Mississippi River shows higher river stages for 1982 which account for higher water levels along the western edge of the Delta. Of the 370 wells measured in April 1981 and April 1982, water levels declined in 261 wells, increased in 109 wells, and averaged 0.52 feet lower in April 1982 than in April 1981. Water levels averaged about 2.0 feet lower in April 1982 in the areas of decline in the interior of the Delta. The declines ranged from near zero to about 16 feet. The largest declines occurred in areas of heavy pumping for aquaculture.

The number of wells in which water levels increased and decreased are given for each county in Table 1.

**WATER-LEVEL CHANGE MAP
SEPTEMBER 1981-APRIL 1982**

The water-level change map for September 1981 through April 1982 shows that during that period ground-water levels generally rose throughout the Delta. Water levels rose more than three feet in some areas along the Bluff Hills and near the Mississippi and Yazoo Rivers, reflecting recharge from these sources. Water levels declined less than one foot in the central Delta.

APRIL 1982 WATER-LEVEL MAP

The water-level map showing the approximate altitude of ground-water levels in the alluvial aquifer in April 1982 indicates that water levels generally were higher along the Bluff Hills, along the Mississippi River, and in the extreme southern part of the Yazoo basin where water levels are affected by backwater from the Mississippi River. Ground-water movement in the Delta is generally southward, but locally movement is into cones of depression, or into streams.

The large area of relatively low water levels in Humphreys and Washington counties is an area where the aquifer is heavily pumped year-round for aquaculture. The smaller cones of depression at Yazoo City and Clarksdale are due to heavy pumping for industrial use.

ADDITIONAL INFORMATION

The map showing the results of the April 1982 water-level measurements is the fourth of a series of semi-annual maps showing seasonal ground-water levels in the alluvial aquifer of the Delta. Data describing the individual wells used in this study may be obtained from the following:

Charles Branch, Director
Mississippi Department of
Natural Resources
Bureau of Land and Water
Resources
Post Office Box 10631
Jackson, Mississippi 39209
(601) 961-5200

Gerald G. Parker, Jr.
District Chief
U.S. Geological Survey
Water Resources Division
Suite 710, Federal Building
100 West Capitol Street
Jackson, Mississippi 39269
(601) 960-4600

Copies of this report can be purchased from:

Open-File Services Section
Western Distribution Branch
U.S. Geological Survey
Box 25425, Federal Center
Lakewood, Colorado 80225
(303) 234-5888

SELECTED REFERENCES

Bettendorff, J. M., and Leake, S. A., 1976, Water for industrial and agricultural development in Attala, Holmes, Humphreys, Issaquena, Sharkey, and Yazoo Counties, Mississippi: Mississippi Research and Development Bulletin, 49 p.

Dalsin, G. J., 1978, Water for industrial and agricultural development in Bolivar, Carroll, Leflore, Sunflower, and Tallahatchie Counties, Mississippi: Mississippi Research and Development Bulletin, 41 p.

Darden, Daphne, 1981, Water-level map of the Mississippi Delta alluvium in northwestern Mississippi, April 1981: U.S. Geological Survey Water-Resources Investigations 81-1123.

1982, Water-level maps of the alluvial aquifer, northwestern Mississippi, September 1981: U.S. Geological Survey Water-Resources Investigations 82-574.

Harbeck, Earl, Jr., Golden, H. G., and Harvey, E. J., 1961, Effect of irrigation withdrawals on stage of Lake Washington, Mississippi: U.S. Geological Survey Water-Supply Paper 1460-I, 388 p.

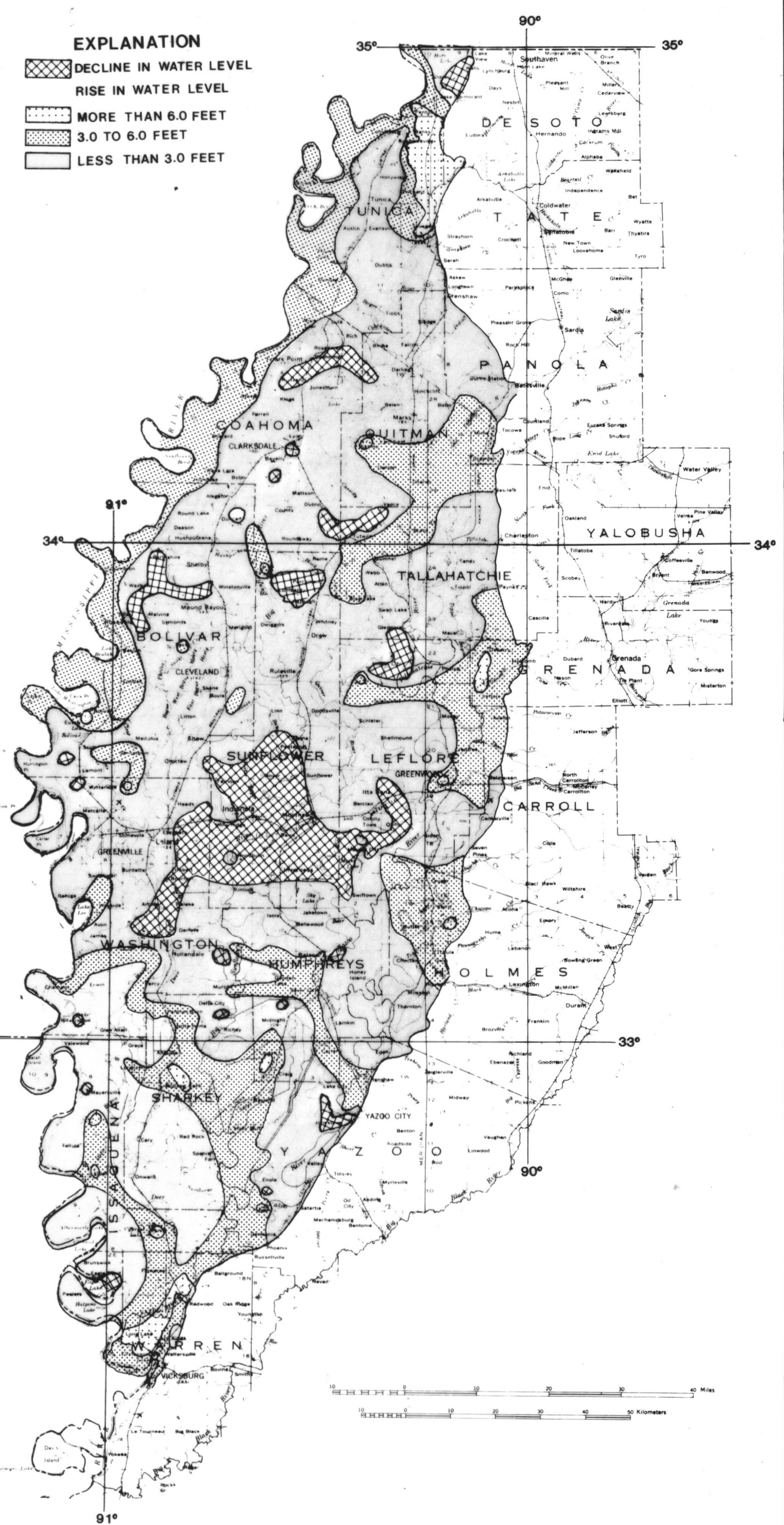
Taylor, R. E., and Thomson, F. H., 1971, Water for industry and agriculture in Washington County, Mississippi: Mississippi Research and Development Bulletin, 21 p.

Wasson, B. E., 1980, Water-level map of the Mississippi Delta alluvium in northwestern Mississippi, September 1980: Bureau of Land and Water Resources Map 80-1.

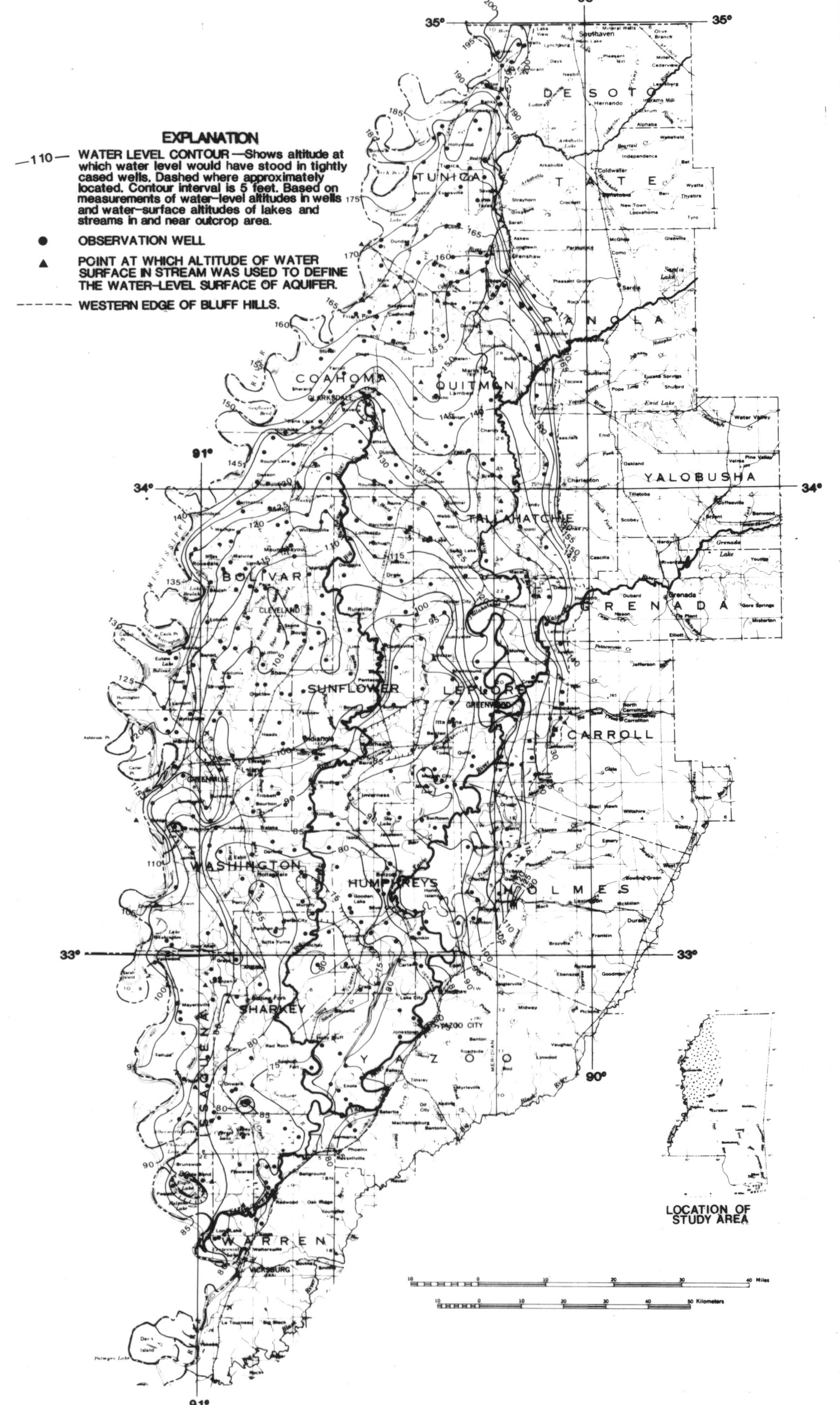
The inch-pound units used in this report may be converted to metric units by the use of the following conversion factors.

To convert	Multiply	To obtain
inch-pound units	by	metric units
inch	25.40	millimeter
foot	0.3048	meter
square mile	2.590	square kilometer
gallon per minute	0.06309	liter per second

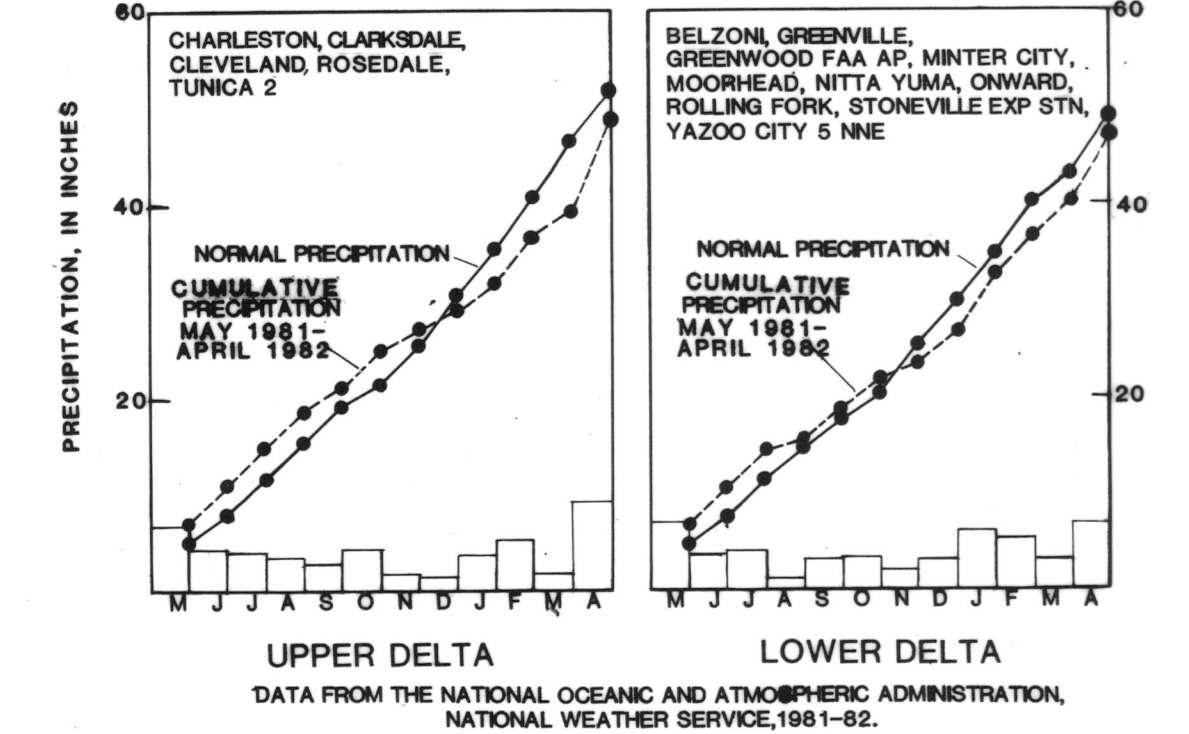
**WATER-LEVEL CHANGE
SEPTEMBER 1981-APRIL 1982**



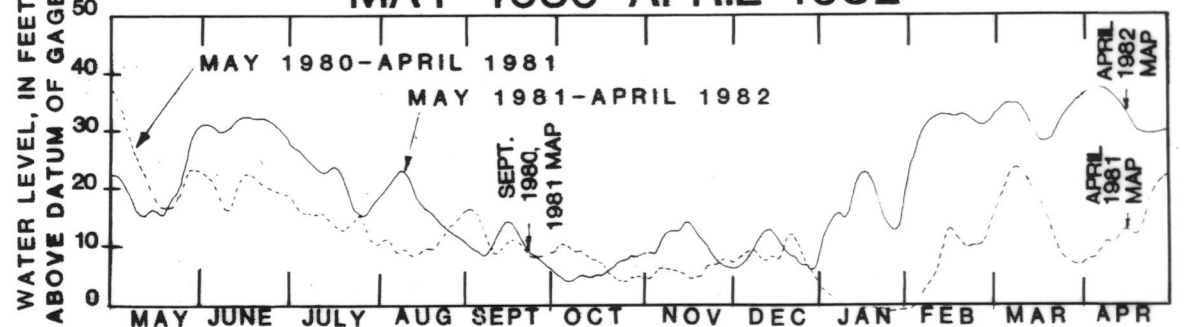
Water-Level Change September 1981-April 1982



PRECIPITATION-UPPER AND LOWER DELTA



**STAGE OF THE MISSISSIPPI RIVER
VICKSBURG, MISSISSIPPI
MAY 1980-APRIL 1982**



WATER-LEVEL MAPS OF THE ALLUVIAL AQUIFER, NORTHWESTERN MISSISSIPPI APRIL 1982

Base maps modified from U.S. Geological Survey Map of Mississippi, Scale 1:1,000,000, 1972

BY DAPHNE DARDEN
U.S. GEOLOGICAL SURVEY