

LEVEL III

12

TRINITY RIVER PROJECT, TEXAS

AD A 097 127

STATUS REPORT OF ENVIRONMENTAL EVALUATIONS

**APPENDIX A
PLATES AND PHOTOGRAPHS**



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U.S. ARMY ENGINEER DISTRICT, FORT WORTH

CORPS OF ENGINEERS

FORT WORTH, TEXAS

JUNE 1975

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-4097127	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Status Report of Environmental Evaluations, Trinity River Project, Texas.		5. TYPE OF REPORT & PERIOD COVERED Environmental evaluation
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) U. S. Army Engineer District, Fort Worth		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS U. S. Army Engineer District, Fort Worth P. O. Box 17300 Fort Worth, Texas 76102		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS U. S. Army Engineer District, Fort Worth P. O. Box 17300 Fort Worth, Texas 76102		12. REPORT DATE June 1975
		13. NUMBER OF PAGES Three volumes
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) NA		15. SECURITY CLASS. (of this report) Unclas
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release; distribution unlimited		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Environmental status report Trinity River Authority Trinity River Project, Texas		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Three volume status report of environmental evaluation of Trinity River Project. This includes (1) Authorized Project Plan that provides for flood control, recreation, water supply, navigation, fish and wildlife programs, hydroelectric power and the Multiple-purpose Channel (2) National Economic Development Plan that is similar to the Authorized Project Plan, but has many features that delete adverse effects to natural resources to reduce cost. (3) Environmental Quality Plan that is a nonstructural multiple-purpose plan of no action in regard to navigation and hydroelectric power for the Corps of Engineers. It		

20. proposes land use regulations for the entire Trinity River flood plain and proposes water conservation in lieu of added development for increasing the water supply. (4) No Action Plan (5) Authorized Project Plan Without Navigation that includes flood control, reservoir regulation channel, strengthen existing agricultural levees, and enlarge Tennessee Colony Lake. This plan reduces some of the adverse effects on natural resources. (6) Authorized Project Plan Without Navigation, Provisions for Future Navigation. This is the same as the previous plan except providing for navigation in the initial stages of design and construction. (7) Authorized Project Plan, Navigation Terminated Downstream from Dallas. Similar to Authorized Project Plan except for the flood control channel. Tax and bond issues were rejected by voters. Congress directed Corps of Engineers to cease further planning for fiscal year 1974 and 1975.

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DTIC TAB	<input type="checkbox"/>
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<u>Plate No.</u>	<u>Title</u>
1	Basin Comprehensive Water Development Plan
2.1	Dallas Floodway Extension Plan of Improvement
2.2	Dallas Floodway Plan of Improvement
2.3	West Fork and Tributaries Plan of Improvement
2.4	West Fork and Tributaries Plan of Improvement
3	Trinity River Project Flood Plain Sections Showing Multiple-Purpose Channel
4	Tennessee Colony Lake Map (River Mile 341.7)
5	Multiple-Purpose Channel Profile
6	Basin Geology and Physiography
7	Topographic Map
8.1	Areal Geology
8.2	Areal Geology
8.3	Areal Geology
8.4	Areal Geology
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10	Ground Water Aquifers
11	Soil Classification and Distribution
12	Basin Agricultural Land Use Potential
13	Trinity Basin Land Use
14	Trinity Basin Climatology
15.1	Water Quality Parameters-Dissolved Oxygen

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15.1	Water Quality Parameters-Dissolved Oxygen

<u>Plate No.</u>	<u>Title</u>
15.2	Water Quality Parameters-BOD
15.3	Water Quality Parameters-Ammonia
15.4	Water Quality Parameters-Nitrite
15.5	Water Quality Parameters-Nitrate
15.6	Water Quality Parameters-Orthophosphate
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15.8	Water Quality Parameters-Specific Conductance
15.9	Water Quality Parameters-Chlorides
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30	Typical Lock (Gravity Type) and Dam
31.1	Multipurpose Channel Profile (with major relocations)

Plate No.

Title

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32	Navigation Lock Operation
33	Galveston Bay Oyster Reefs and Nursery Areas

TRINITY RIVER PROJECT
Environmental Statement, Appendix 1

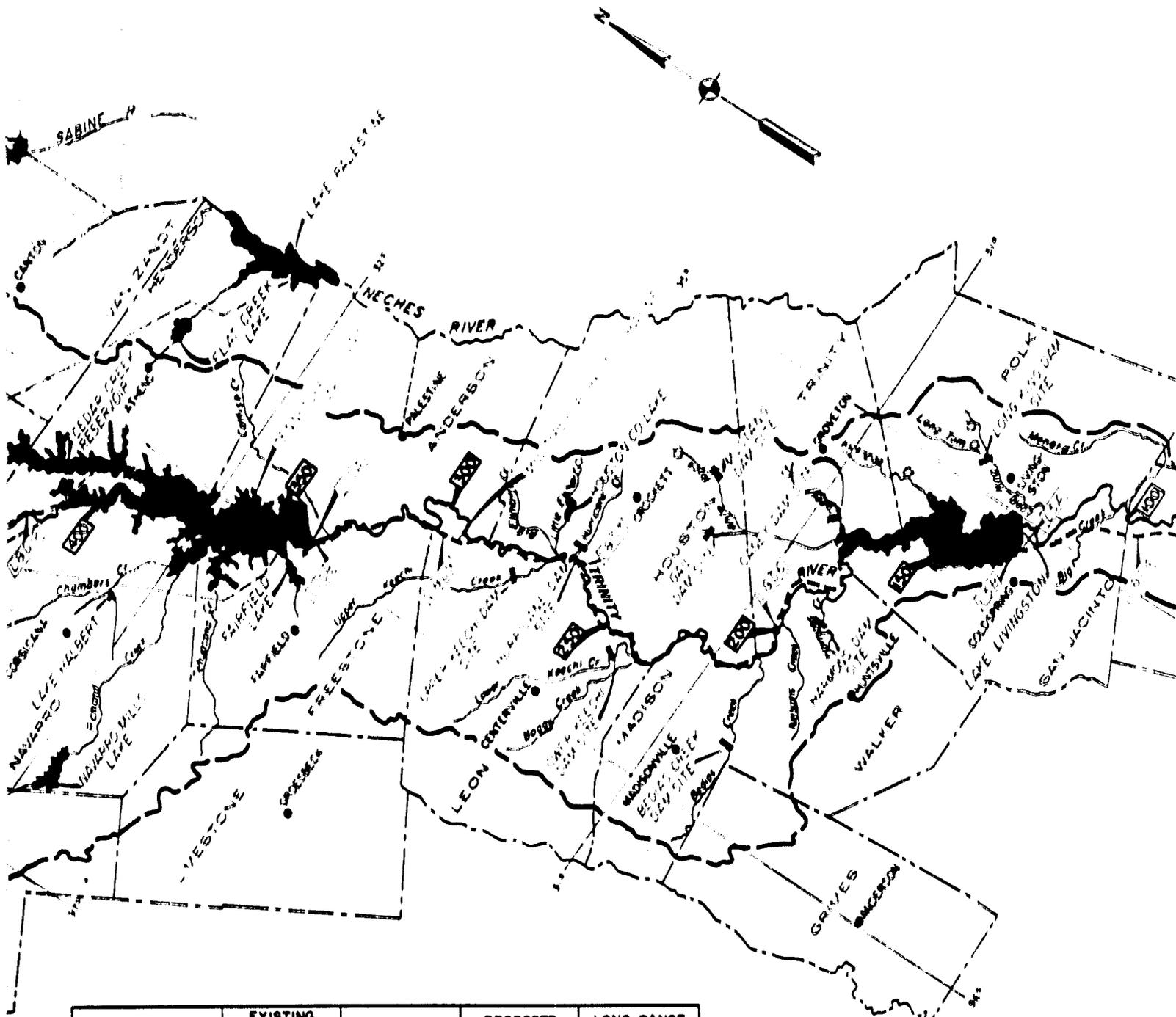
List of Photographs

<u>Photograph No.</u>	<u>Subject</u>
1	Anahuac, Texas
2	Heron-Egret Rookery
3	Coastal Industrial Water Authority and Dayton Canals
4	Port of Liberty, Texas
5	Knight's Forest Residential Development
6	Old River Lake Residential Development
7	Flooded Development below Lake Livingston Dam
8	Development on Lake Livingston Shoreline
9	Eastham Prison Farm
10	Electric Generating Plant - Fairfield, Texas
11	Lignite Strip Mining Operation
12	Lignite Strip Mining Operation
13	Flooding in Proposed Tennessee Colony Lake Area
14	Electric Generating Plant - Trinidad, Texas
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19	Lion Country Safari - Grand Prairie
20	Urban Flood Plain Cropland
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List of Photographs

<u>Photograph No.</u>	<u>Subject</u>
22	Confluence of Clear Fork and West Fork of Trinity River - Fort Worth
23	Verdigris River Navigation Channel, Oklahoma
24	Newt Graham Lock & Dam, Verdigris River, Oklahoma





PROJECTS	EXISTING OR UNDER CONSTRUCTION	AUTHORIZED	PROPOSED TRINITY RIVER PROJECT	LONG RANGE DEVELOPMENT PLAN
LAKES				
LOCKS & DAMS			(L&D ?)	
DAM SITES				
FLOODWAYS				
CHANNELS				
PIPELINES				

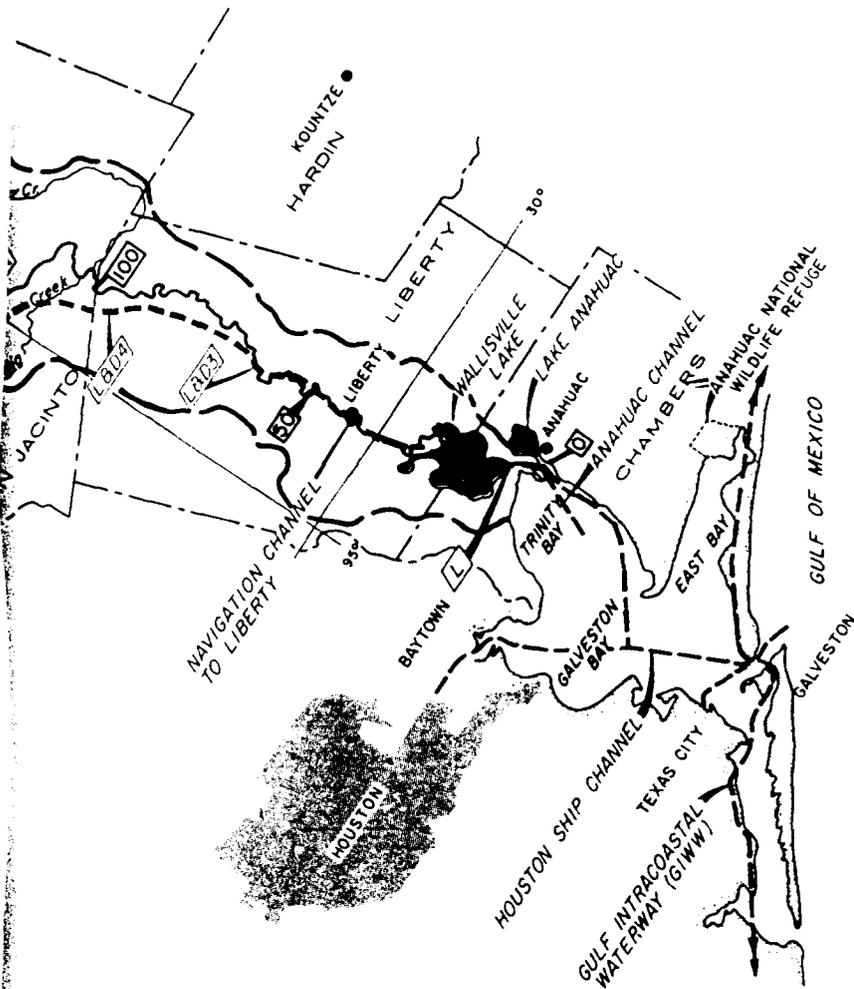
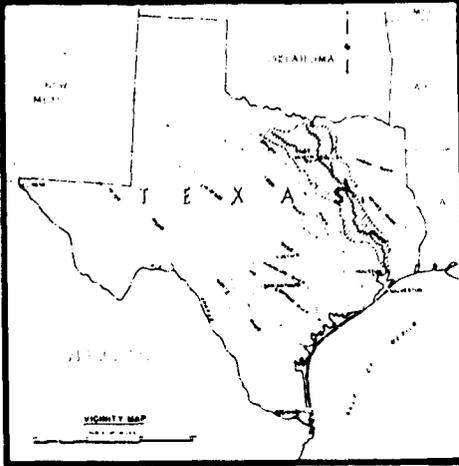
LEGEND

- COUNTY SEAT
- TRINITY WATERSHED BOUNDARY
- RIVER MILE
- COUNTY LINE
- LEVEE DISTRICT
- NAVIGATION LOCK & DAM NUMBER

SCALE OF MILES

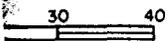


* MULTIPLE PURPOSE CHANNEL FOR NAVIGATION & FLOOD CONTROL (MIN 12' x 850')



BOUNDARY

DAM NUMBER



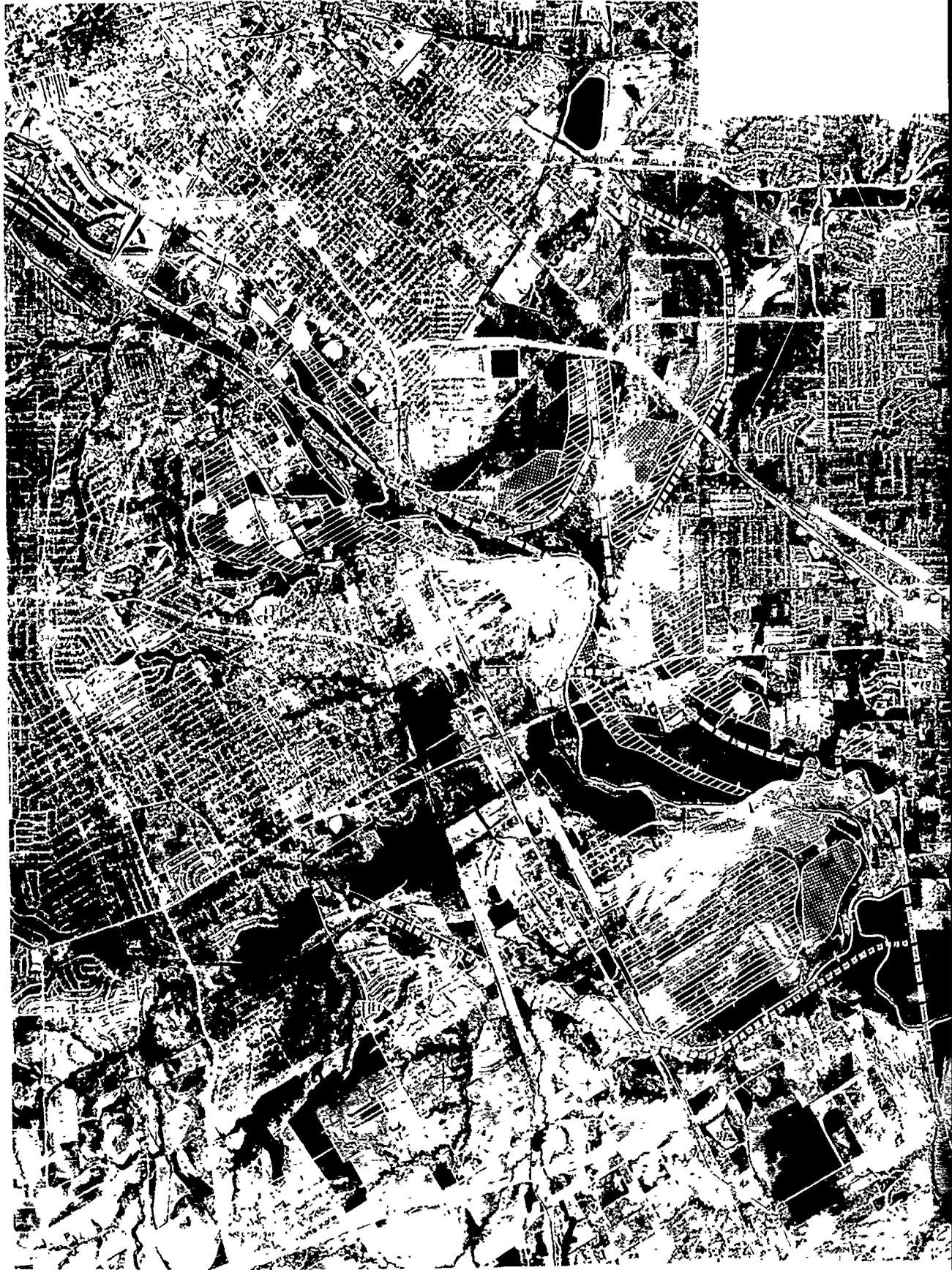
TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
 BASIN COMPREHENSIVE
 WATER DEVELOPMENT PLAN

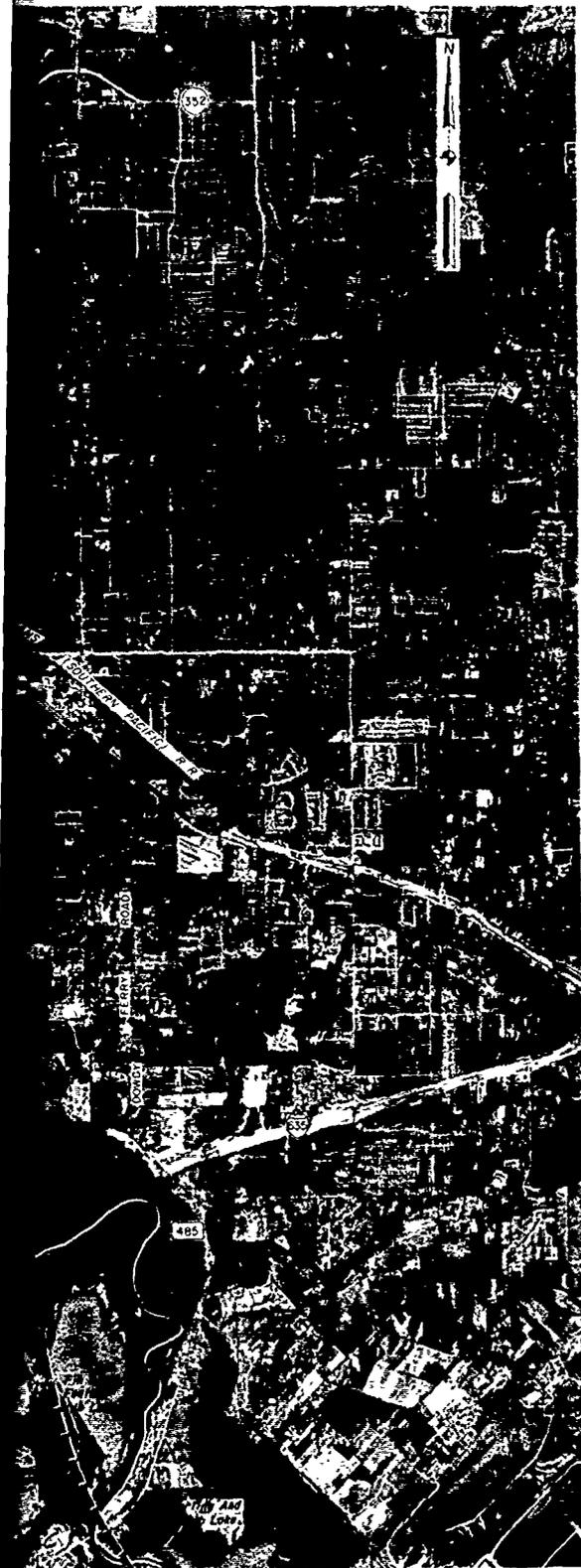
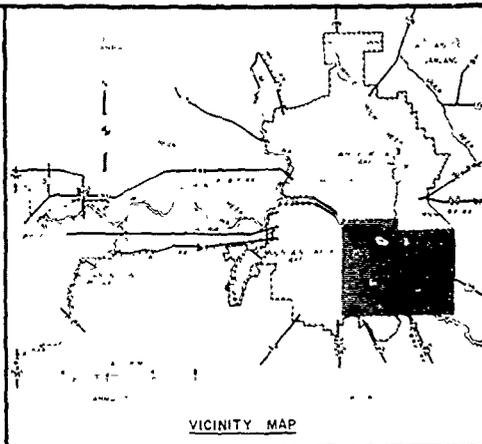
U. S. ARMY ENGINEER DIST., FORT WORTH

TO ACCOMPANY ENVIRONMENTAL STATEMENT

PLATE I

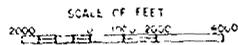
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L F G E N D

- ▬▬▬▬▬▬ MULTIPLE PURPOSE CHANNEL
- ▬▬▬▬▬▬ FLOOD CONTROL CHANNEL
- +—+—+— LEVEE ALIGNMENT
- W — W — W — EXISTING RIVER CHANNEL
- · — · — · — · — FILL AREA
- · — · — · — · — SUMP AREA
- 320 CHANNEL MILEAGE
- 490 RIVER MILEAGE

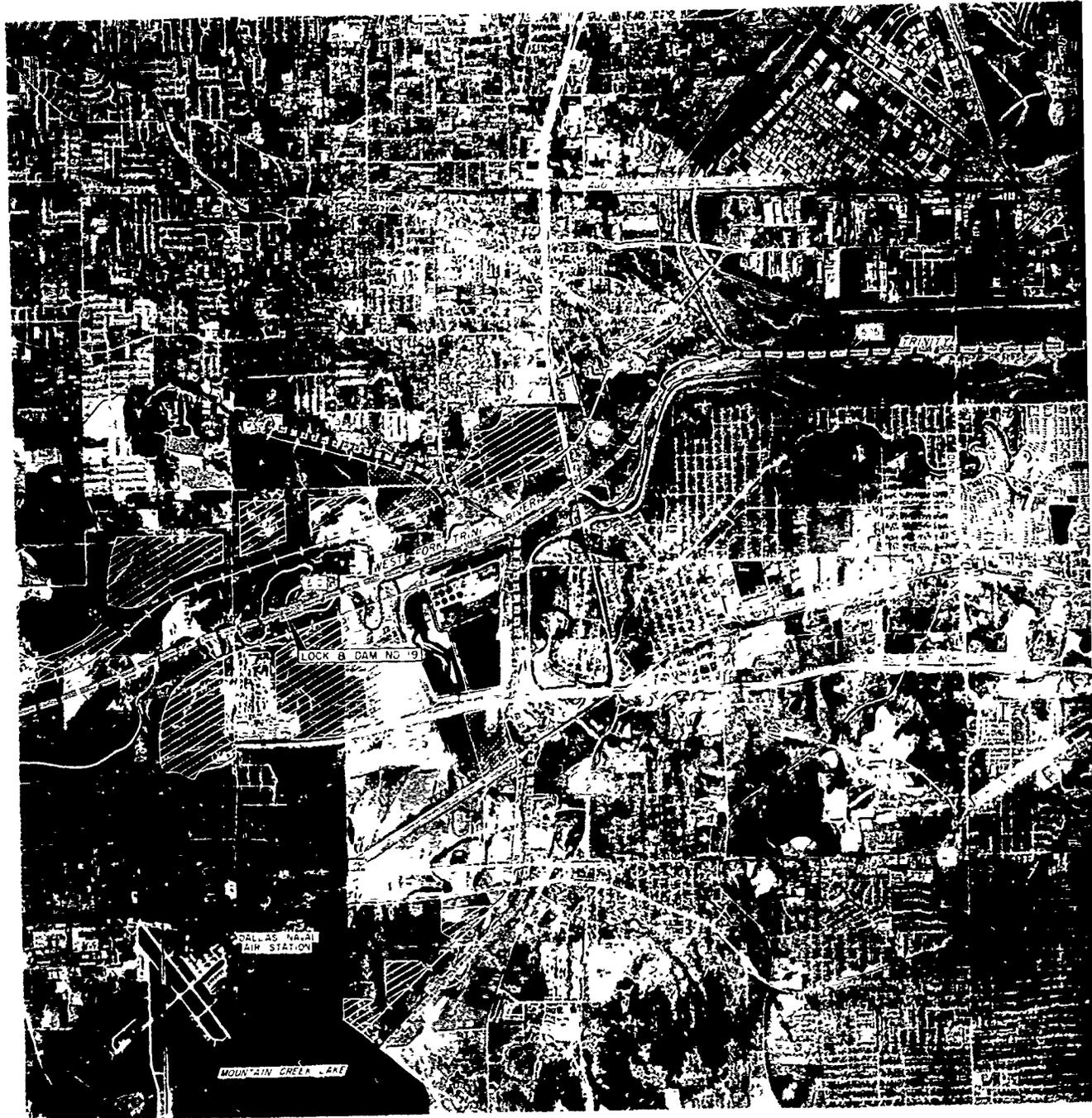


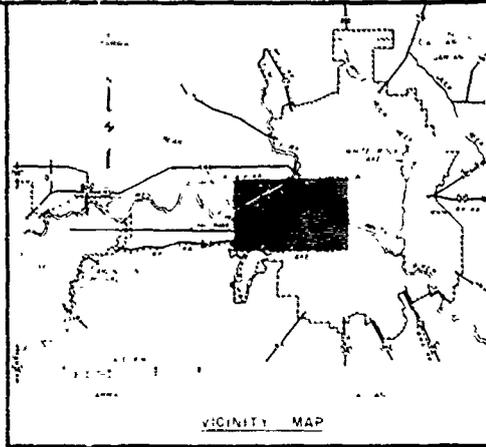
TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
MULTIPURPOSE CHANNEL PLAN
DALLAS FLOODWAY EXTENSION

U S ARMY ENGINEER DISTRICT, FORT WORTH

T. M. WARD ENVIRONMENTAL STATEMENT

PLATE 21





LEGEND

- ▬▬▬▬▬ MULTIPLE PURPOSE CHANNEL
- ▬▬▬▬▬ FLOOD CONTROL CHANNEL
- +—+—+— LEVEE ALIGNMENT
- — — — — EXISTING RIVER CHANNEL
- ■ ■ ■ ■ FILL AREA
- ○ ○ ○ ○ SUMP AREA
- ③③③ CHANNEL MILEAGE
- ④④④ RIVER MILEAGE

SCALE

TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT

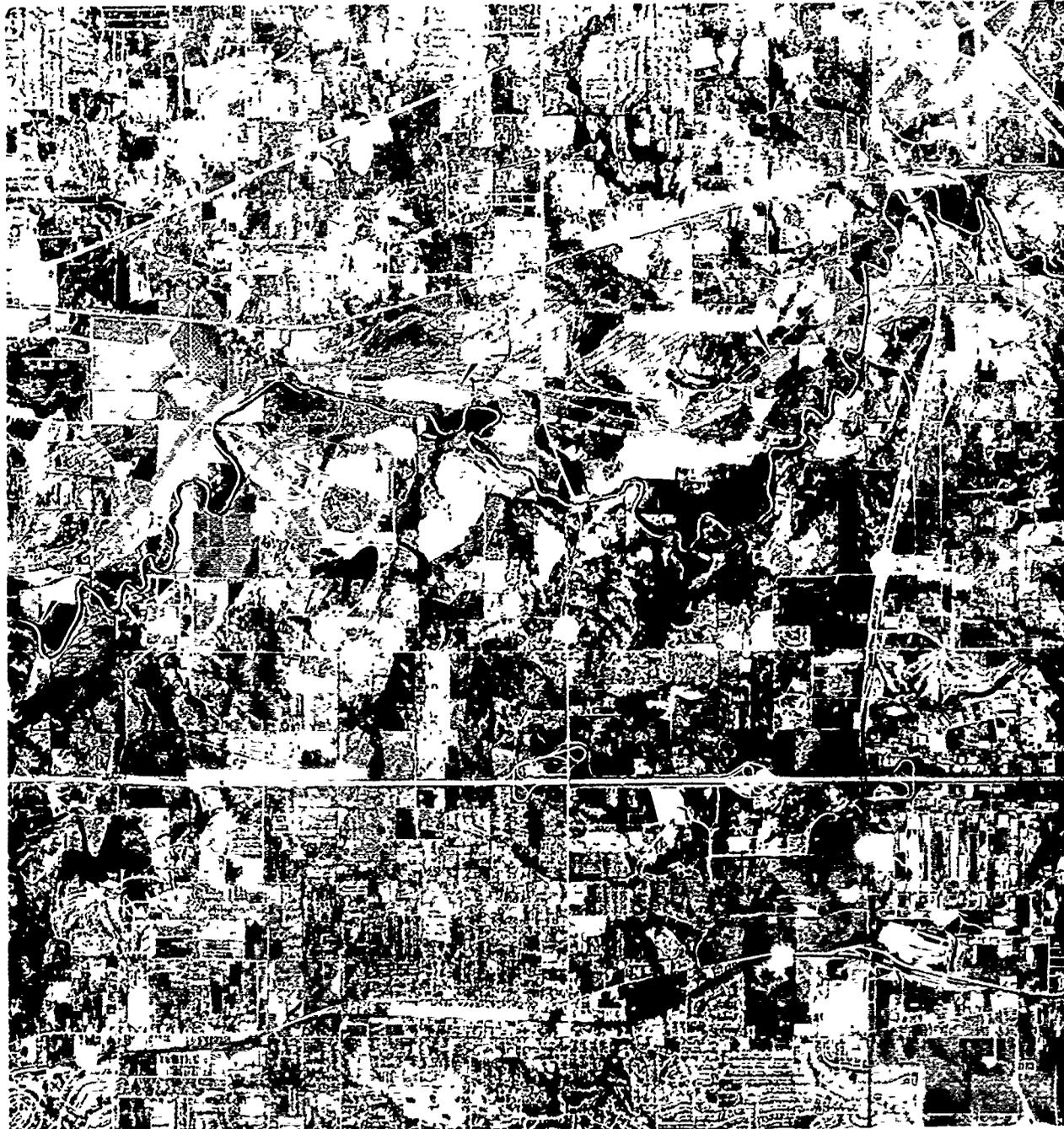
**MULTIPURPOSE CHANNEL PLAN
 WEST FORK FLOODWAY**

U.S. ARMY ENGINEER DISTRICT, FORT WORTH

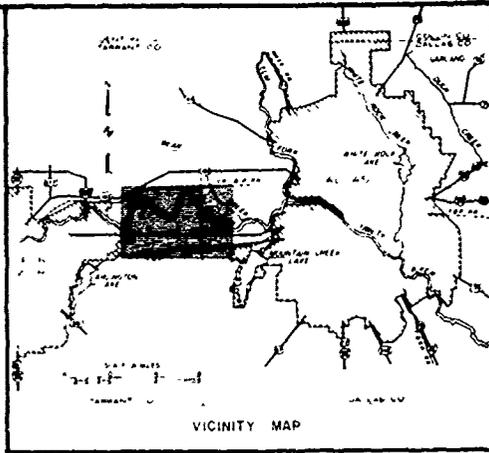
DATE OF ISSUE: 1964

PLATE 22

J

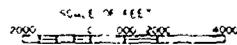


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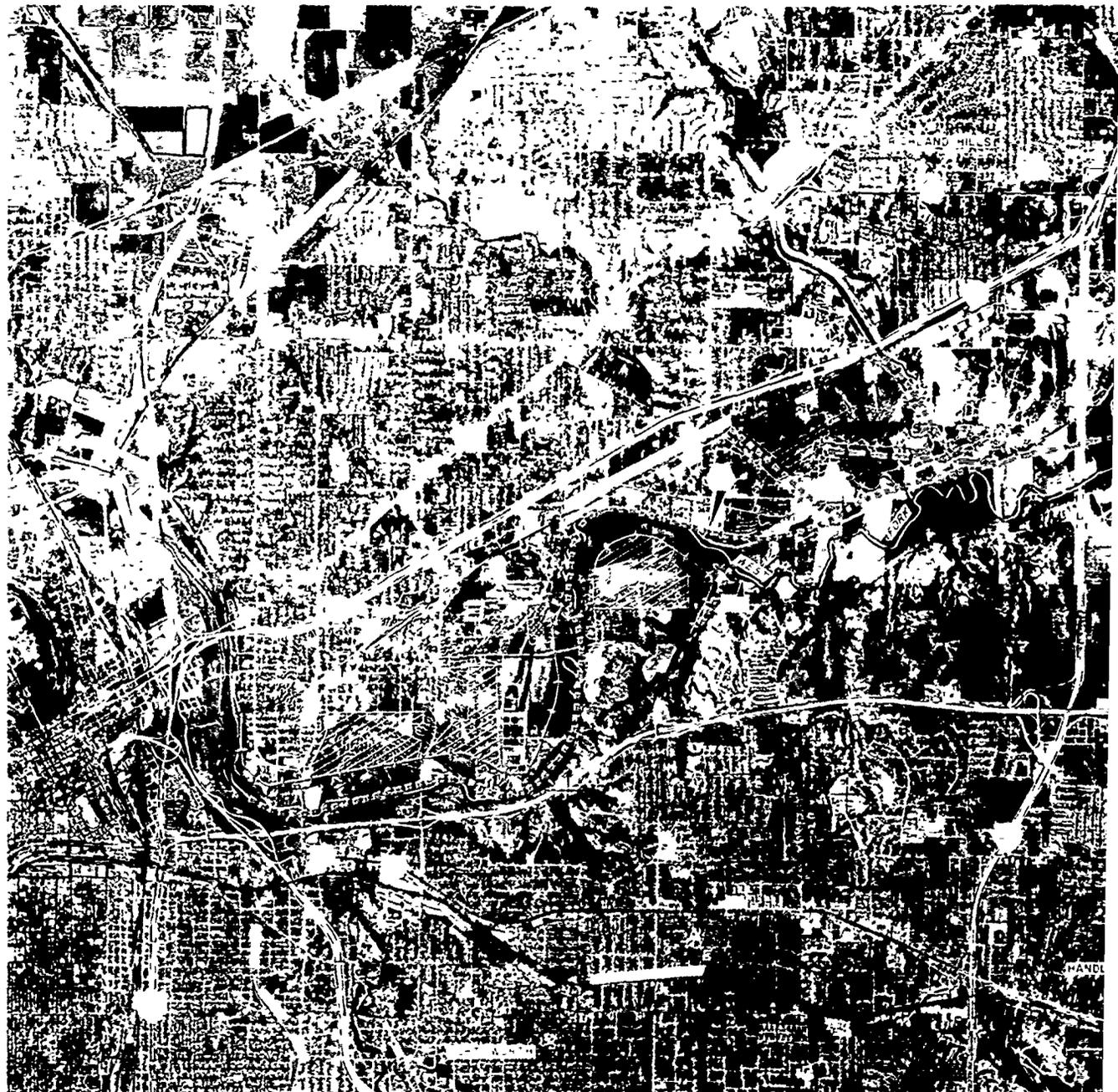
LEGEND

- MULTIPLE PURPOSE CHANNEL
- FLOOD CONTROL CHANNEL
- LEVEE ALIGNMENT
- EXISTING RIVER CHANNEL
- FILL AREA
- SUMP AREA
- CHANNEL MILEAGE
- RIVER MILEAGE

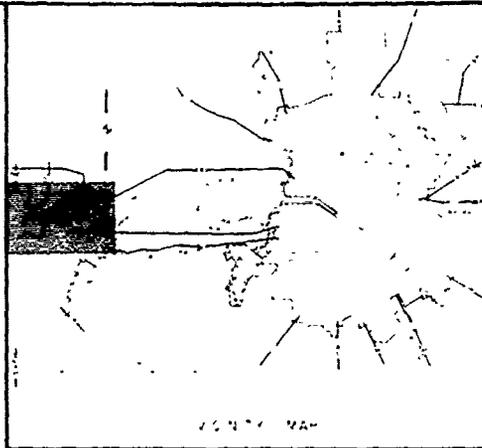


TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
MULTIPURPOSE CHANNEL PLAN
 WEST FORK FLOODWAY
 U.S. ARMY ENGINEER DISTRICT, FORT WORTH
 WATER AND ENVIRONMENTAL STATEMENT

PLATE 23



1

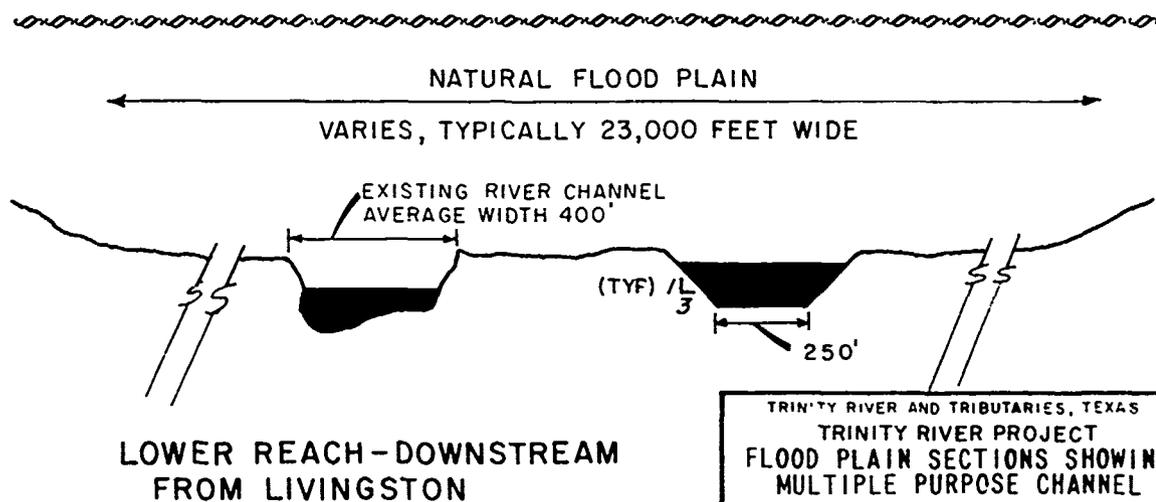
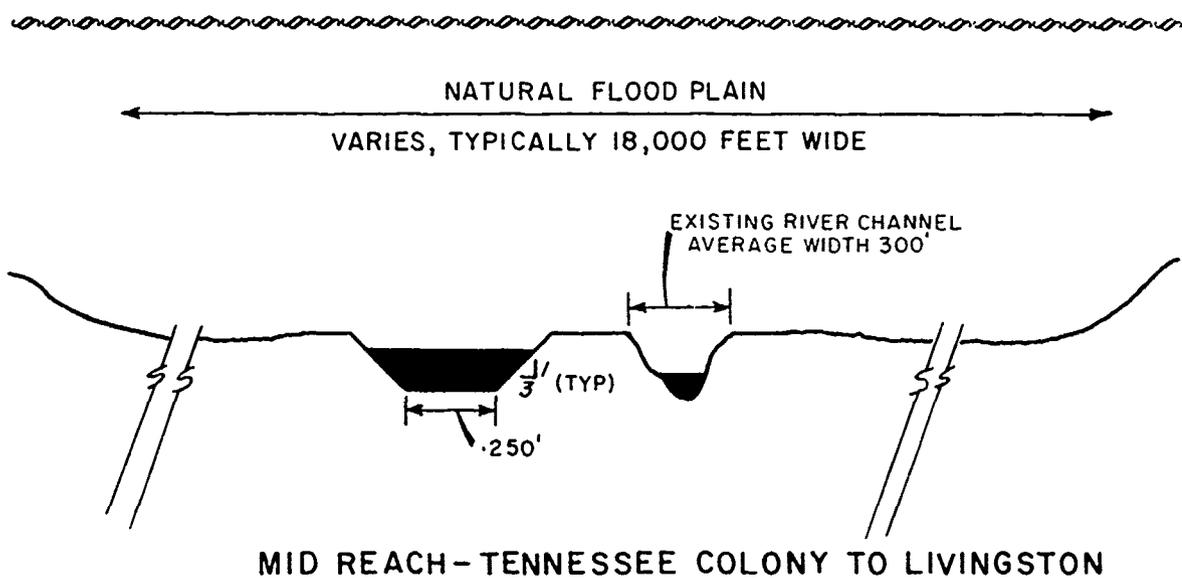
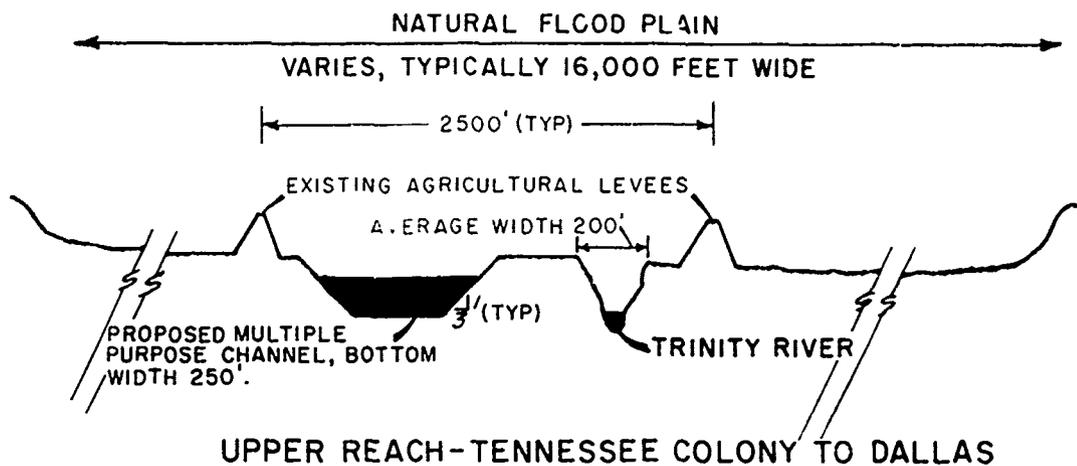


LEGEND

- — — — — MULTIPLE PURPOSE CHANNEL
- — — — — FLOOD CONTROL CHANNEL
- + — + — ELEV. ALIGNMENT
- — — — — EXISTING RIVER CHANNEL
- ▭ FILL AREA
- ▭ TEMP. AREA
- — — — — CHANNEL MILEAGE
- — — — — RIVER MILEAGE

TRINITY RIVER AT TUBAHAMIE, TEXAS
 TRINITY RIVER PROJECT
MULTIPURPOSE CHANNEL PLAN
 WEST FORK FLOODWAY
 U.S. ARMY ENGINEER DISTRICT, FORT WORTH

2



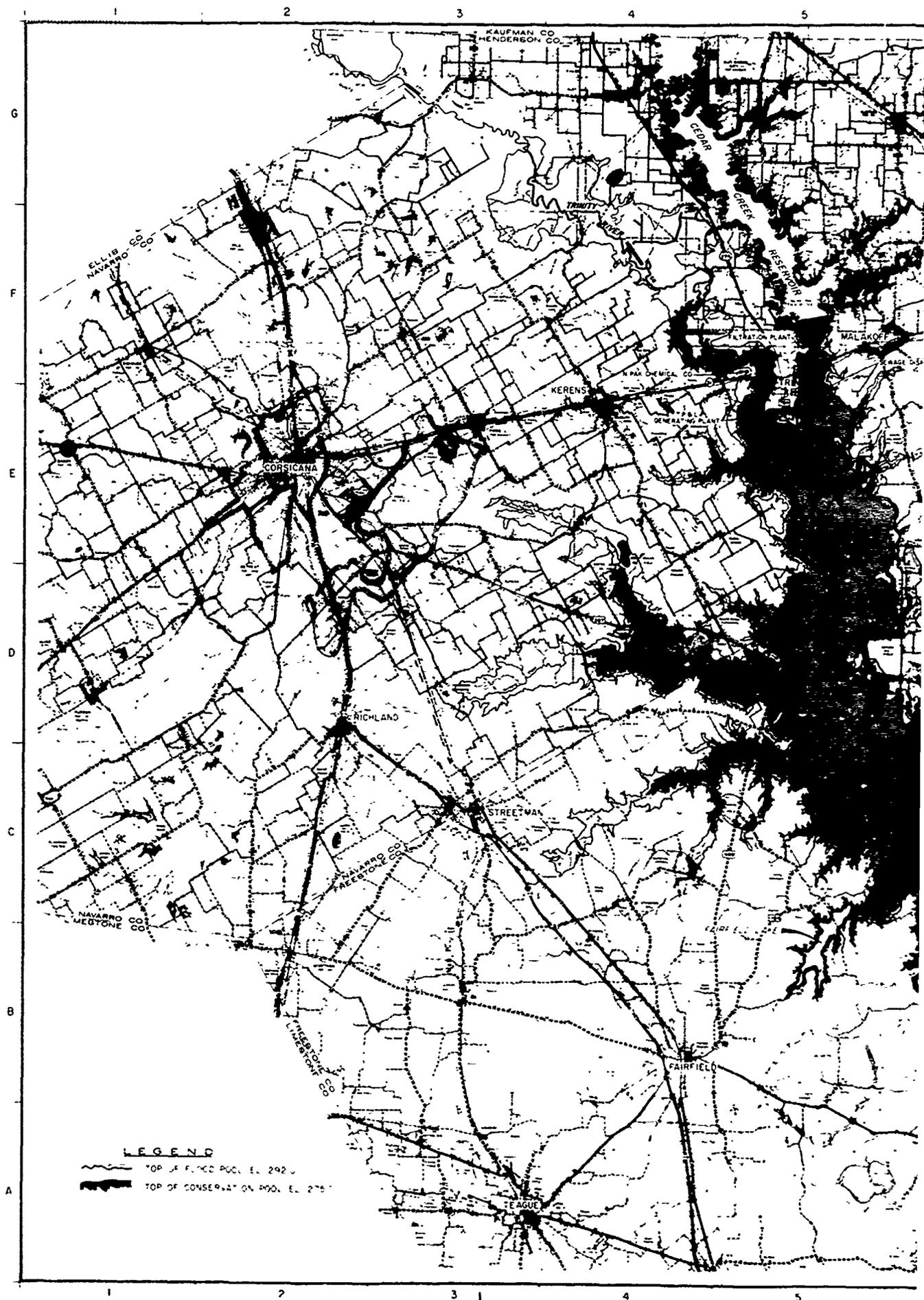
NOTE:

DETAILED DIMENSIONS FOR THE MULTI-PURPOSE CHANNEL ARE SHOWN ON PLATE 27.

TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT
FLOOD PLAIN SECTIONS SHOWING
MULTIPLE PURPOSE CHANNEL

U.S. ARMY ENGR. DIST., FT. WORTH

TO ACCOMPANY ENVIRONMENTAL STATEMENT



LEGEND

-  TOP OF FLOOD POND, E. 292
-  TOP OF CONSERVATION POND, E. 275

KAUFMAN CO
HENDERSON CO

ELLIS NAVARRO CO

TRINITY RIVER

CECILIA RIVER

RESERVOIR

PLANTATION PLANT

MALAKOFF

KERENS

NAVARRO CO

GENERATING PLANT

NAVARRO CO

MEDWINE CO

NAVARRO CO

FREESTONE CO

STREETMAN

CECILIA RIVER

FAIRFIELD

CEAGUE

1 2 3 4 5

G

F

E

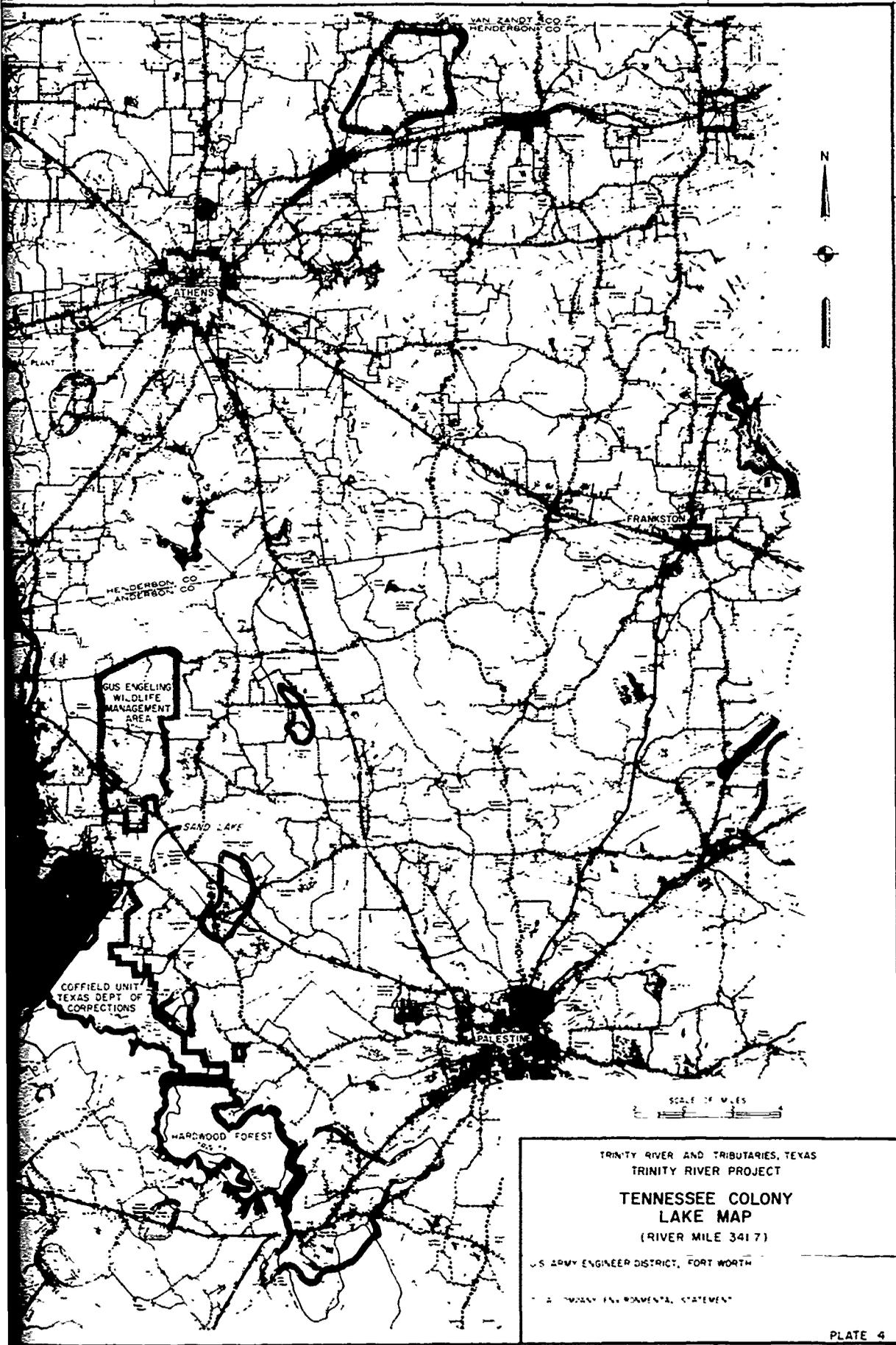
D

C

B

A

6 7 8 9 10



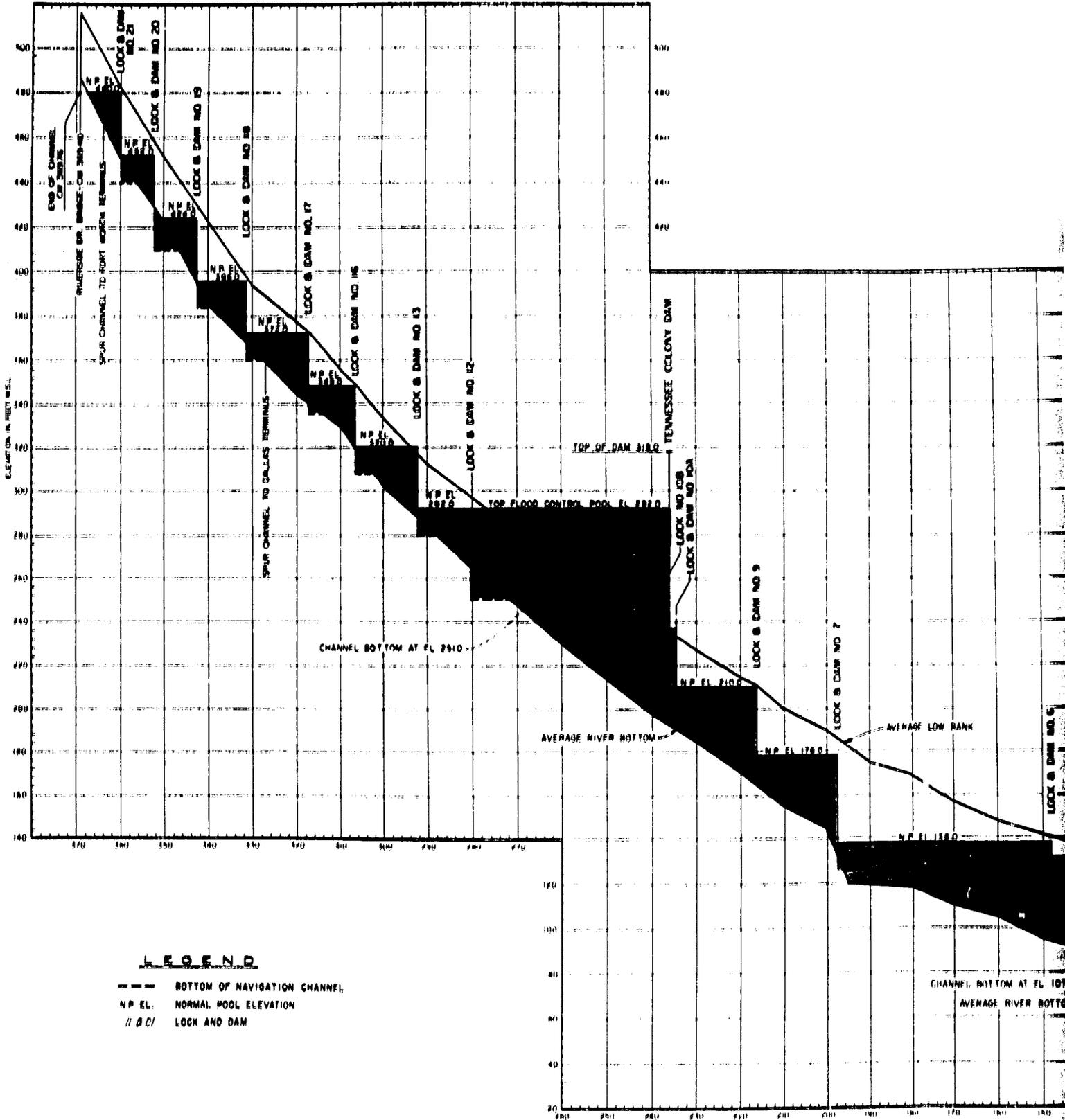
SCALE OF MILES
 0 1 2 3 4

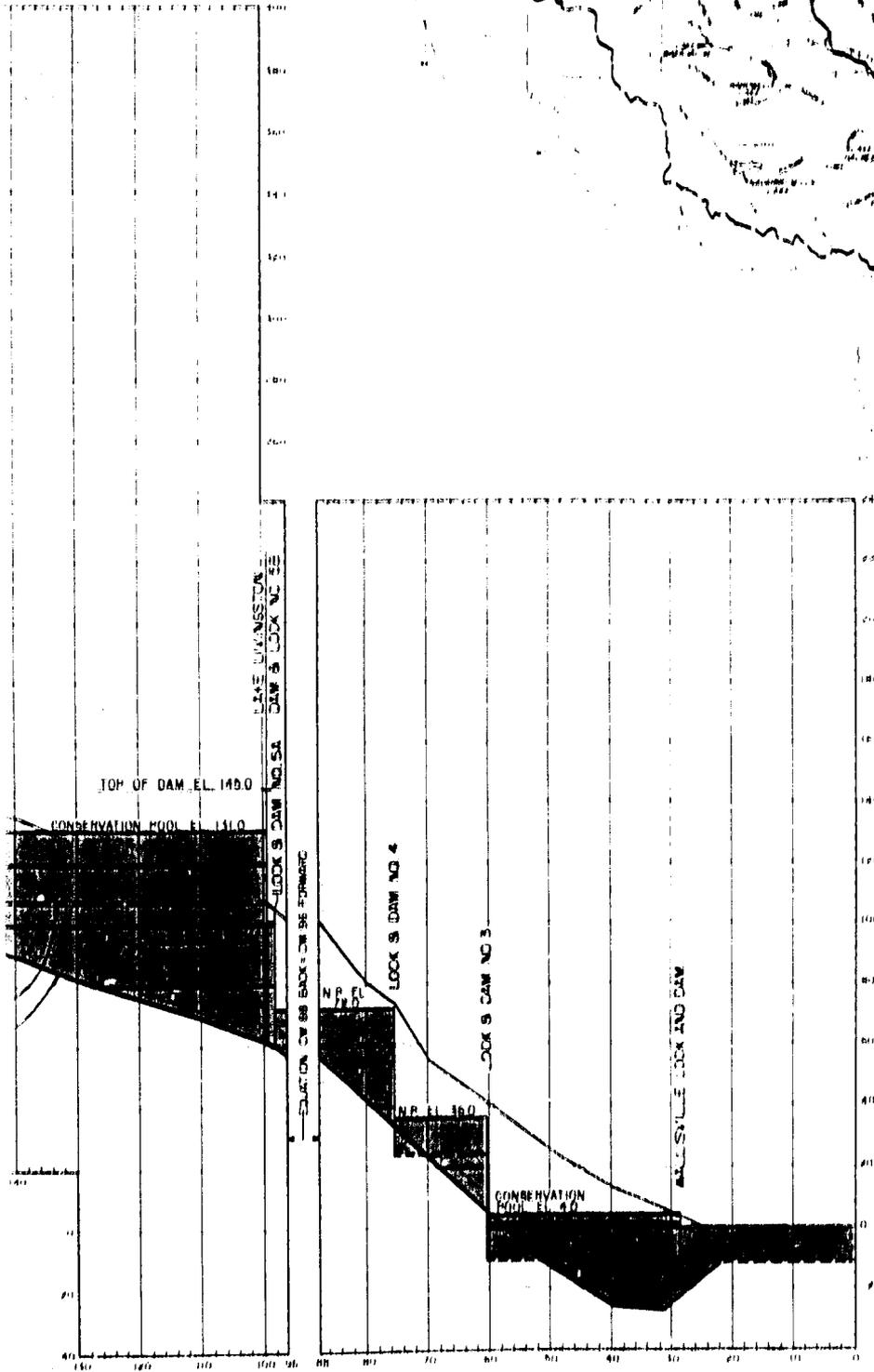
TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
**TENNESSEE COLONY
 LAKE MAP**
 (RIVER MILE 341.7)

U.S. ARMY ENGINEER DISTRICT, FORT WORTH

"WATER ENVIRONMENTAL STATEMENT"

6 7 8





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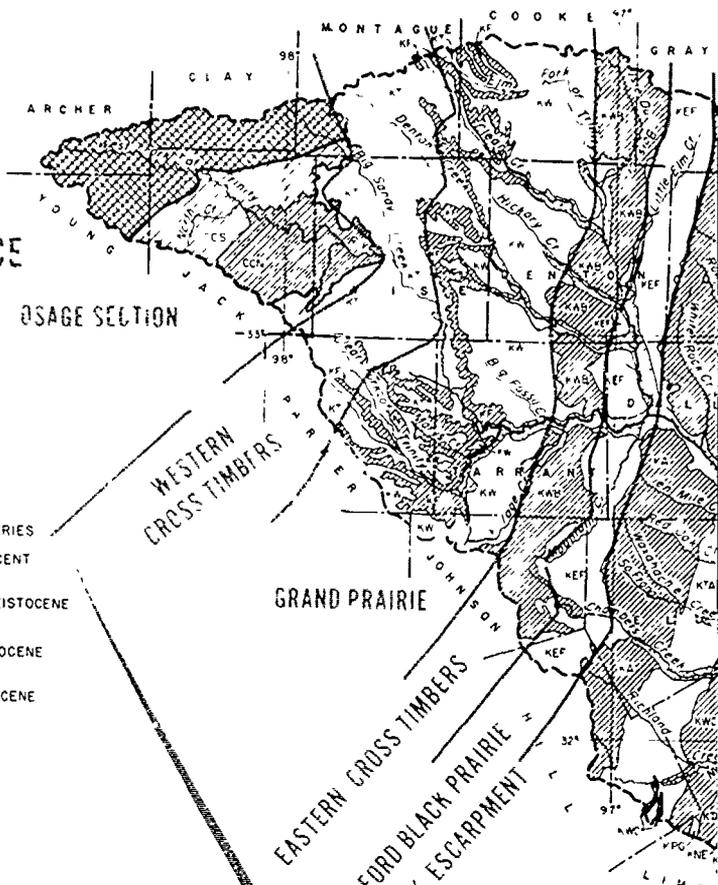
TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
 MULTIPLE PURPOSE CHANNEL
 PROFILE

U.S. ARMY ENGINEER DISTRICT, FT. WORTH

TO ACCOMPANY ENVIRONMENTAL STATEMENT

PLATE D

CENTRAL LOWLAND PROVINCE



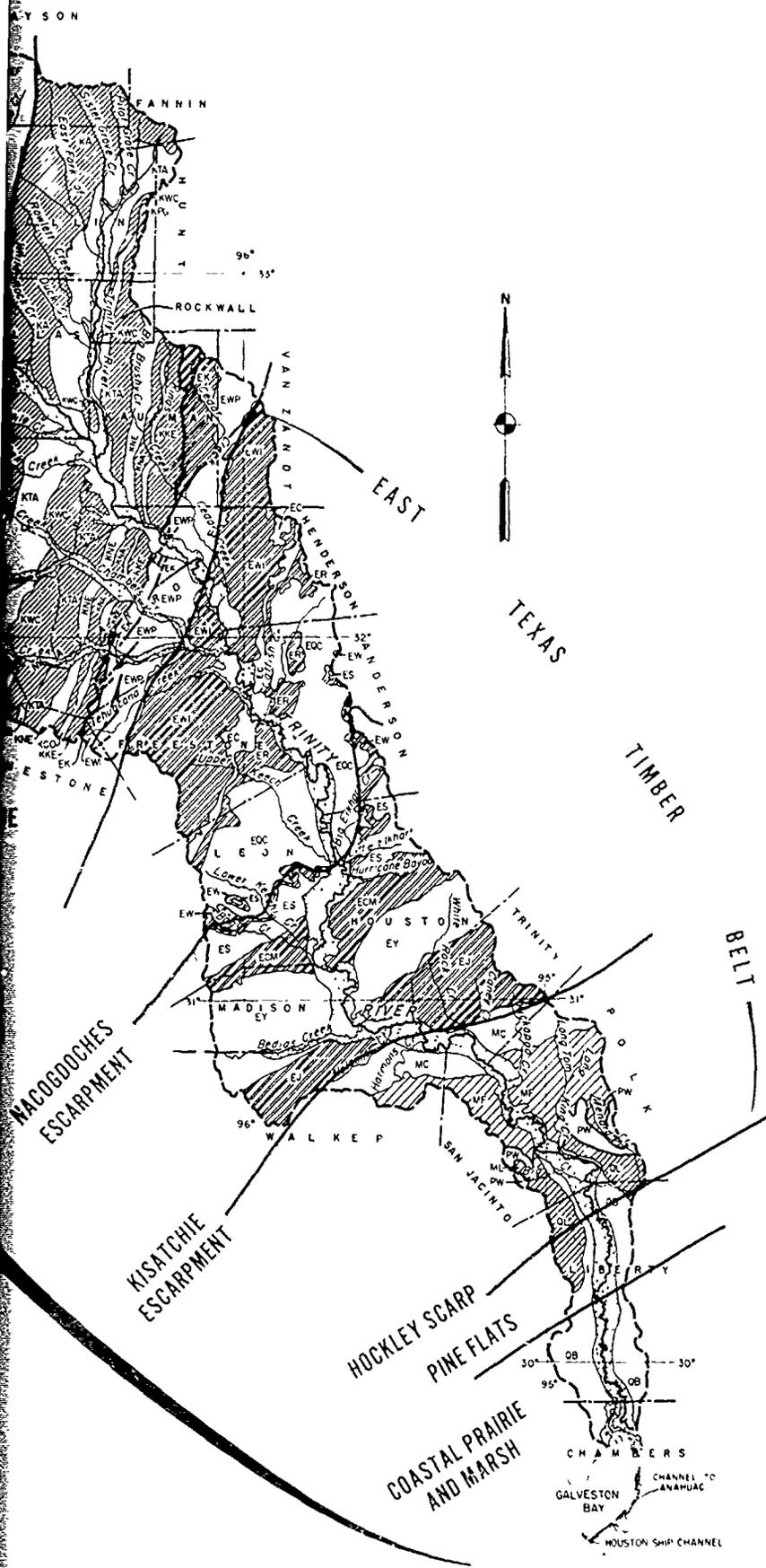
LEGEND

FORMATION	GROUP	SERIES
Q	ALLUVIUM	RECENT
OB	BEAMONT CLAY	PLEISTOCENE
OL	LOSSE	
PA	WILLS SAND	PLIOCENE
MP	FLEMING	MIOCENE
MC	CATAHOLA	
J	JACKSON UNDIFFERENTIATED	JACKSON
EY	YEGUA	Eocene
EMV	WOOD MOUNTAIN	
ES	SPURTH SAND	
MECHES	MECHES	
EQC	QUEEN CITY SAND	
REKLAW	REKLAW	
EL	AMRZO SAND	
EA	UNDIFFERENTIATED	
EMP	WILLS POINT CLAY	
KINGD	KINGD	
KEMP	KEMP CLAY	UPPER CRETACEOUS
CCS	CORP CANA MARL	
NACATOOH	NACATOOH SAND	
KNE	NEWLAND LLE MARL	
JT	UPPER TAYLOR MARLBROOK MARL	
PG	PEGAN GAP CHALK	
KAC	KOLFE CITY SAND	
KTA	LOWER TAYLOR (OZANI)	
A	AUSTIN CHALK	
KEF	EAGLE FORD SHALE	
W	WOODBINE SAND	WOODBINE
MS	MAYN STREET PANDAW BEND	WASHITA
NT	DENTON FORT WORTH DUCK CREEK KIAMICH	
GOODLAND	GOODLAND	
WALNUT	WALNUT CLAY	FREDERICKSBURG
TRINITY	TRINITY	PERMIAN
TRINITY	TRINITY	
TRINITY	TRINITY	
CISCO	CISCO	PENNSYLVANIAN
CANYON	CANYON	

COASTAL PLAIN PROVINCE

WEST GULF COASTAL PLAN SECTION

NAP



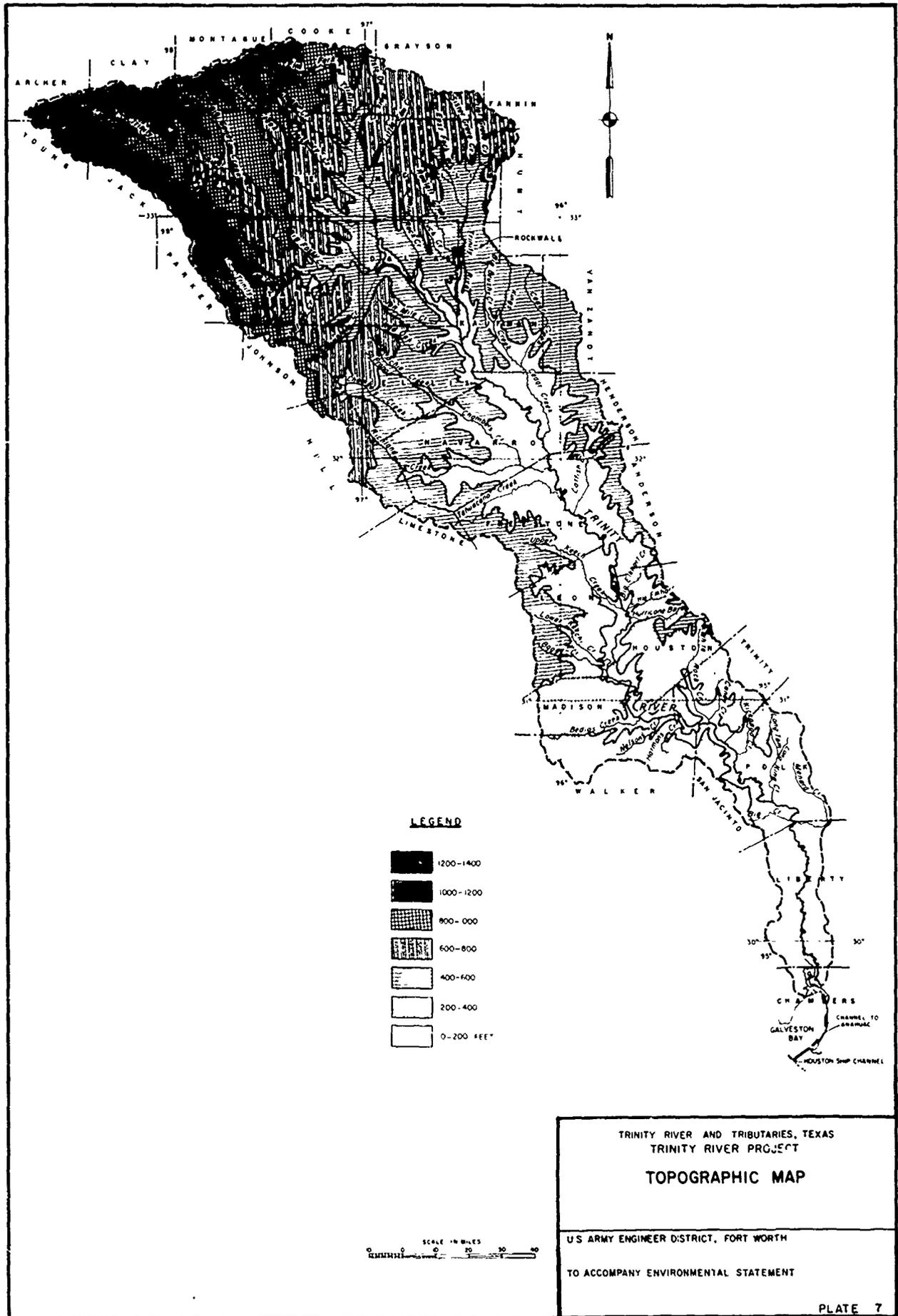
VICINITY MAP



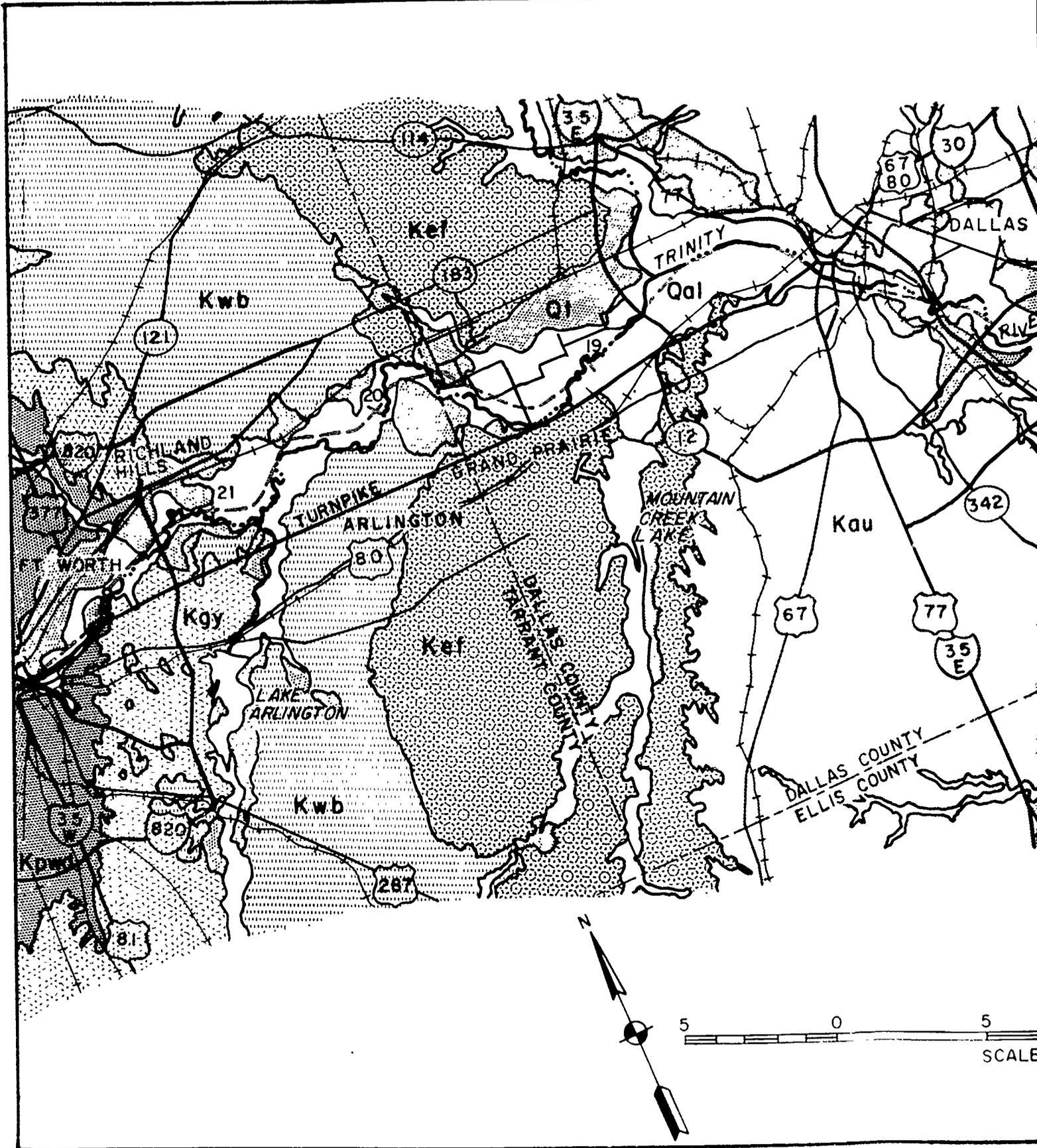
TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
**BASIN GEOLOGY
 AND PHYSIOGRAPHY**

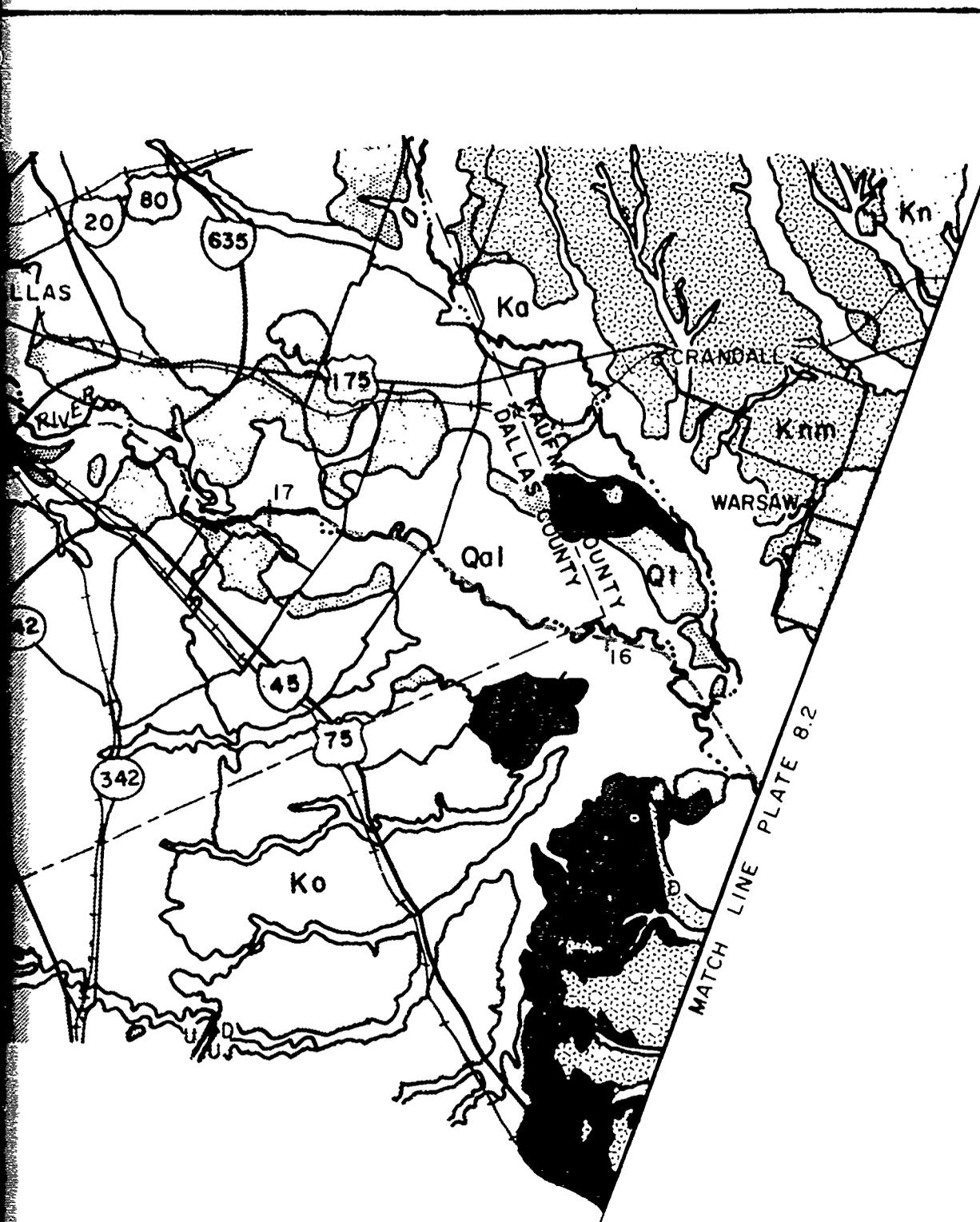
U.S. ARMY ENGINEER DISTRICT, FORT WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT

PLATE 6



CORPS OF ENGINEERS





Qal	ALLUVIUM
Qf	FLUVIATILE
Kn	NACATOCH
Knm	NEYLANDVI
Ko	WOLFE CIT
Kau	OZAN FORM
Kgt	AUSTIN CH
Kwb	EAGLE FO
Kgy	WOODBINE
Kpvd	GRAYSON M
	PAWPAW FO

SEE CHART 13 FOR DESC
STRATIGRAPHY

---	PROPOSED
+	LOCK AND

COMPILED FROM "GEOLOG
ECONOMIC GEOLOGY, UN



LEGEND

M
LE TERRACE DEPOSITS
H SAND
VILLE FORMATION & MARLBROOK MARL
CITY FORMATION
FORMATION (LOWER TAYLOR MARL)
CHALK
ORD GROUP UNDIVIDED
E FORMATION
MARL & MAIN ST. LIMESTONE UNDIVIDED
FORMATION, WENO LIMESTONE, DENTON CLAY
SCRIPTION OF FORMATIONS AND

ED MULTIPURPOSE CHANNEL

D DAM (L & D # 15 DELETED)

OGIC ATLAS OF TEXAS", BUREAU OF
UNIV. OF TEXAS AT AUSTIN.

TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT

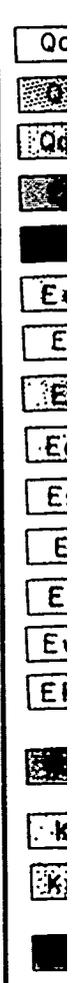
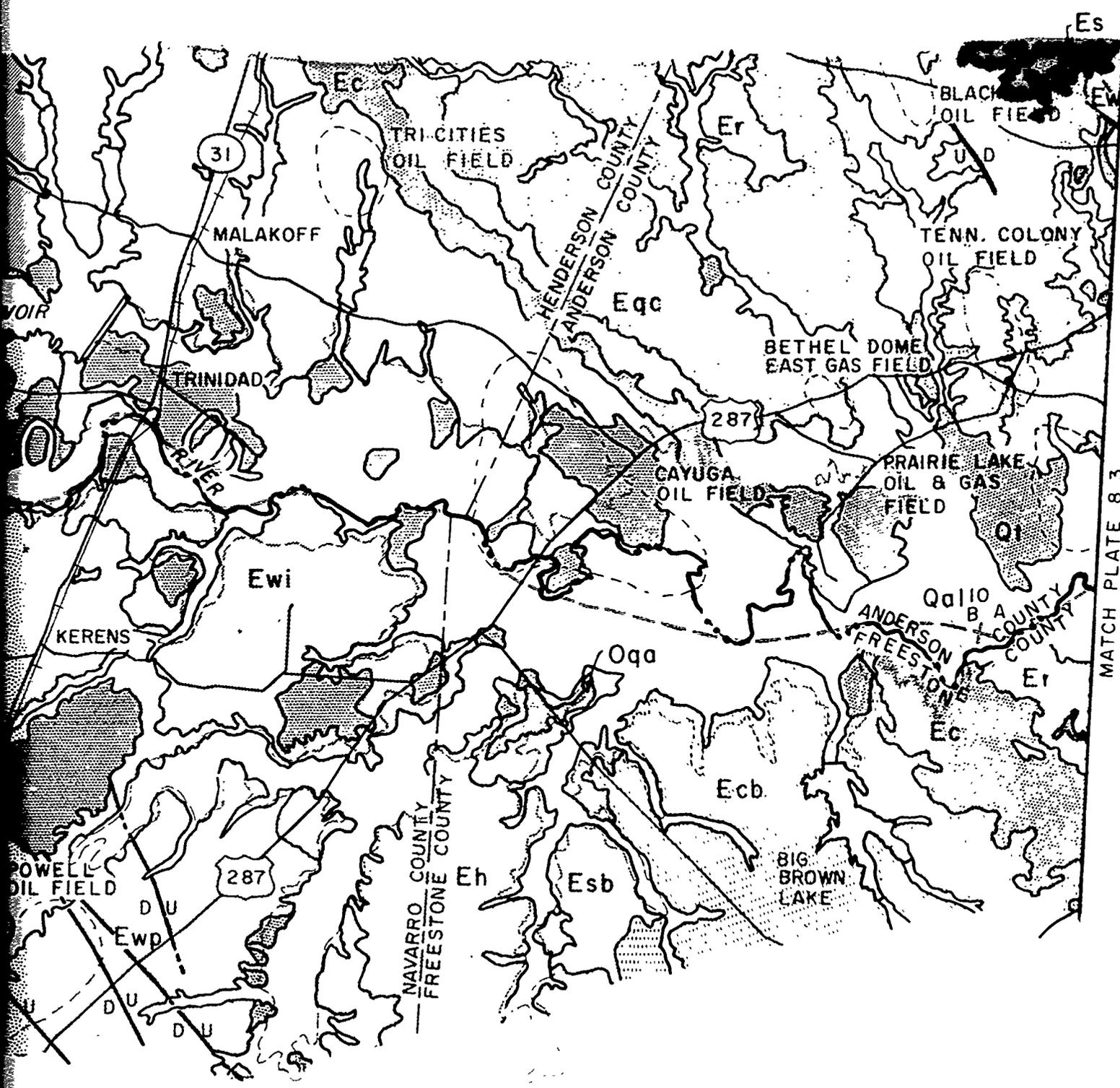
AREAL GEOLOGY

U.S. ARMY ENGR DIST, FORT WORTH

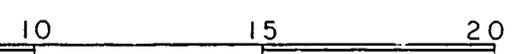
TO ACCOMPANY ENVIRONMENTAL STATEMENT

PLATE 8.1

3

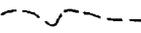
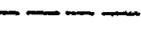
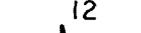
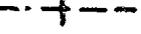


MATCH PLATE 8 3



SCALE IN MILES

LEGEND

	ALLUVIUM
	FLUVIATILE TERRACE DEPOSITS
	QUARTZ ARENITE
	SPARTA SAND
	WECHES FORMATION
	QUEEN CITY SAND
	REKLAW FORMATION
	CARRIZO SAND
	CALVERT BLUFF FORMATION
	SIMSBORO FORMATION
	HOOPER FORMATION
	WILCOX GROUP UNDIVIDED
	WILLS POINT FORMATION
	PISGAH & LITTIG MEMBERS OF KINCAID FORMATION
	KEMP CLAY & CORSICANA MARL UNDIVIDED
	NACATOCH SAND
	NEYLANDVILLE FORMATION & MARLBROOK MARL
	WOLFE CITY FORMATION
	TENNESSEE COLONY LAKE
	PROPOSED MULTIPURPOSE CHANNEL
	
	LOCK AND DAM (L & D # 11 & # 14 DELETED)

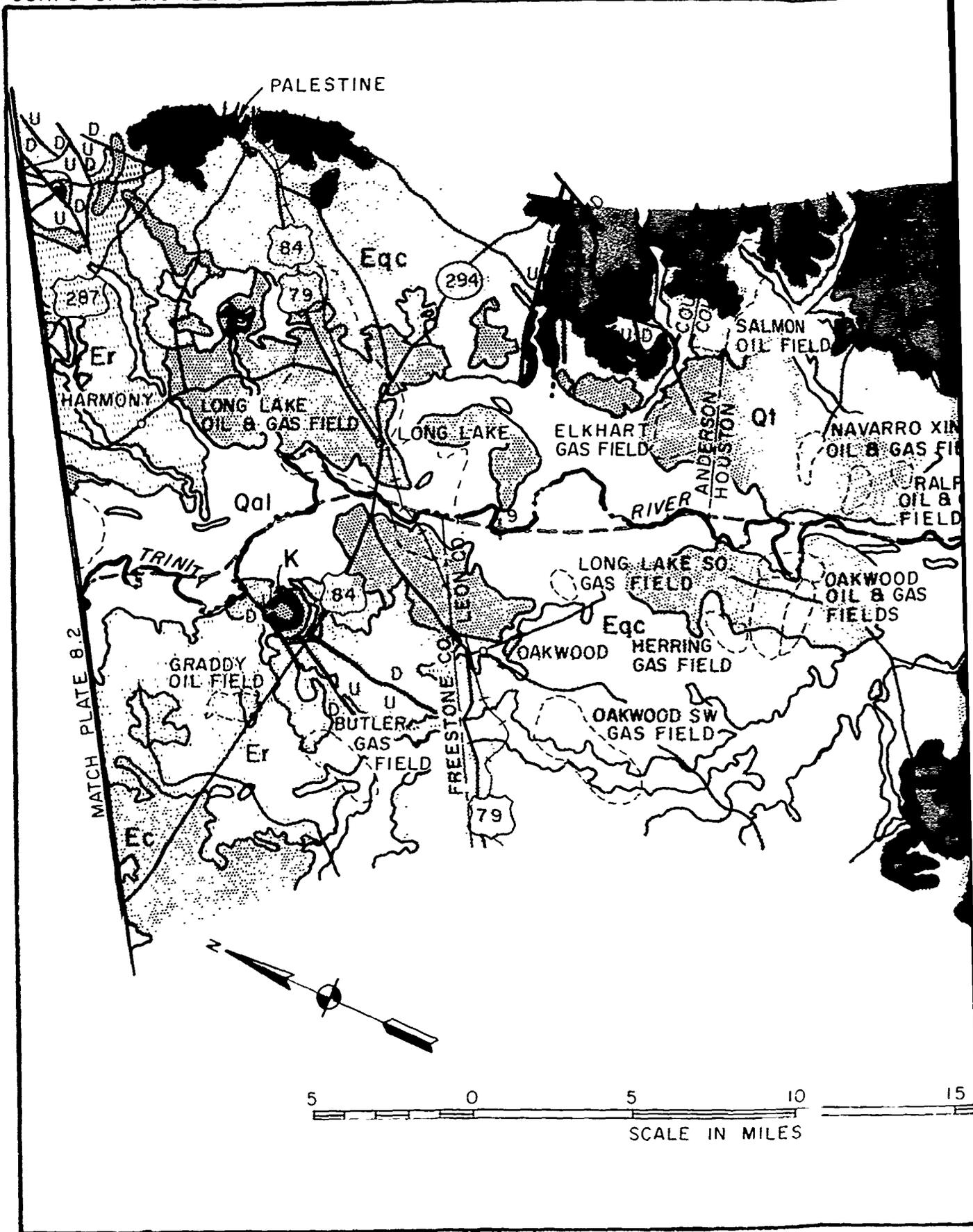
TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT

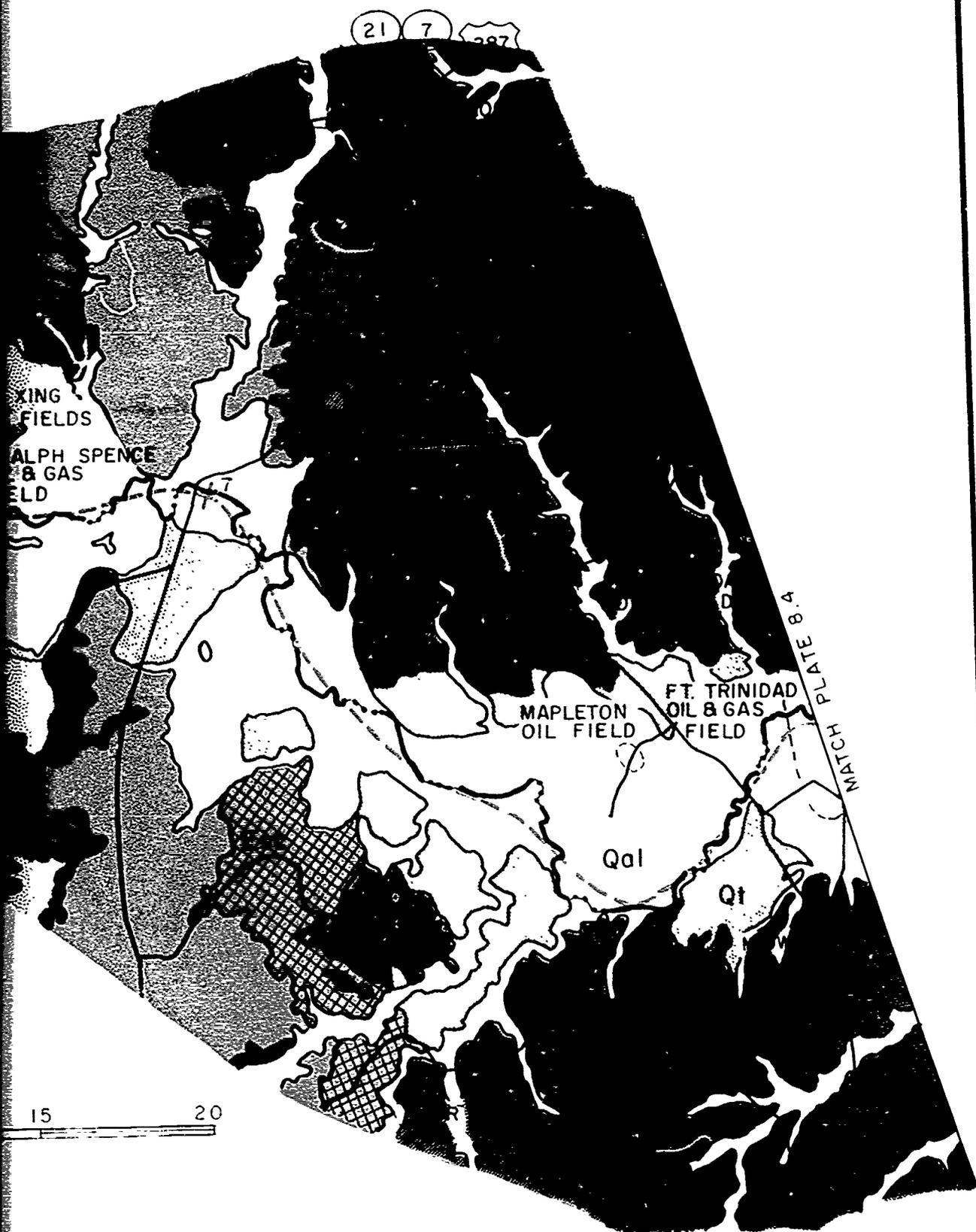
AREAL GEOLOGY

U.S. ARMY ENGR DIST, FORT WORTH

TO ACCOMPANY ENVIRONMENTAL STATEMENT

CORPS OF ENGINEERS





- Qal
- Qt
-
-
-
- Er
-
- Eqc
- Er
- Ec
- Ewi
- K

7

U. S. ARMY

LEGEND

ALLUVIUM

FLUVIATILE TERRACE DEPOSITS

YEGUA FORMATION

COOK MOUNTAIN FORMATION

STONE CITY FORMATION

SPARTA SAND

WECHES FORMATION

QUEEN CITY SAND

REKLAW FORMATION

CARRIZO SAND

WILCOX GROUP UNDIVIDED

CRETACEOUS

PROPOSED MULTIPURPOSE CHANNEL

LOCK & DAM (L & D # 8 DELETED)

TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT

AREAL GEOLOGY

U.S. ARMY ENGR DIST, FORT WORTH

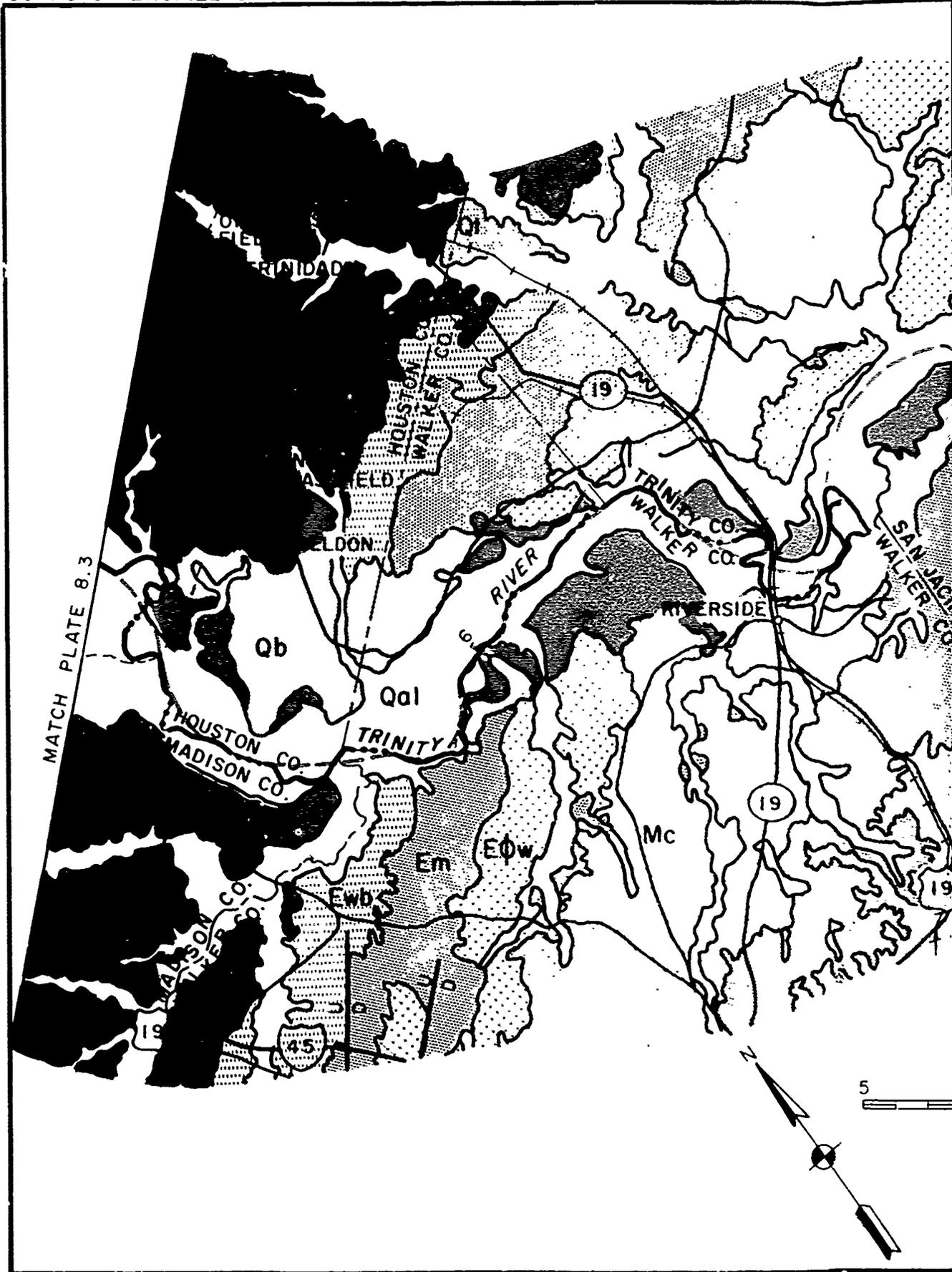
TO ACCOMPANY ENVIRONMENTAL STATEMENT

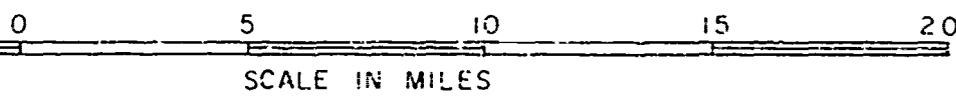
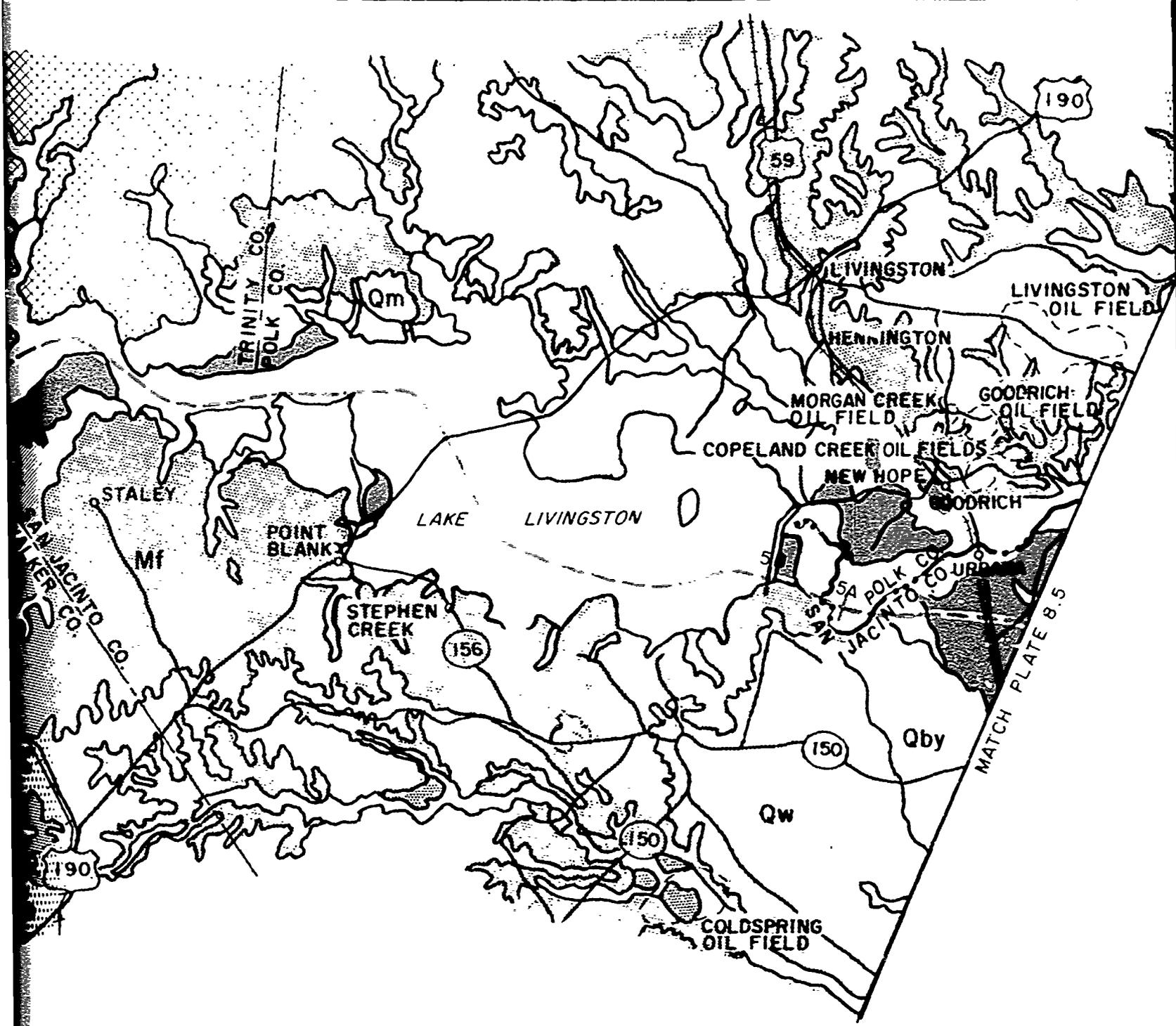
PLATE 83

1

3

CORPS OF ENGINEERS





LEGEND

	ALLUVIUM
	DEWEYVILLE FORMATION
	BEAUMONT FORMATION
	MONTGOMERY FORMATION
	BENTLEY FORMATION
	FLUVIATILE TERRACE DEPOSITS UNDIVIDED
	WILLIS FORMATION
	FLEMING FORMATION
	CATAHOULA FORMATION
	WHITSETT FORMATION
	MANNING FORMATION
	WELLBORN FORMATION
	CADDELL FORMATION
	YEGUA FORMATION

----- PROPOSED MULTIPURPOSE CHANNEL

---+⁶--- LOCK AND DAM

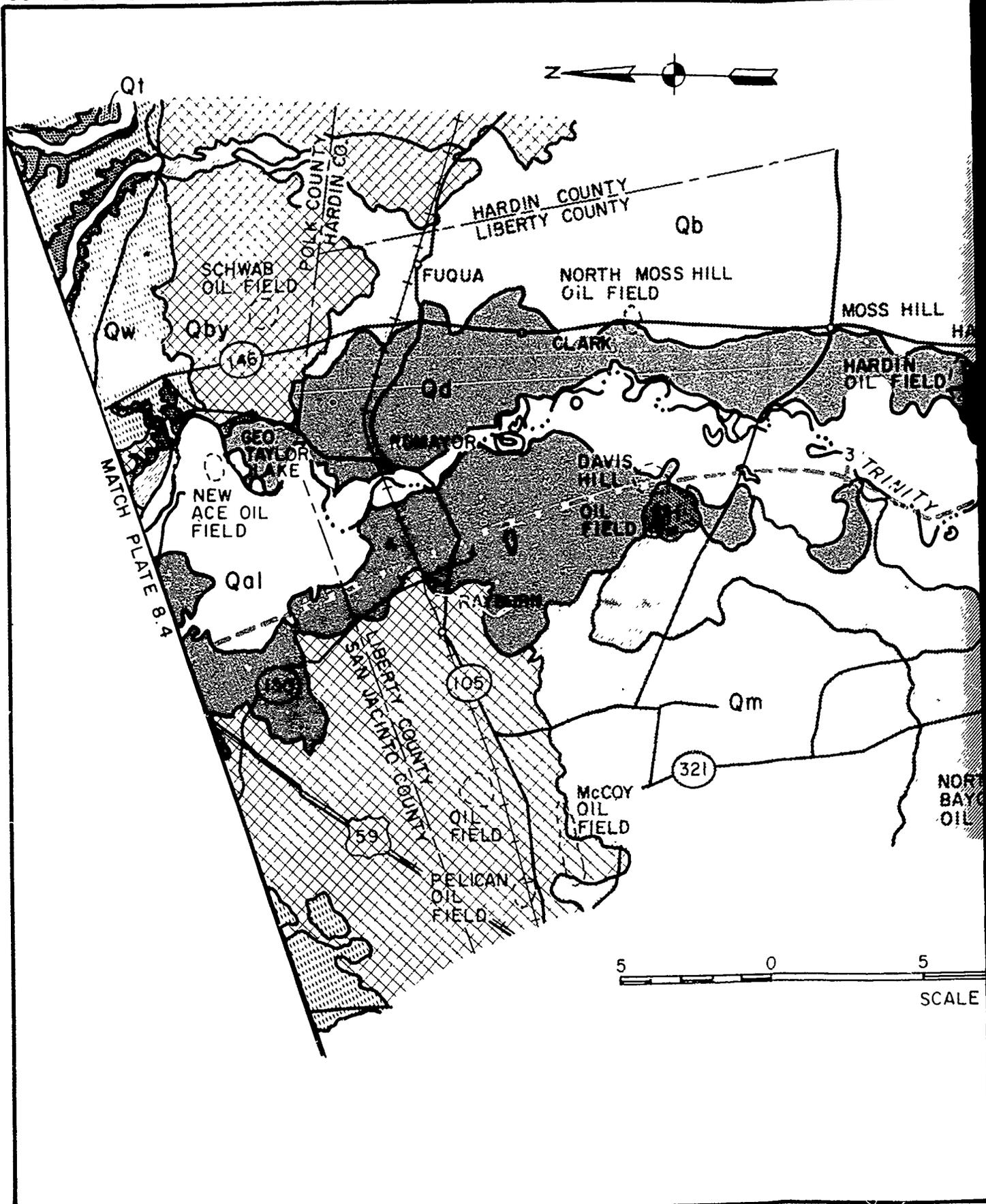
TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT

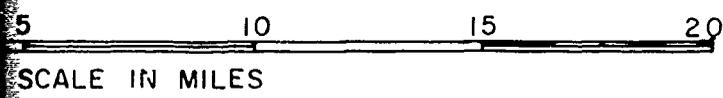
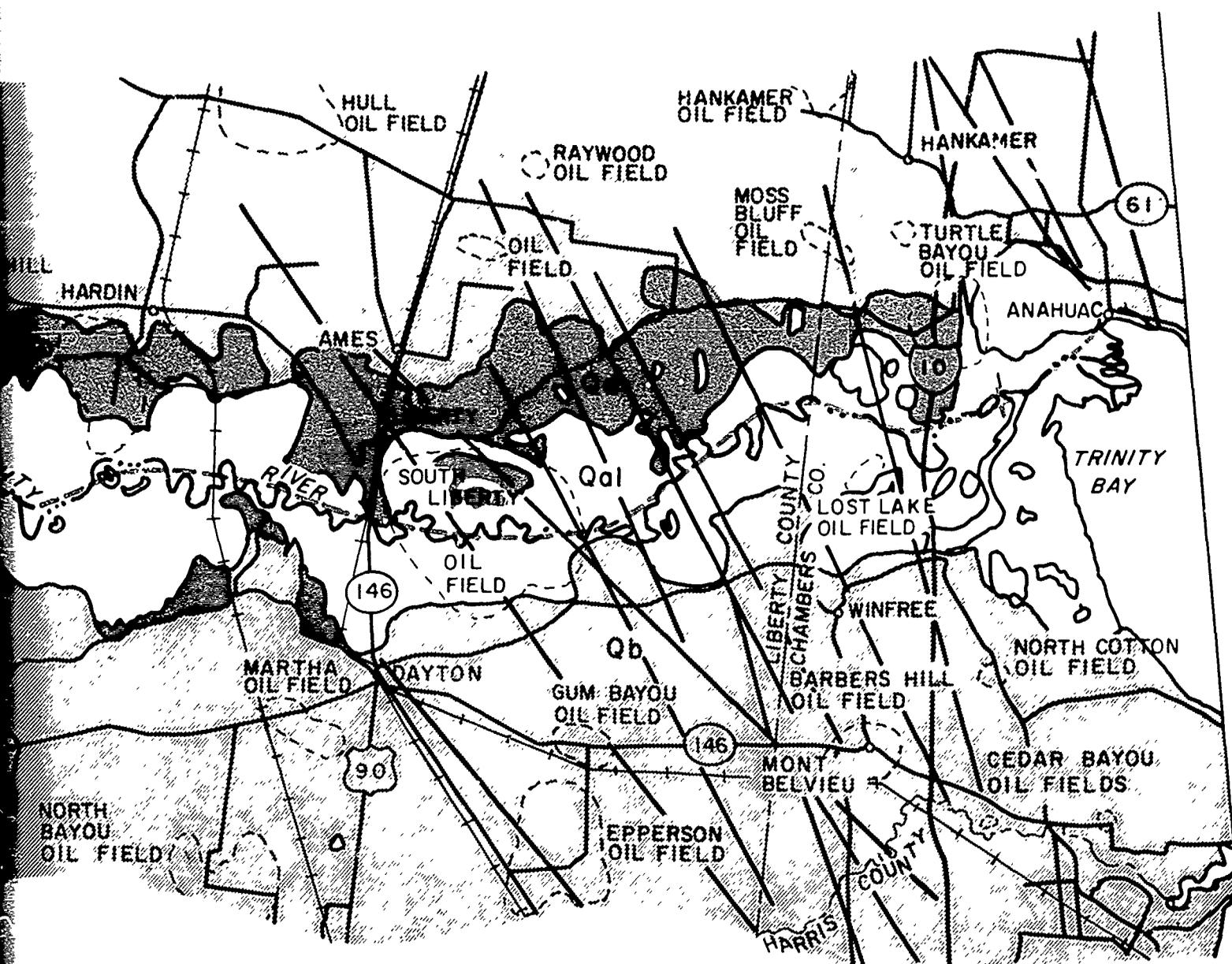
AREAL GEOLOGY

U.S. ARMY ENGR DIST, FORT WORTH
TO ACCOMPANY ENVIRONMENTAL STATEMENT

3

CORPS OF ENGINEERS





2

LEGEND

-  ALLUVIUM
-  DEWEYVILLE FORMATION
-  BEAUMONT FORMATION
-  MONTGOMERY FORMATION
-  BENTLEY FORMATION
-  FLUVIATILE TERRACE DEPOSITS UNDIVIDED
-  WILLIS FORMATION
-  FLEMING FORMATION

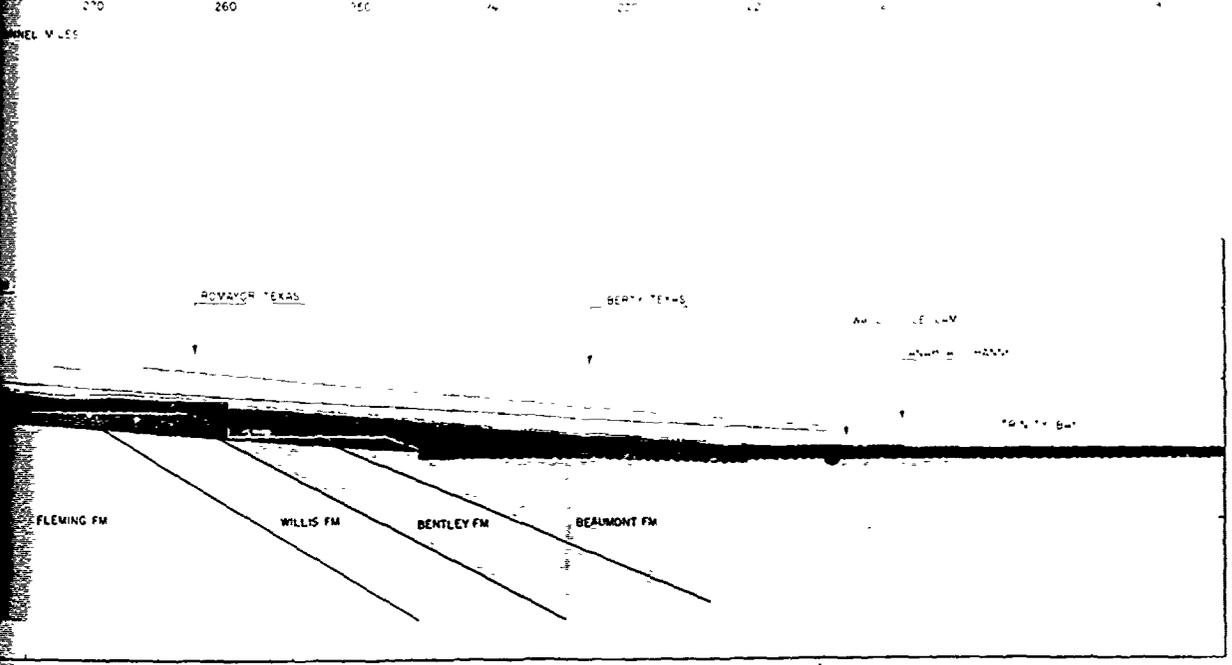
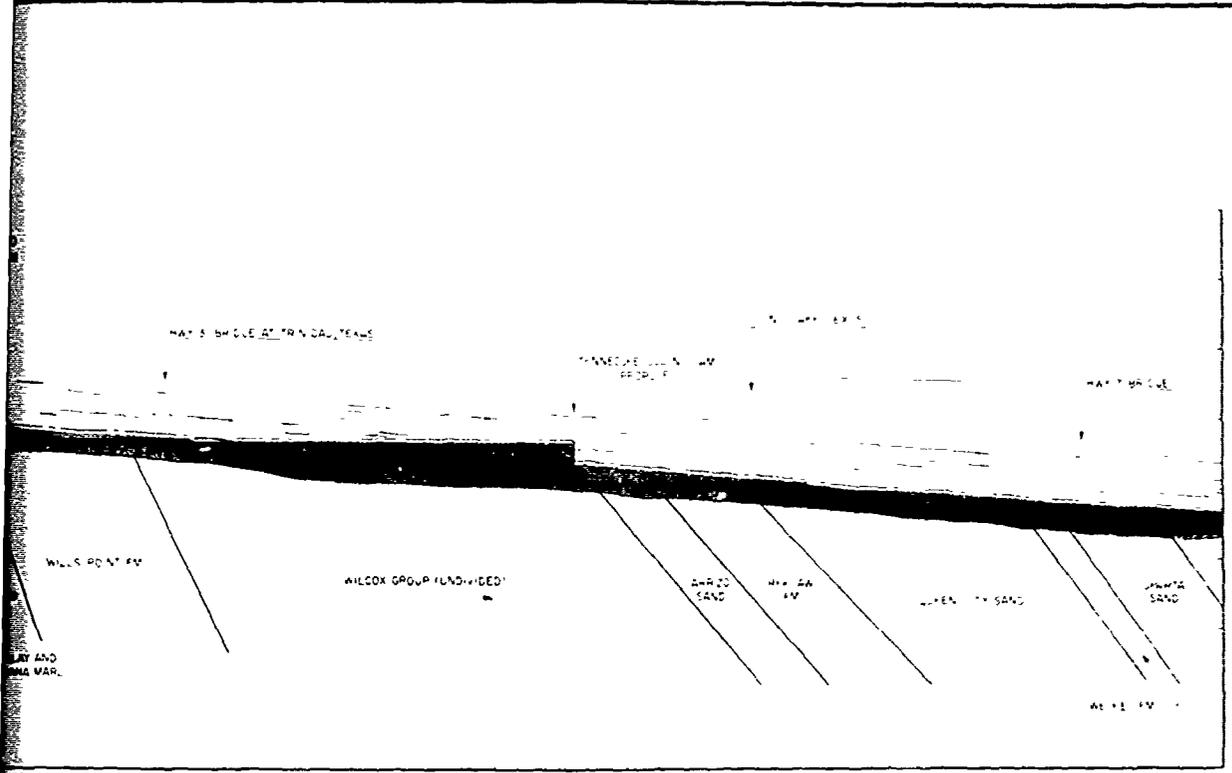
----- PROPOSED MULTIPURPOSE CHANNEL

---+---³ LOCK AND DAM (L&D # 2 DELETED)

TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT

AREAL GEOLOGY

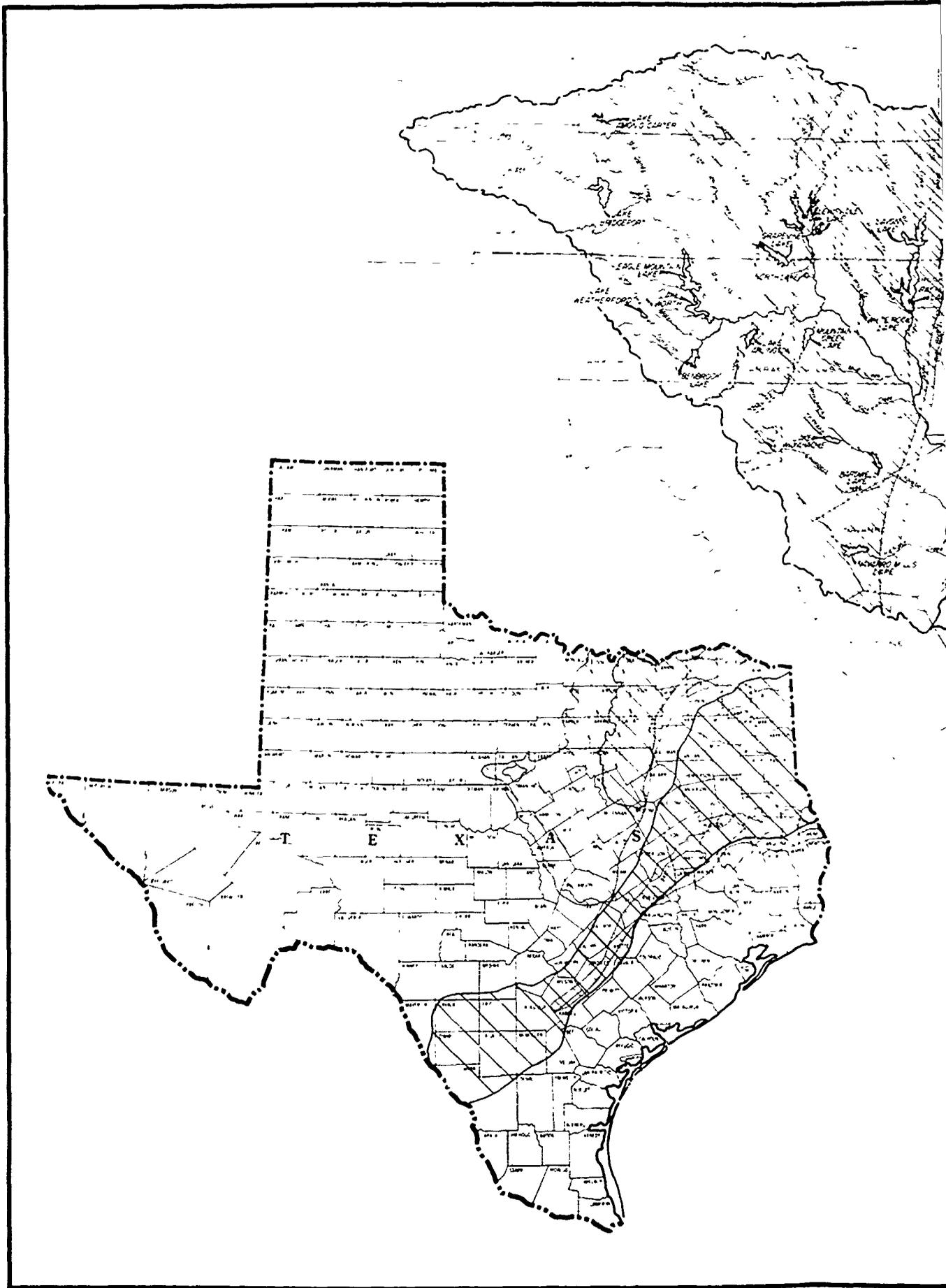
U.S. ARMY ENGR DIST, FORT WORTH
TO ACCOMPANY ENVIRONMENTAL STATEMENT

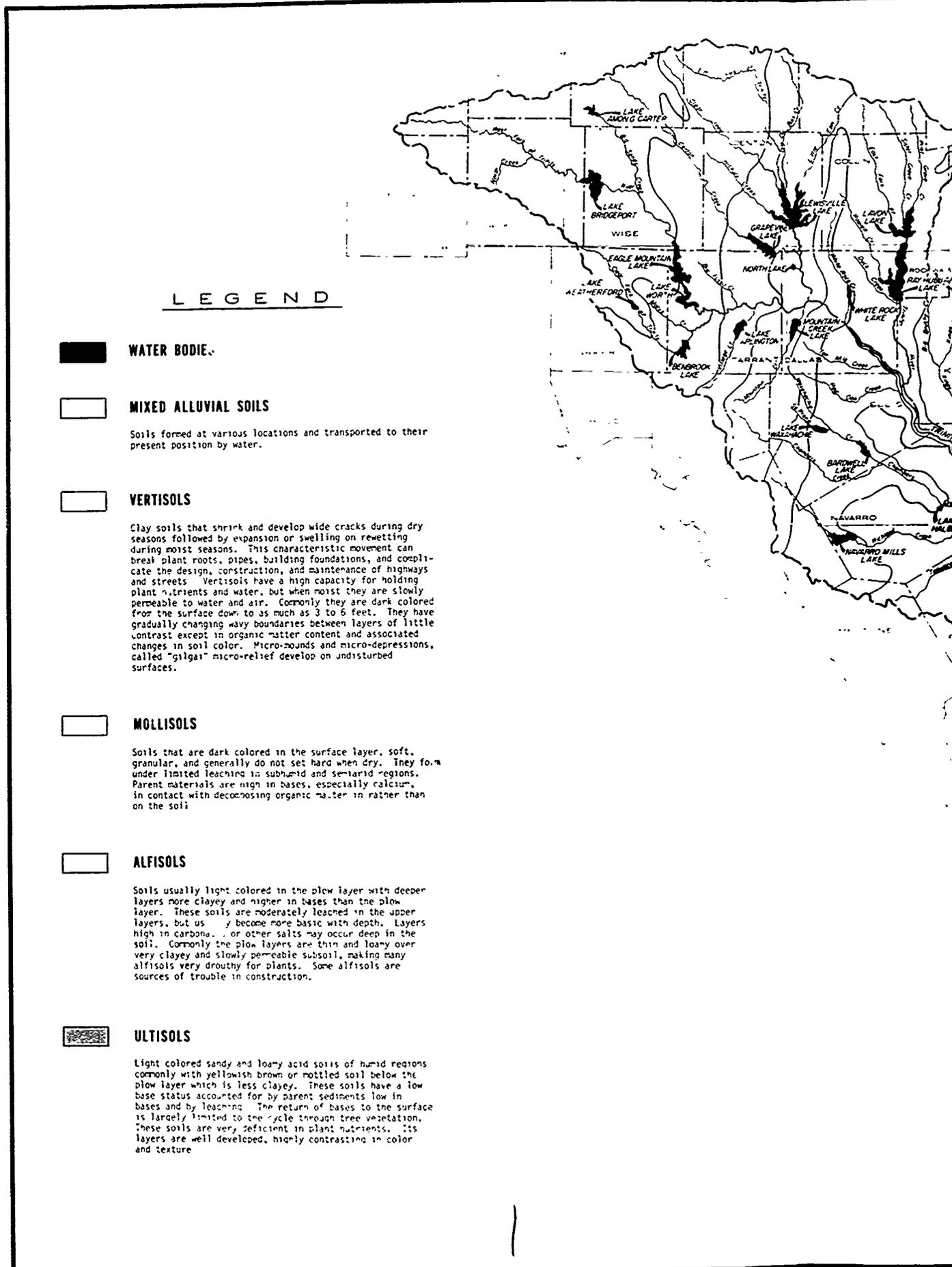


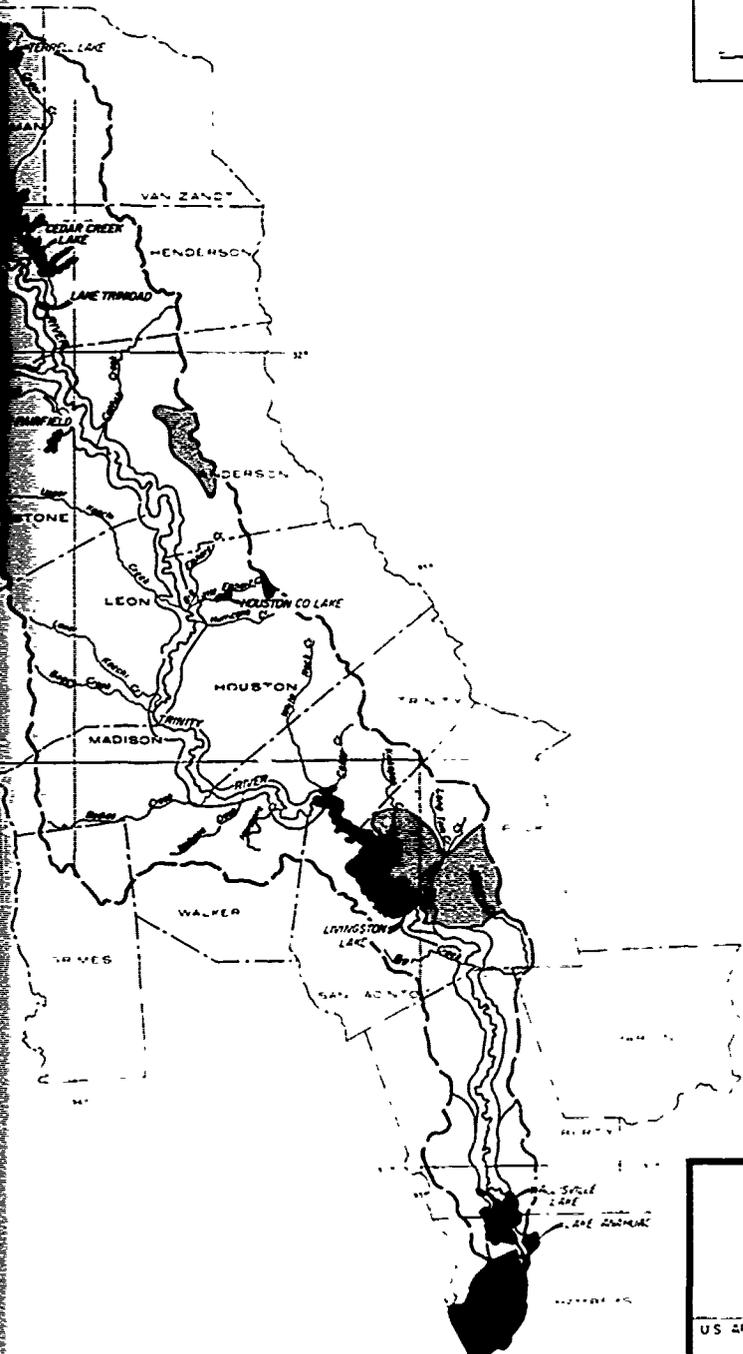
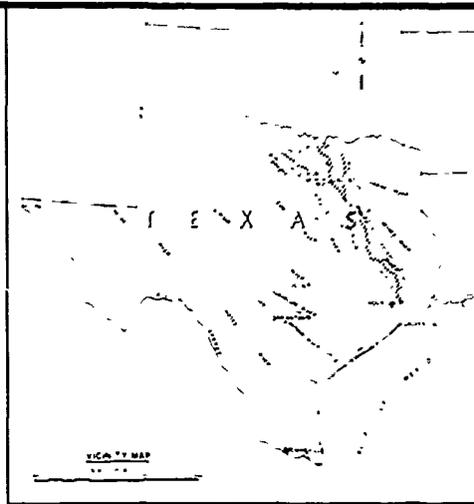
TRINITY RIVER AND TWIN TAPES TEXAS
TRINITY RIVER PROJECT
GEOLOGIC SECTION
 U.S. ARMY ENGINEER DISTRICT, FORT WORTH

(Faint, illegible text describing the drawing and project details)

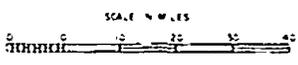
2







NOTE
 Data from So. Orders of Texas
 General So. Map of Texas, Texas
 Agricultural Experiment Station
 and USDA Soil Conservation Service



TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
 SOIL CLASSIFICATION
 AND DISTRIBUTION
 U.S. ARMY ENGINEER DISTRICT, FORT WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT
 PLATE II

**GRAND PRAIRIE**

Undulating to hilly, deeply incised (locally stony) prairies, with moderate to rapid surface drainage.

Elevation: 600 - 1,100 feet.

Annual rainfall: 30 - 35 inches.

Annual frost-free period: 230 - 240 days.

Vegetation: Uplands--tall bunch grasses, short grasses, live oak, cedar. Bottomlands--hardwoods, mainly species of oak, elm and native pecan.

SOILS

Uplands--dark, deep to shallow and stony, calcareous clays with subsols of lighter, tiny earths and limestone fragments. Main series: San Saba, Denton, Crawford, Tarrant, Brackett.

Bottomlands--minor areas of reddish brown, loamy to clayey, calcareous alluvial soils. Main series: Miller, Norwood, Yahola (Red and Brazos Rivers). Some dark, clayey, calcareous to neutral, alluvial soils. Main series: Frio, Trinity, Gowen (minor streams).

LAND USE POTENTIALS

About three-fourths of the area is in range. Some small grain, grain sorghum, corn, wheat and forage crops are grown. Range is the major land use potential, but grain and forage crop production can be intensified locally.

**GULF COAST PRAIRIE**

Nearly level, practically undissected plain with slow surface drainage.

Elevation: Sea level - 250 feet.

Annual rainfall: 28 - 56 inches.

Annual frost-free period: 240 - 320 days.

Vegetation: Uplands--tall bunch grasses; coastal fringe--salt grasses. Bottomlands--hardwoods, mainly oak species.

SOILS

Uplands--dark, neutral to slightly acid clay loams and clays changing gradually with depth to light, calcareous clays. Main series: Lake Charles, Beaumont, Edna, Bernard.

Farther south, in the subhumid Coast Prairie (Coastal Bend), soils are less acid and some are calcareous. Main series: Victoria, Orelia, Clarendon.

Light, acid sands and darker, loamy to clayey soils--some saline and sodic--lie in a narrow band along the coast. Main series: Harris, Galveston.

In a narrow belt inland from the dark, clayey soils, lighter, acid, fine sandy loam soils with gray to brown and red mottled clayey subsols are prevalent. Main series: Katy, Hockley, Kenny, Edna.

Bottomlands--reddish brown to dark gray, slightly acid to calcareous, loamy to clayey alluvial soils. Main series: Miller, Norwood, Pledger (Brazos and Colorado Rivers); Kaufman and Trinity (Trinity River).

LAND USE POTENTIALS

Cropland, range, urban and industrial centers are major land use categories. Rice, grain sorghum, cotton, corn and tame pasture are important crops. About one-third of the area is cultivated. Intensive dryland and irrigated cropping and livestock production are major potentials. Urban, industrial and recreational developments are increasing rapidly.

**WEST CROSS TIMBERS**

Undulating to gently rolling, well-dissected scrub oak woodland area, with rapid surface drainage.

Elevation: 900 - 1,500 feet.

Annual rainfall: 28 - 32 inches.

Annual frost-free period: 230 - 240 days.

Vegetation: Uplands--scrub oak, tall bunch grasses. Bottomlands--hardwoods, mainly oak and elm species.

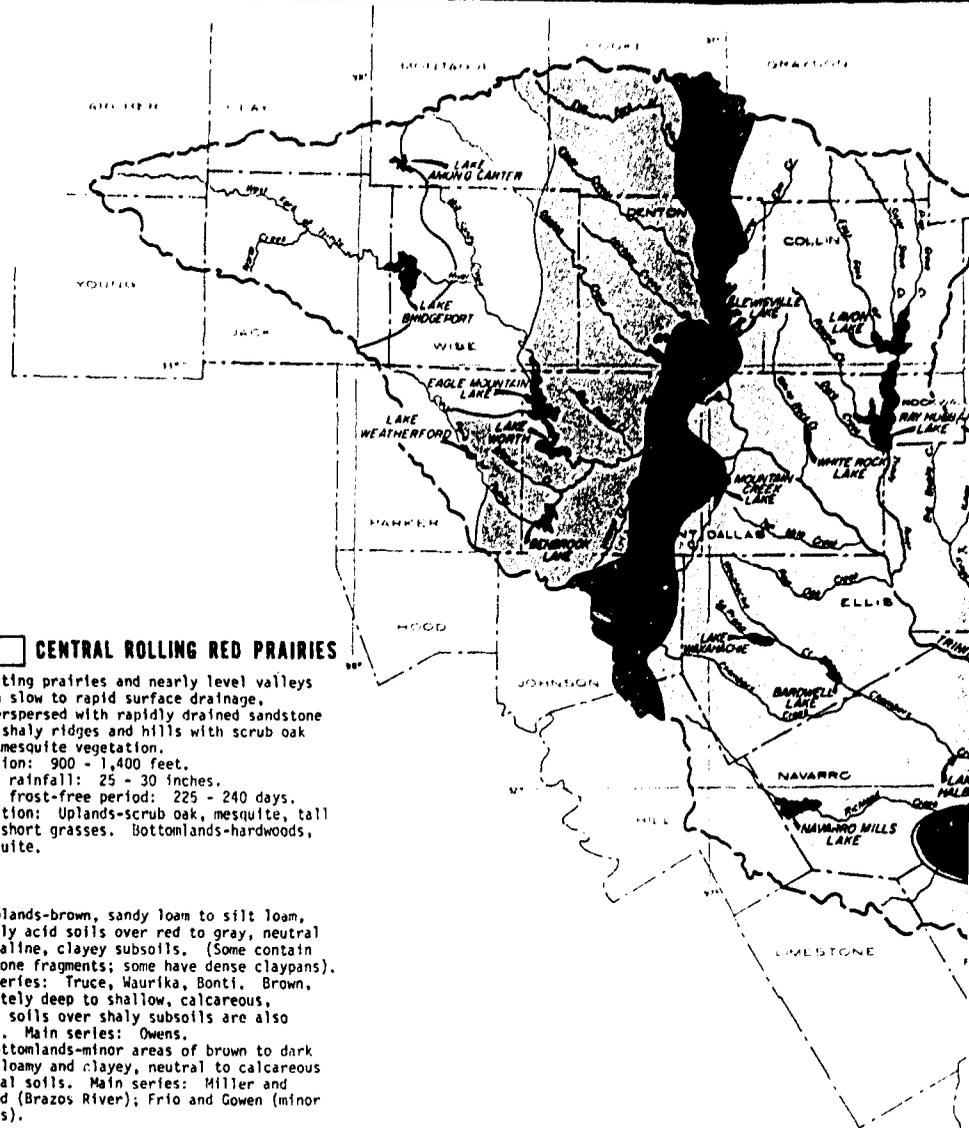
SOILS

Uplands--light, slightly acid, loamy sands and sandy loams over yellowish brown to red clayey subsols. Main series: Windthorst, Nimrod, Daffau.

Bottomlands--small areas of dark, neutral to calcareous, clayey and loamy alluvial soils along minor streams. Main series: Frio, Gowen.

LAND USE POTENTIALS

Range and pasture utilize over half the land. Peanuts, fruits, vegetables and forage are major crops. Intensification of farming and pasture and range improvement are main potentials.

**CENTRAL ROLLING RED PRAIRIES**

Undulating prairies and nearly level valleys with slow to rapid surface drainage, interspersed with rapidly drained sandstone and shaly ridges and hills with scrub oak and mesquite vegetation.

Elevation: 900 - 1,400 feet.

Annual rainfall: 25 - 30 inches.

Annual frost-free period: 225 - 240 days.

Vegetation: Uplands--scrub oak, mesquite, tall and short grasses. Bottomlands--hardwoods, mesquite.

SOILS

Uplands--brown, sandy loam to silt loam, slightly acid soils over red to gray, neutral to alkaline, clayey subsols. (Some contain limestone fragments; some have dense claypans). Main series: Truce, Maurika, Bonti. Brown, moderately deep to shallow, calcareous, clayey soils over shaly subsols are also common. Main series: Owens.

Bottomlands--minor areas of brown to dark gray, loamy and clayey, neutral to calcareous alluvial soils. Main series: Miller and Norwood (Brazos River); Frio and Gowen (minor streams).

LAND USE POTENTIALS

Over three-fourths of the land is in range. Grain sorghum, wheat, oats, peanuts and fruits are grown on the better soils. Intensification of farming and range improvement are best potentials.

**EAST CROSS TIMBERS**

A gently rolling, moderately dissected, narrow strip of scrub oak woodlands, with moderate to rapid surface drainage.

Elevation: 500 - 700 feet.

Annual rainfall: Approximately 35 inches.

Annual frost-free period: 230 - 250 days.

Vegetation: Uplands--oak trees and tall bunch grasses. Bottomlands--hardwoods, mainly oak.

SOILS

Uplands--light, slightly acid, loamy sands and sandy loams over yellowish brown to red clayey subsols. Main series: Windthorst, Galey, Konowa.

Bottomlands--minor areas of brown, slightly acid, loamy alluvial soils, mainly the Gowen series, along minor streams; also, some minor areas of dark, clayey, neutral to calcareous alluvial soils. Main series: Kaufman, Trinity (Upper Trinity River and tributaries).

LAND USE POTENTIALS

Range, pasture and urban development are major land uses; some peanuts, fruits, vegetables and forage crops are produced. Urban development, intensification of present cropping and dairying for urban markets are major potentials.

**SOUTHERN COASTAL PLAIN**

Nearly level to gently undulating forested area, generally well dissected and locally hilly, with slow to rapid surface drainage.

Elevation: 200 - 700 feet.

Annual rainfall: 40 - 56 inches.

Annual frost-free period: 235 - 265 days.

Vegetation: Uplands--loblolly, shortleaf and longleaf pine with associated hardwood species, mainly oak. Bottomlands--hardwoods, mainly species of oak and sweetgum with some pine and cypress.

SOILS

Uplands--light to red, acid, sandy loams and sands over gray, yellow, red or mottled sandy loam to clay subsols. Subsols of finer textures are a few inches to 3 or more feet below the surface. Main series: Bowie, Kirvin, Troup. In the hilly "Redlands": Nacogdoches, Ruston, Bub. In the poorly drained "Flatwoods and Big Thicket": Segno, Splendora, Sorter.

Bottomlands--light brown to dark gray, acid to calcareous, loamy to clayey alluvial soils; some poorly drained. Main series: Miller, Yahola, Pledger (Red River); Kaufman, Gowen, Tusculumbia, Trinity (Trinity and other major rivers). More acid, loamy soils are extensive in flood plains of minor streams.

LAND USE POTENTIALS

About two-thirds of the area is forested, with commercial pine and hardwood timber produced in the uplands. Commercial hardwoods are more important in the bottomlands. Tame pasture, feed grains, forages, fruits and vegetables are main crops. Water resource development and recreation are also important parts of the economy.

Forests and lakes make the area especially well-suited for recreation and industrial expansion. A potential exists for additional fruit, vegetable, beef and dairy production.

TEXAS CLAYPAN AREA

Nearly level to gently rolling, moderately dissected woodland-savannah to brushy area ("Post Oak Belt") with moderate surface drainage. Elevation: 200 - 500 feet. Annual rainfall: 30 - 45 inches. Annual frost-free period: 235 - 280 days. Vegetation: Uplands-scattered stands of post oak and blackjack oak with tall bunch grasses; yaupon and other underbrush prevalent in places. Bottomlands-hardwoods, predominantly oak; pecans in some areas.

SOILS

Uplands - gray, slightly acid, sandy loams, commonly thin over gray, mottled or red, firm, clayey subsoils. Some deep sandy soils with less clayey subsoils exist. Main series: Lufkin, Axtell, Tabor (thin surface claypan soils); Freestone, Eufaula (thick surface sandy soils).

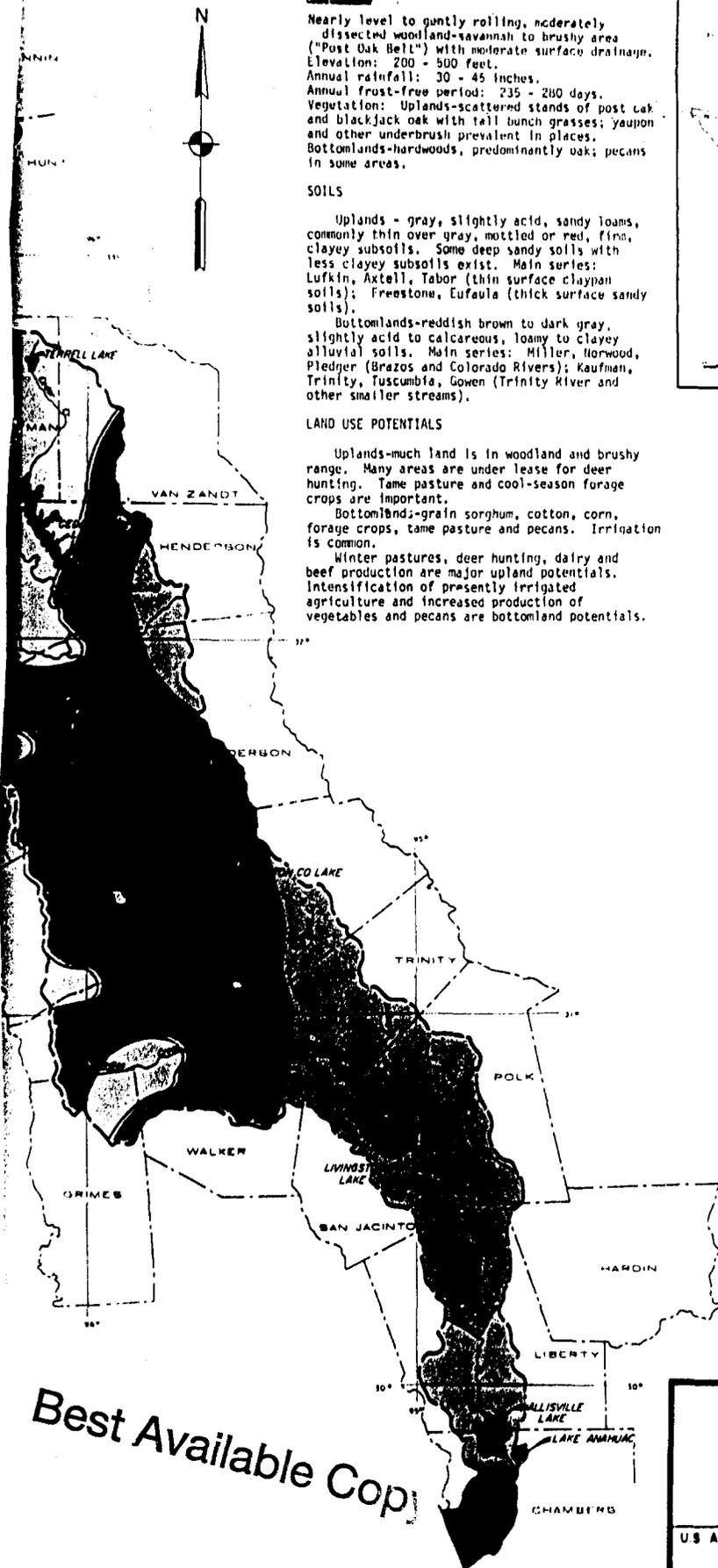
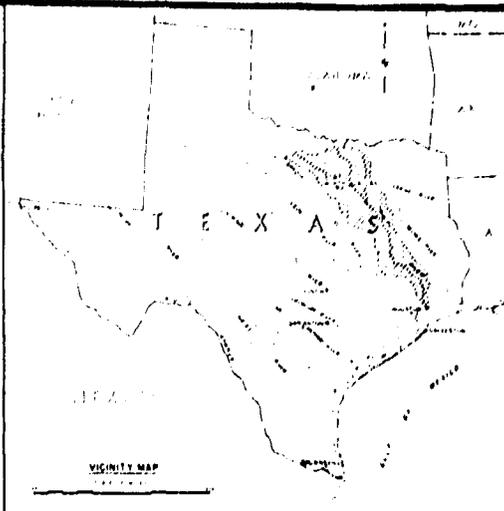
Bottomlands-reddish brown to dark gray, slightly acid to calcareous, loamy to clayey alluvial soils. Main series: Miller, Norwood, Pledger (Brazos and Colorado Rivers); Kaufman, Trinity, Tuscumbia, Gowen (Trinity River and other smaller streams).

LAND USE POTENTIALS

Uplands-much land is in woodland and brushy range. Many areas are under lease for deer hunting. Tame pasture and cool-season forage crops are important.

Bottomlands-grain sorghum, cotton, corn, forage crops, tame pasture and pecans. Irrigation is common.

Winter pastures, deer hunting, dairy and beef production are major upland potentials. Intensification of presently irrigated agriculture and increased production of vegetables and pecans are bottomland potentials.



TEXAS BLACKLAND PRAIRIE

Nearly level to rolling, well-dissected prairies, with moderate to rapid surface drainage. The flood plains are slowly drained; some areas are wooded.

Elevation: 250 - 700 feet. Annual rainfall: 30 - 45 inches. Annual frost-free period: 230 - 260 days.

Vegetation: Uplands--tall bunch grasses; some mesquite and oaks in the "graylands." Bottomlands-mainly species of oak, elm, cottonwood, including native pecan trees.

SOILS

Uplands-"Blacklands"-dark, calcareous, clayey soils changing gradually with depth to light marls or chalks. Main series: Houston Black, Austin, Heiden. "Graylands"-neutral to slightly acid clays to sandy loams over firm, dark gray to red, mottled, clayey subsoils, all becoming calcareous in the substratum. Main series: Burleson, Wilson, Crockett.

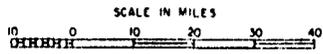
Bottomlands-reddish brown to dark gray, slightly acid to calcareous, loamy to clayey, alluvial soils. Main series: Miller, Norwood, Pledger (Brazos and Colorado Rivers); Kaufman, Frigo, Trinity, Tuscumbia (Trinity River and minor streams).

LAND USE POTENTIALS

Nearly half the area is cropland, with cotton, grain sorghum, corn, wheat and forages as major crops. Tame pastures and meadows occupy about one-fourth the land area. Pecan groves and dryland and irrigated crops are important in the floodplains.

Major potentials include intensification of production of cotton, food and feed grains, forages and pecans, with additional output of beef and dairy products for an expanding urban complex.

NOTE:
Data from Land Resource Areas of Texas, Texas ABM Publication B-1070



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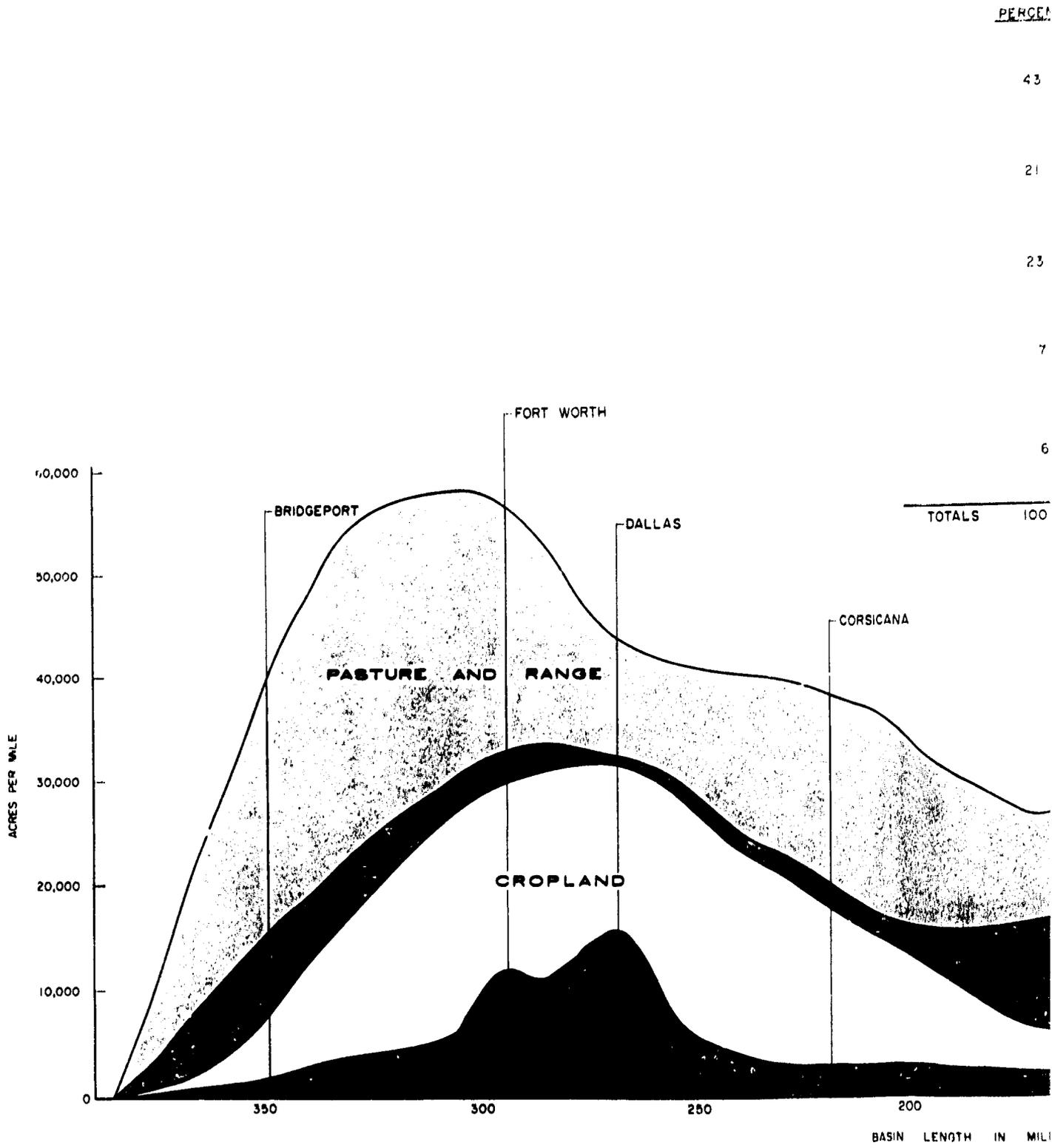
TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT

**BASIN AGRICULTURAL
LAND USE POTENTIAL**

U.S. ARMY ENGINEER DISTRICT, FORT WORTH

TO ACCOMPANY ENVIRONMENTAL STATEMENT

PLATE 12



PERCENT

43

21

23

7

6

TOTALS 100

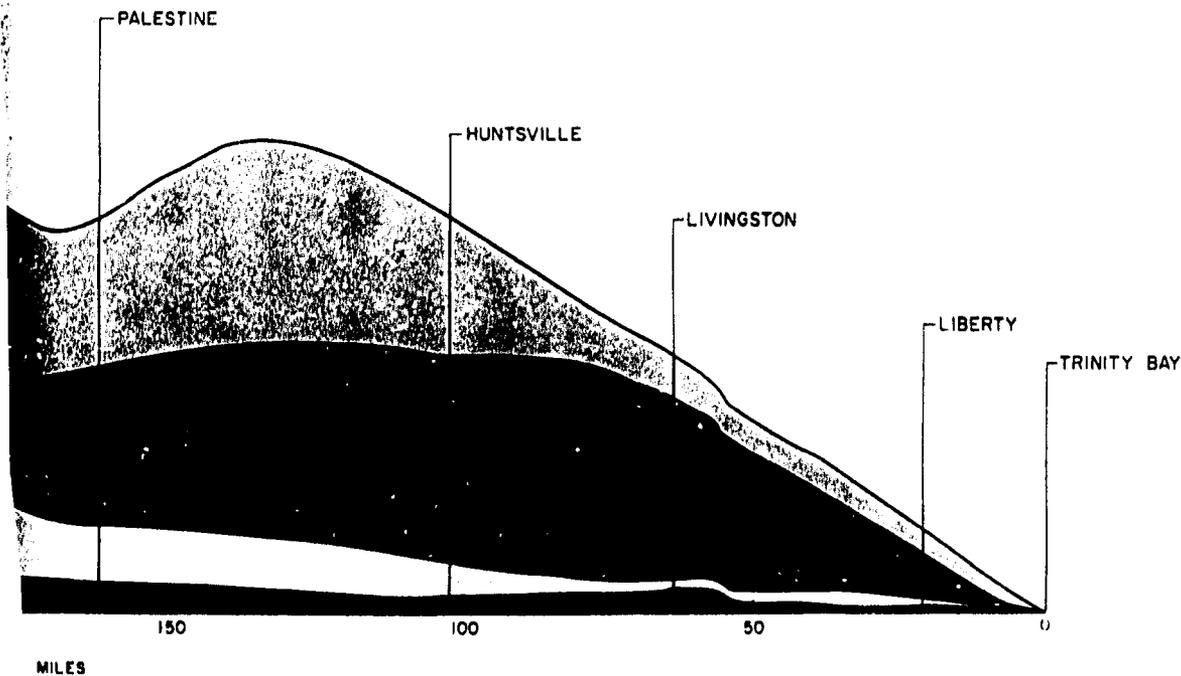
BASIN LENGTH IN MILES

PERCENT ACRES

LEGEND

43	4,961,000		<p>PASTURE AND RANGE- Land in grass or other long term forage growth that is used primarily for grazing. This does not include rotation pasture or cropland. The land may not have 10% or more canopy cover of shade trees or scattered timber trees. The principal plant cover is such as to identify its use as permanent grazing land.</p>
21	2,424,000		<p>FOREST LAND- Lands which are (a) at least 10 percent stocked by forest trees of any size and capable of producing timber or other wood products, or capable of exerting an influence on the water regime; (b) lands from which the trees described in (a) have been removed to less than 10 percent stocking and which have not been developed for other uses; (c) afforested (planted) areas; and (d) chaparral areas.</p>
23	2,718,000		<p>CROPLAND- Land in tillage rotation, orchards, and land formerly used for crops which has not been purposely converted to another use. Lands used for hay meadows are included in cropland. Land use was classed according to findings at the time of inspection.</p>
7	756,000		<p>URBAN- Areas that include cities, villages, and built-up areas of more than 10 acres. It also includes road and railroad areas, industrial sites, railroad yards, cemeteries, airports, golf courses, shooting ranges, institutional, and public administrative sites.</p>
6	641,000		<p>OTHER LAND- Areas not classified above such as rivers, lakes, mining areas, etc.</p>

100% 11,500,000 ACRES • 17,969 SQ. MI.

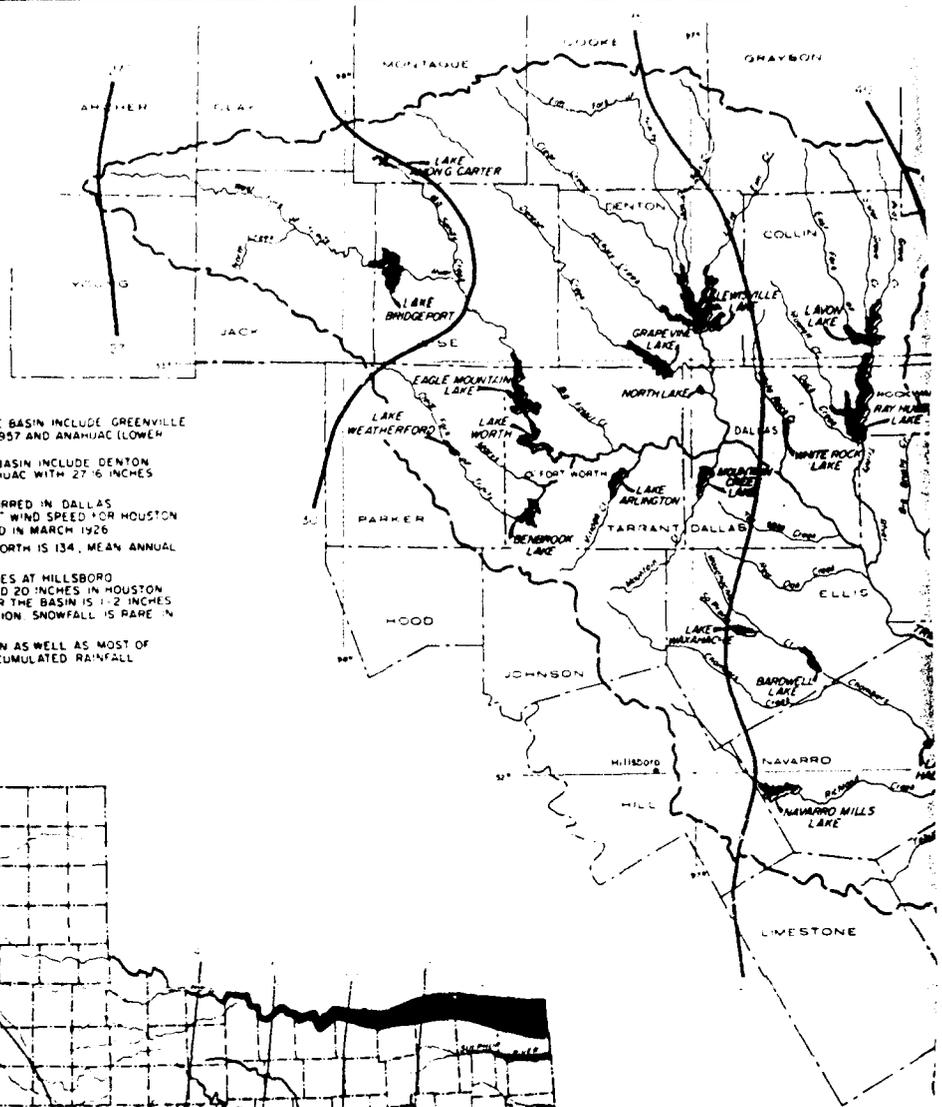


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NOTE:
Basic data from 1970 USDA -
Soil Conservation Service

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TRINITY RIVER AND TRIBUTARIES, TEXAS TRINITY RIVER PROJECT TRINITY BASIN LAND USE
U.S. ARMY ENGINEER DISTRICT, FORT WORTH TO ACCOMPANY ENVIRONMENTAL STATEMENT
PLATE 13



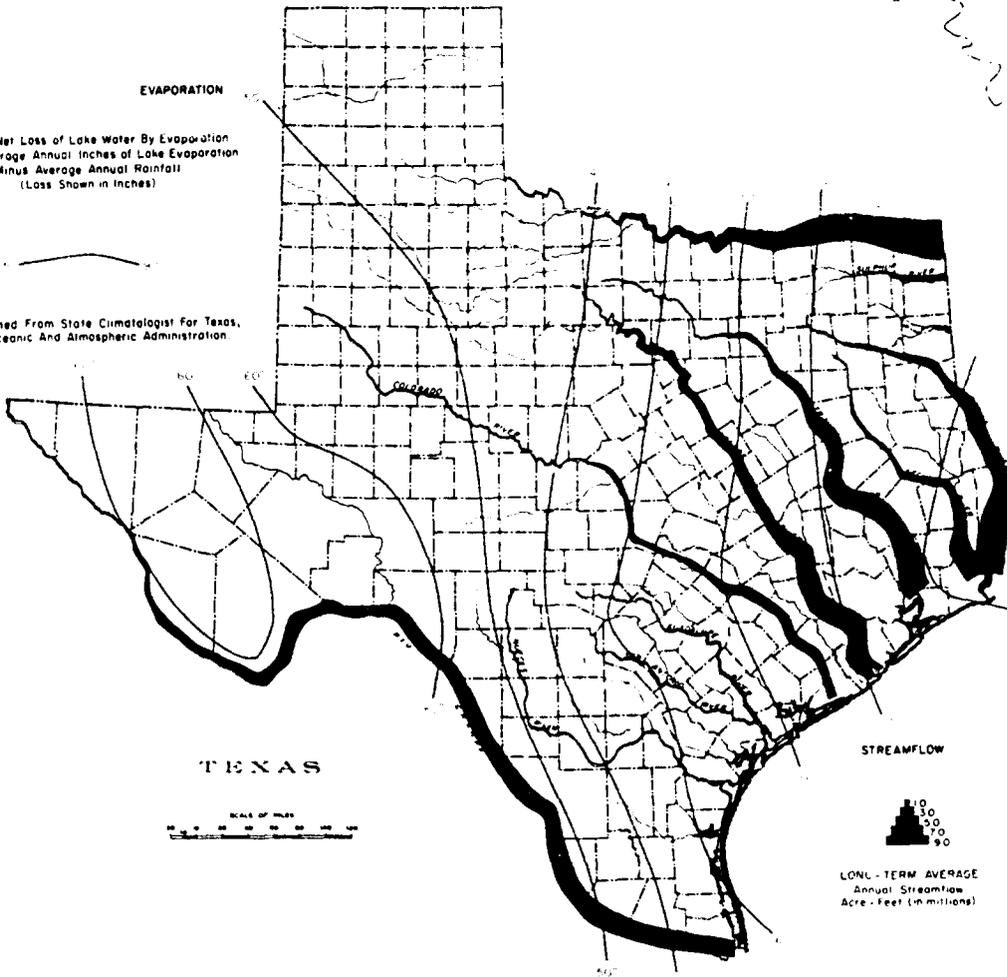
ADDITIONAL BASIN WEATHER NOTES:

- 1 HIGH ANNUAL RAINFALL VALUES RECORDED FOR THE BASIN INCLUDE GREENVILLE (ADJACENT TO UPPER BASIN) WITH 75.24 INCHES IN 1957 AND ANAHUAC (LOWER BASIN) WITH 98.08 IN 1946.
- 2 LOW ANNUAL RAINFALL VALUES RECORDED FOR THE BASIN INCLUDE DENTON (UPPER BASIN) WITH 15.11 INCHES IN 1963 AND ANAHUAC WITH 27.6 INCHES IN 1954.
- 3 THE "FASTEST MILE" WIND SPEED OF 77 M.P.H. OCCURRED IN DALLAS (UPPER BASIN) IN JULY, 1936, THE "FASTEST MILE" WIND SPEED FOR HOUSTON (ADJACENT TO LOWER BASIN) OF 84 M.P.H. OCCURRED IN MARCH 1926.
- 4 MEAN ANNUAL NUMBER OF CLOUDY DAYS FOR FORT WORTH IS 134, MEAN ANNUAL NUMBER OF CLOUDY DAYS IN HOUSTON IS 171.
- 5 HIGH SNOWFALLS FOR THE BASIN INCLUDE 26 INCHES AT MILLSBORO (ADJACENT TO UPPER BASIN) IN DECEMBER 1929, AND 20 INCHES IN HOUSTON (ADJACENT TO LOWER BASIN) IN FEBRUARY 14, 1895. AVERAGE ANNUAL SNOWFALL FOR THE BASIN IS 1.2 INCHES PER YEAR IN THE UPPER BASIN WITH NO ACCUMULATION. SNOWFALL IS RARE IN THE LOWER BASIN.
- 6 A SEVERE DROUGHT OCCURRED IN THE TRINITY BASIN AS WELL AS MOST OF TEXAS DURING THE YEARS 1950-1957, WITH THE ACCUMULATED RAINFALL DEFICIENCY REACHING 68 INCHES IN FORT WORTH.

EVAPORATION

Annual Net Loss of Lake Water By Evaporation Equals Average Annual Inches of Lake Evaporation Minus Average Annual Rainfall (Loss Shown in Inches)

Data Obtained From State Climatologist for Texas, National Oceanic And Atmospheric Administration



TEXAS



STREAMFLOW



LONG-TERM AVERAGE Annual Streamflow Acre-Feet (in millions)

AVERAGE ANNUAL STREAMFLOW OF MAJOR RIVERS AND AVERAGE ANNUAL NET LAKE EVAPORATION

Data Sources for Water Quality Parameters
on Plates 15.1 through 15.19

MC CULLOUGH, JACK D. and MICHAEL A. CHAMP. 1973, Limnologic - aquatic elements. In, "Ecological Survey Data for Environmental Considerations on the Trinity River and Tributaries, Texas." Stephen F. Austin State University, Nacogdoches, Texas, Corps of Engineers Contract No. DACW63-73-C-0016. 93 - 195.

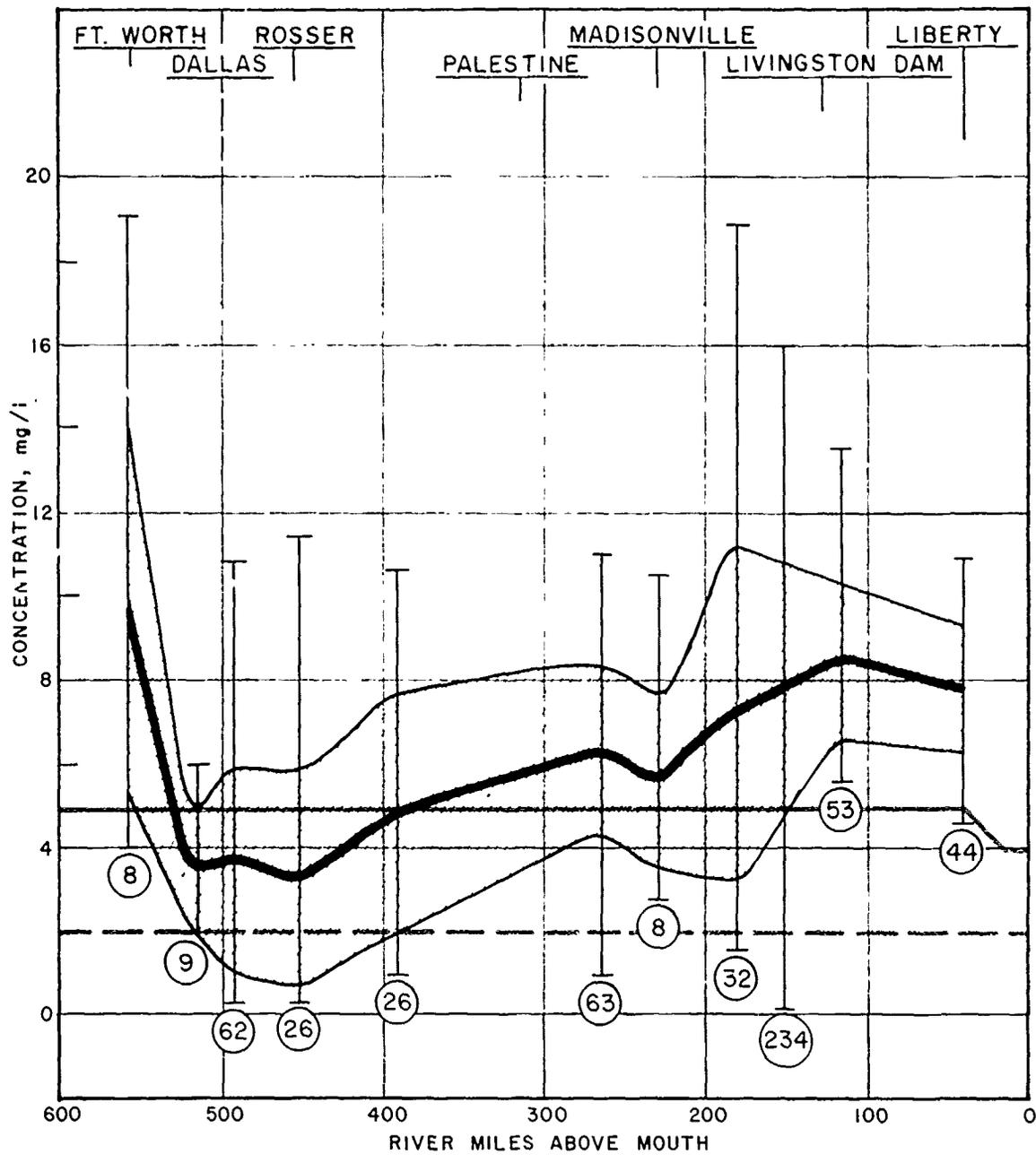
MC CULLOUGH, JACK D. 1972. Eutrophication and pesticide elements. In, "A Survey of the Environmental and Cultural Resources of the Trinity River." Stephen F. Austin State University, Nacogdoches, Texas, Corps of Engineers Contract No. DACW63-72-C-0005. 141 - 189.

U.S.G.S. 1968. Water quality records, Part 2. In, "Water Resource Data for Texas." U.S.G.S. Water Resources Division, Austin, Texas. 746 p.

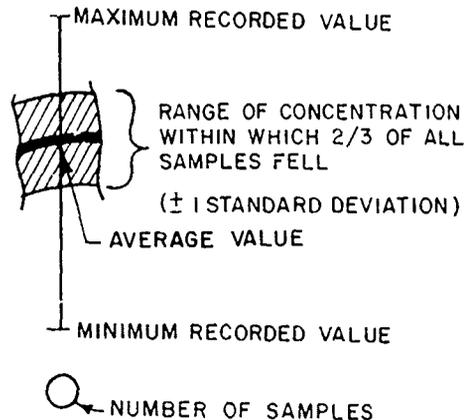
U.S.G.S. 1970. Water quality records, Part 2. In, "Water Resource Data for Texas." U.S.G.S. Water Resources Division, Austin, Texas. 714 p.

Plates 15.1 through 15.10 include data from Corps of Engineers contract studies listed above, USGS water quality sampling stations, and the Trinity River Authority. This sampling was all conducted between October 1967 and September 1973, although individual parameters may not span this entire period.

Sampling for Plates 15.11 through 15.19 was conducted between 1 September 1972 and 30 June 1973. This sampling spanned the four seasons and included a variety of flows ranging from less than 100 cfs to more than 15,000 cfs.

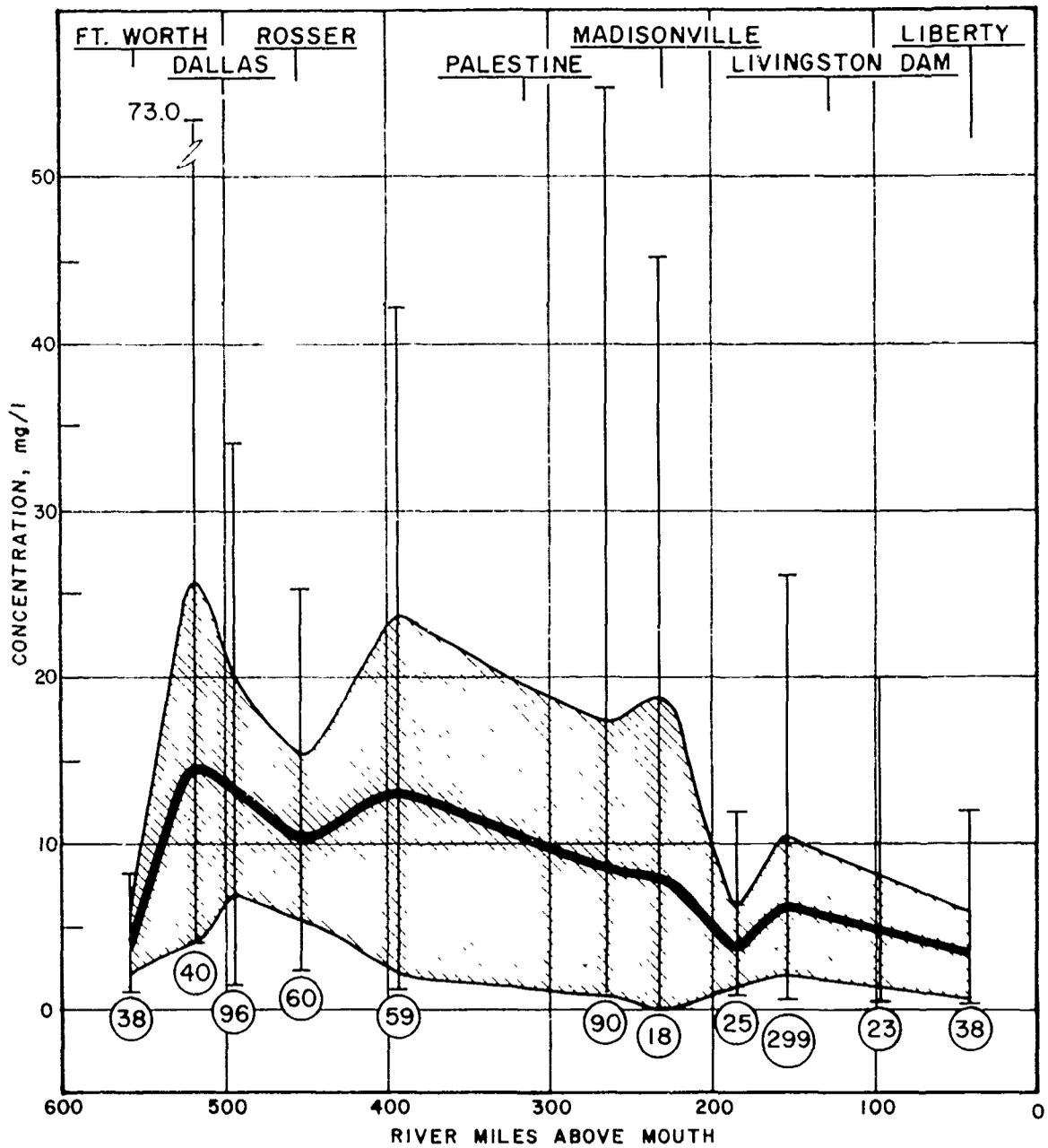


LEGEND

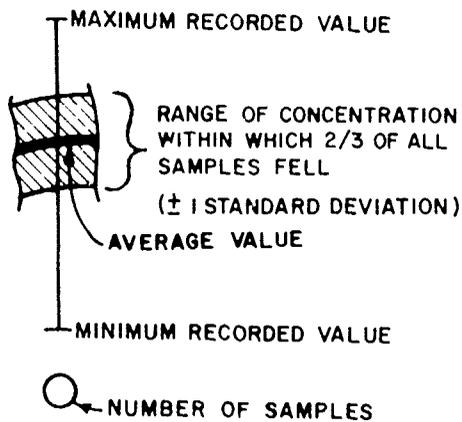


——— Minimum 4.0 tidal; 5.0 all else; Texas Water Quality Standards, October 1973
 - - - Exception: minimum 2.0 when low flow is effluent dominated, Texas Water Quality Standards, October 1973

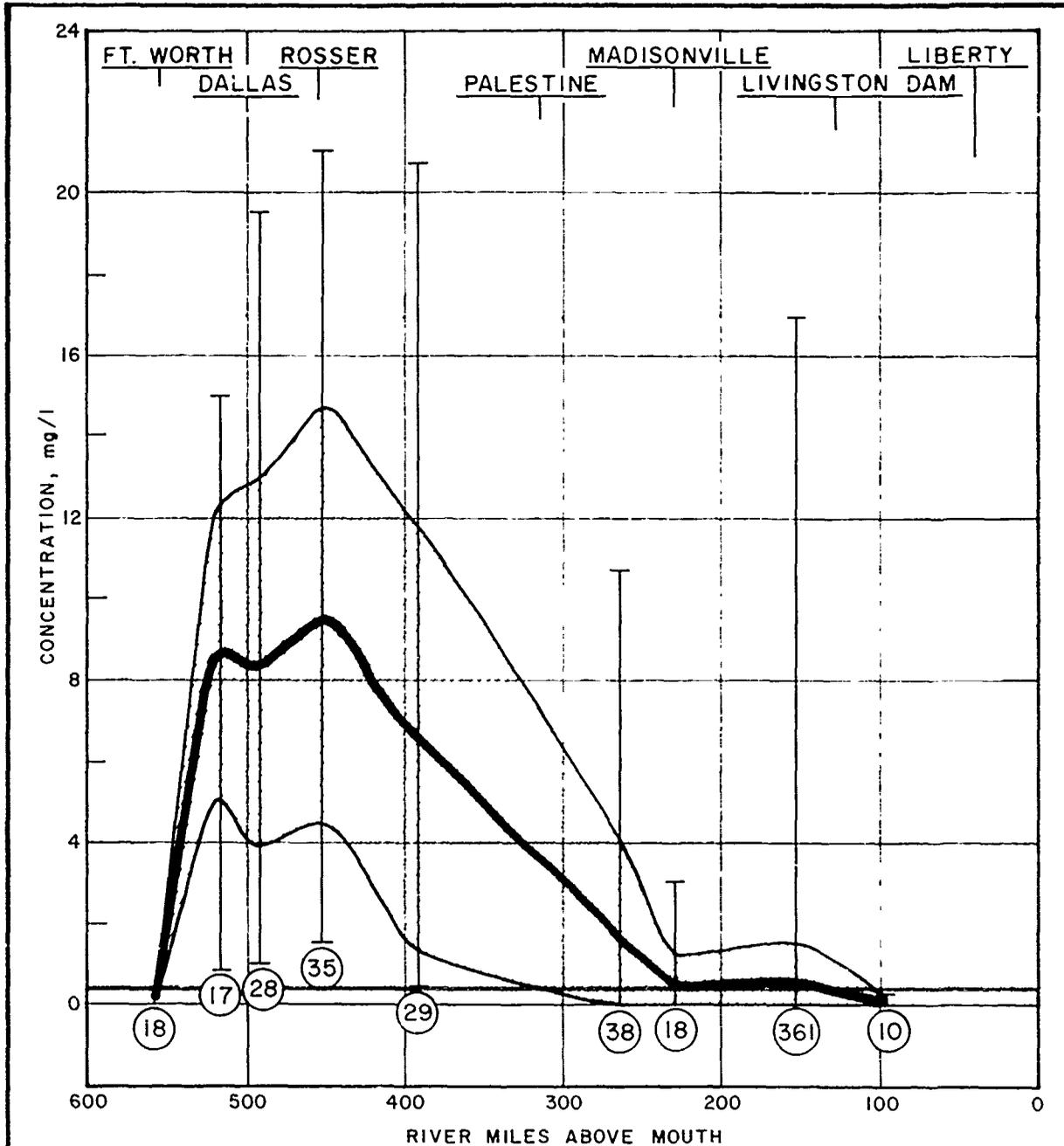
TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
WATER QUALITY PARAMETERS
DISSOLVED OXYGEN
 U S ARMY ENGINEER DIST., FT WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT



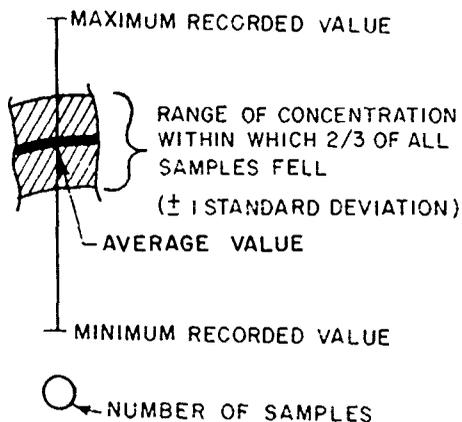
LEGEND



TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
WATER QUALITY PARAMETERS
BIOCHEMICAL OXYGEN DEMAND (BOD)
 U.S. ARMY ENGINEER DIST, FT WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT
 PLATE 15.2



LEGEND



Permissible limit for public water supplies is 0.5 mg/l;
 Water Quality Criteria, Federal Water Pollution Control Administration, 1 April 1968

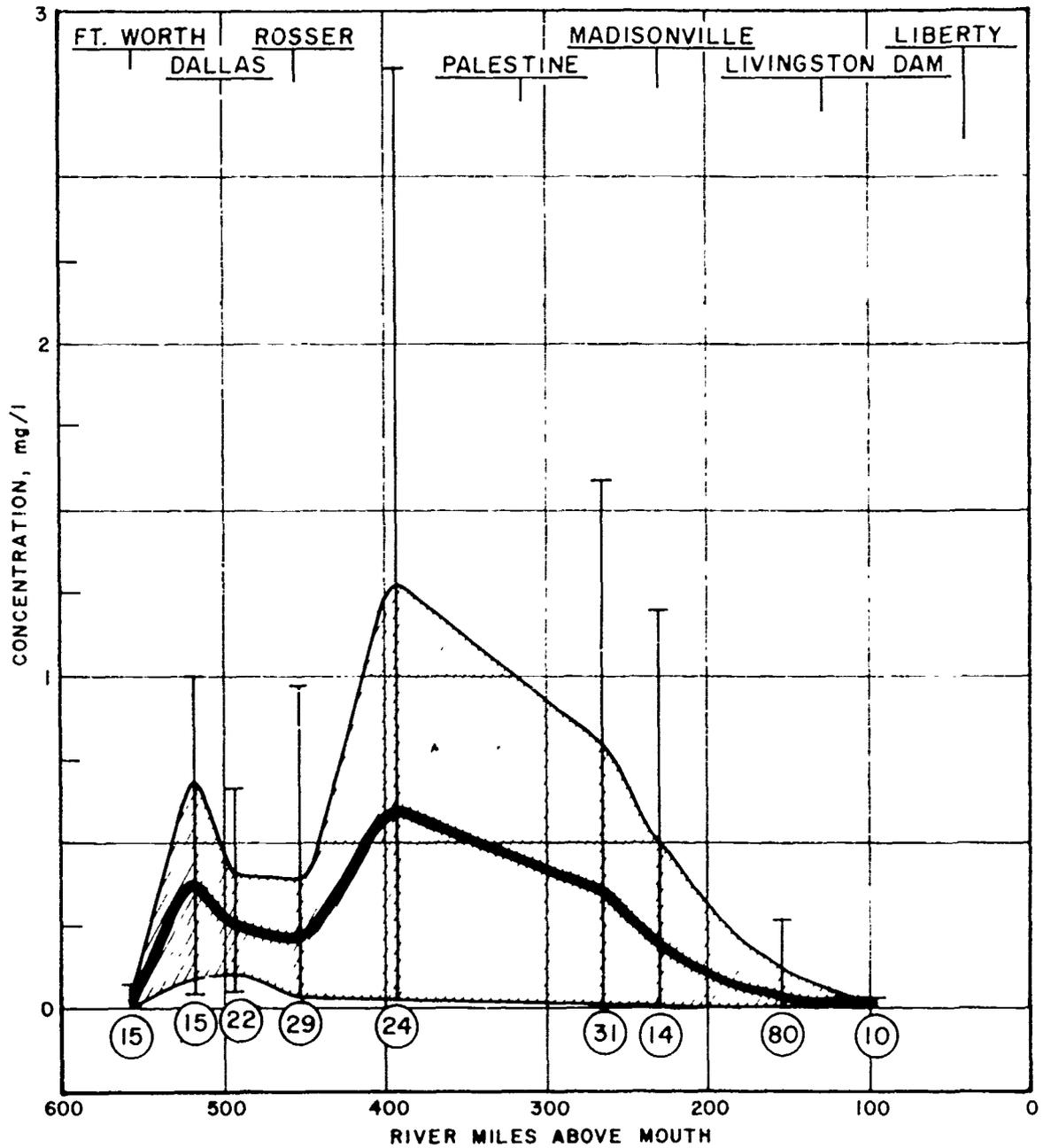
TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT

**WATER QUALITY PARAMETERS
 NITROGEN AS AMMONIA**

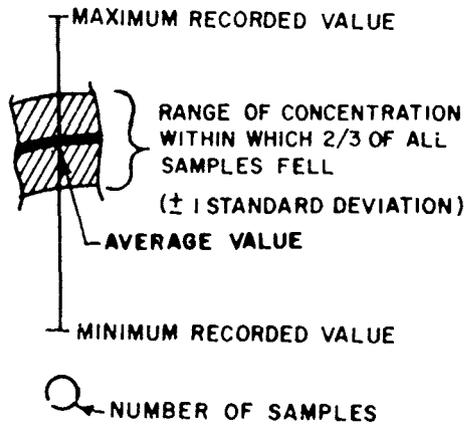
U.S. ARMY ENGINEER DIST, FT WORTH

TO ACCOMPANY ENVIRONMENTAL STATEMENT

PLATE 153



LEGEND

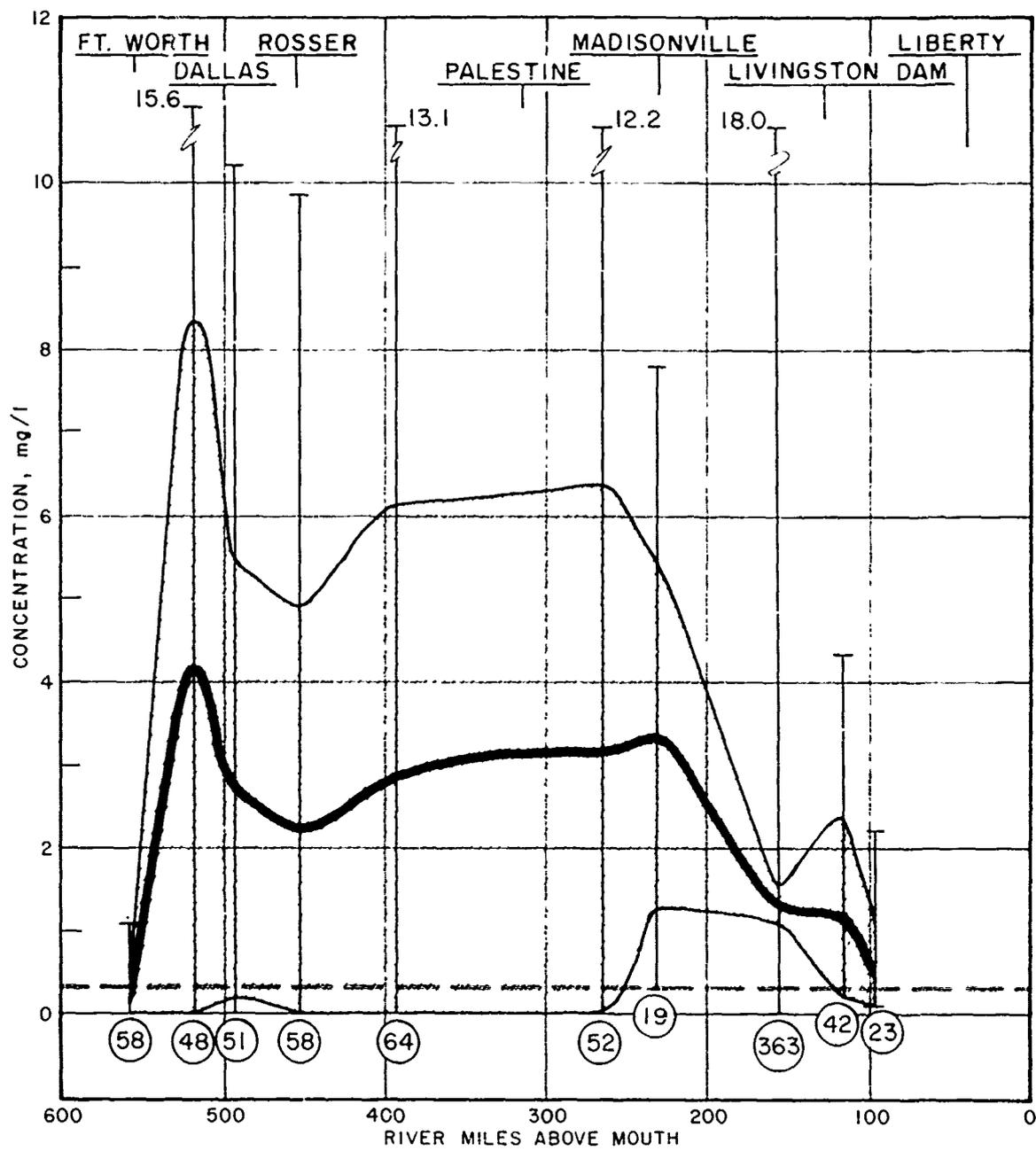


See text for water quality standards on Nitrates and Nitrites

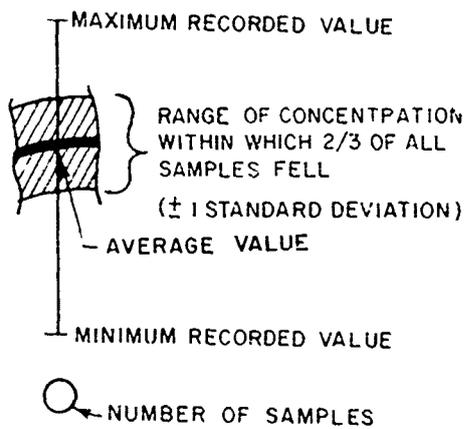
TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
WATER QUALITY PARAMETERS
NITROGEN AS NITRITE

U.S. ARMY ENGINEER DIST., FT. WORTH

TO ACCOMPANY ENVIRONMENTAL STATEMENT



LEGEND



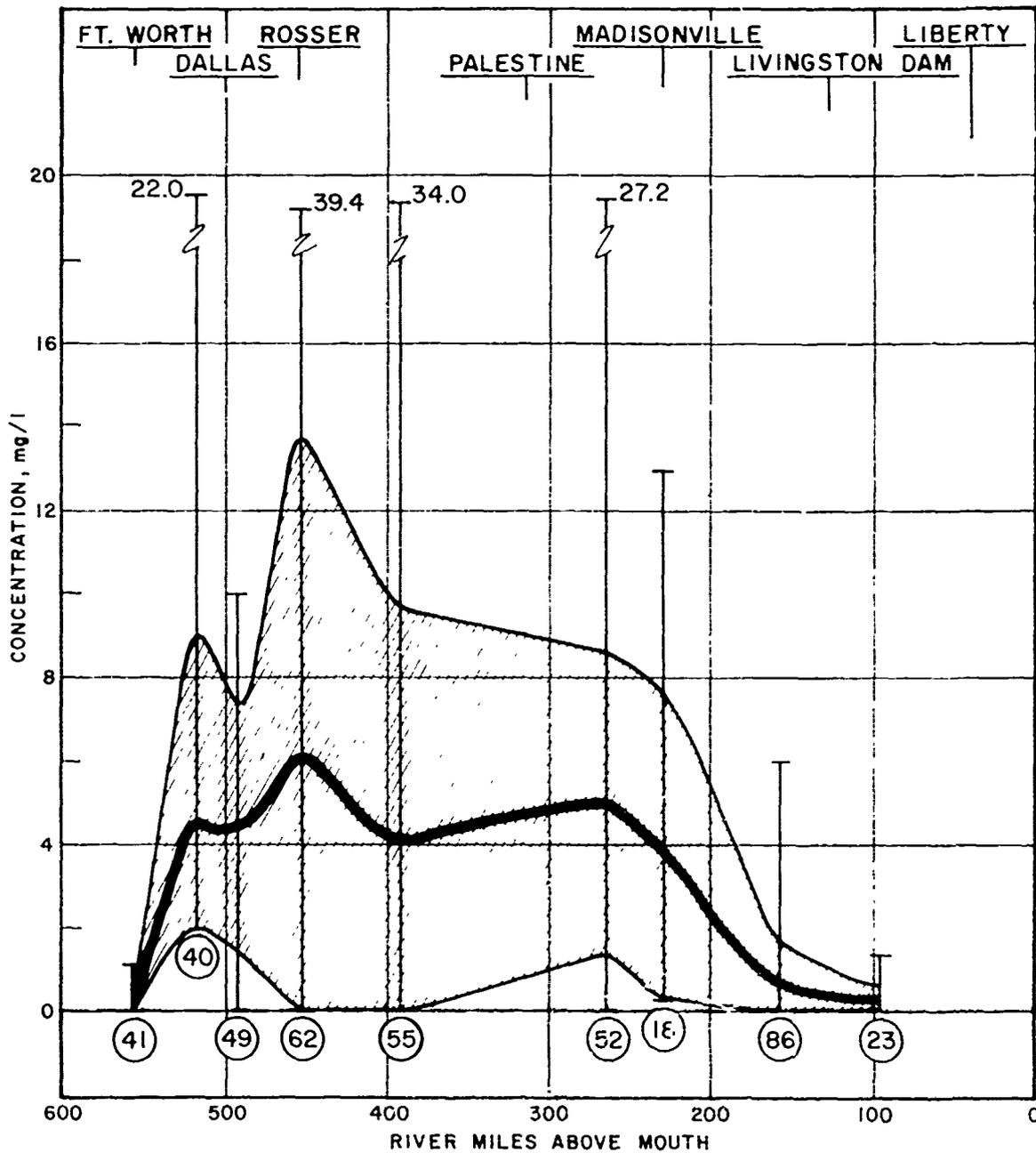
--- Minimum quantity of nitrate necessary for accelerated algal growth is 0.3 mg/l (Vollenweider, 1968)

See text for water quality standards on Nitrates and Nitrites

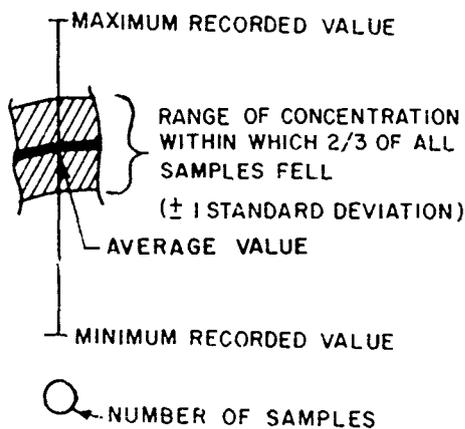
TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT
**WATER QUALITY PARAMETERS
NITROGEN AS NITRATE**

U.S. ARMY ENGINEER DIST, FT WORTH

TO ACCOMPANY ENVIRONMENTAL STATEMENT



LEGEND

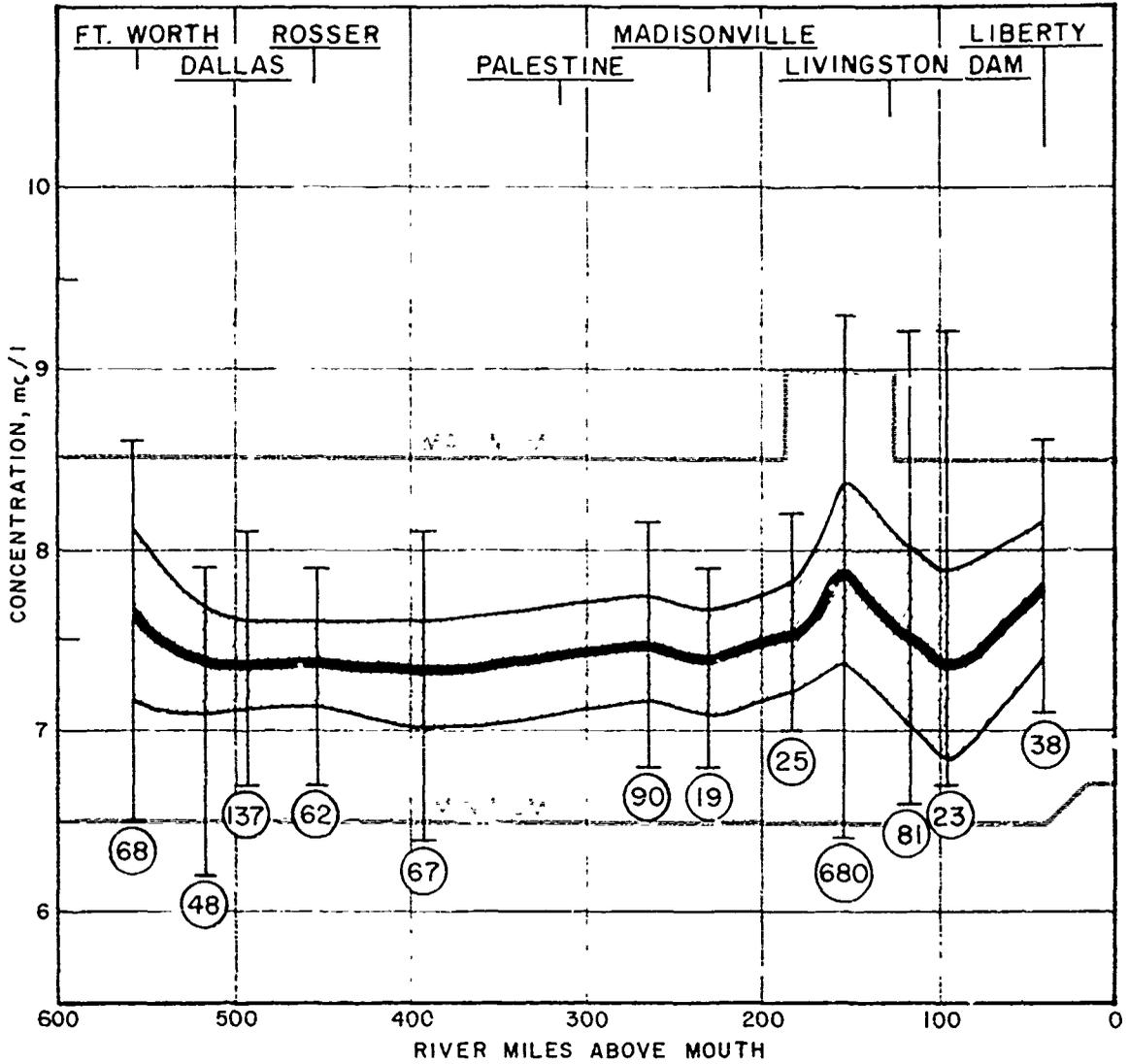


Minimum quantity of total phosphorus necessary for accelerated algal growth is 0.01 mg/l (orthophosphates are a part of this minimum) (Vollenweider, R. A., 1968)

TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT
WATER QUALITY PARAMETERS
ORTHOPHOSPHATE

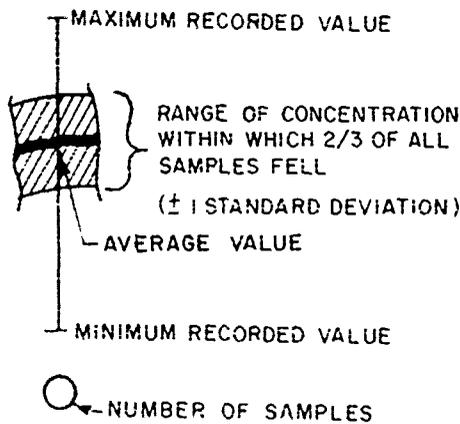
U.S. ARMY ENGINEER DIST., FT. WORTH

TO ACCOMPANY ENVIRONMENTAL STATEMENT



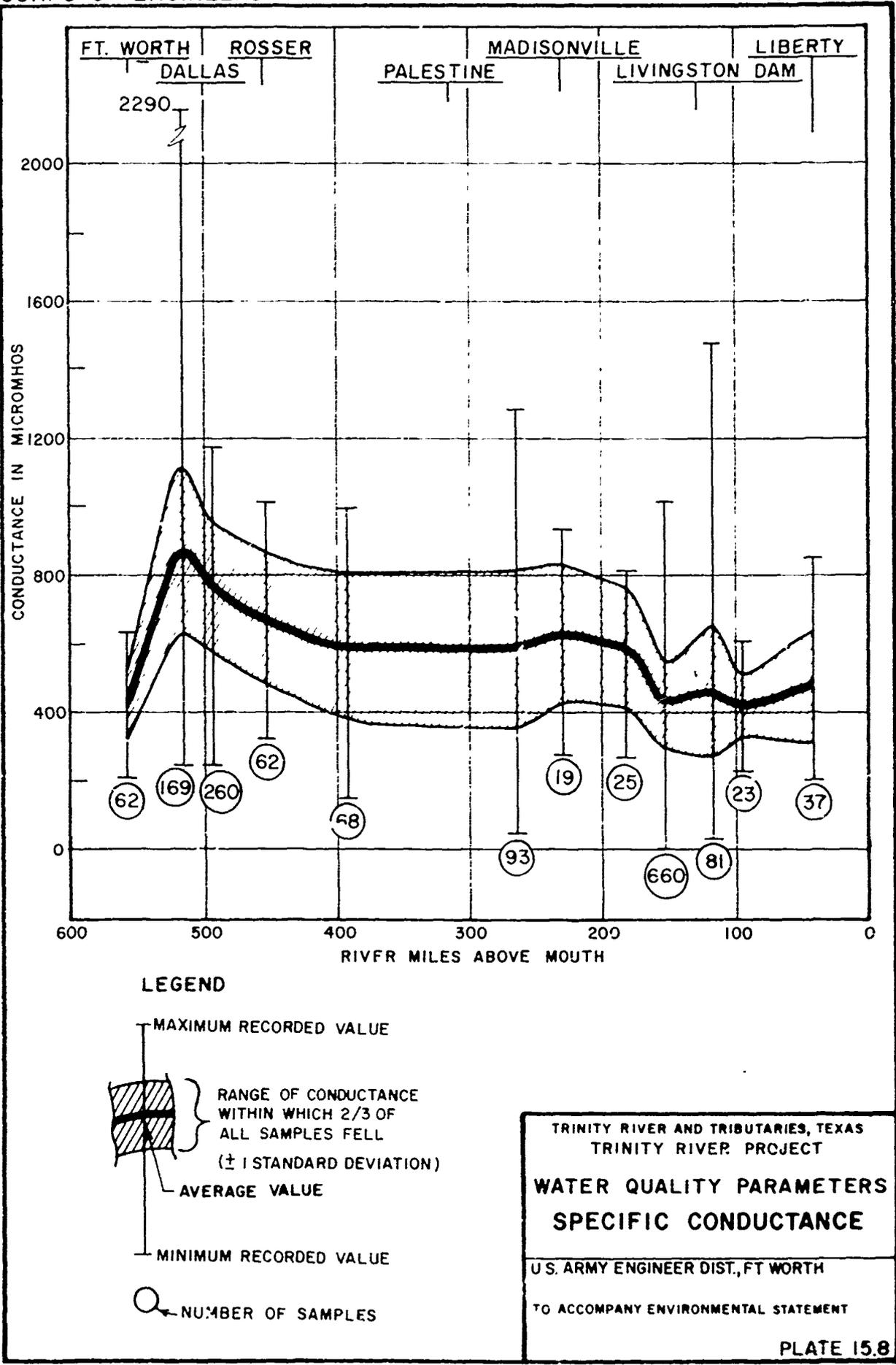
Maximum 9.0 Lake Livingston, 8.5 all else; Minimum 6.7 tidal, 6.5 all else; Texas Water Quality Standards, Oct 1973

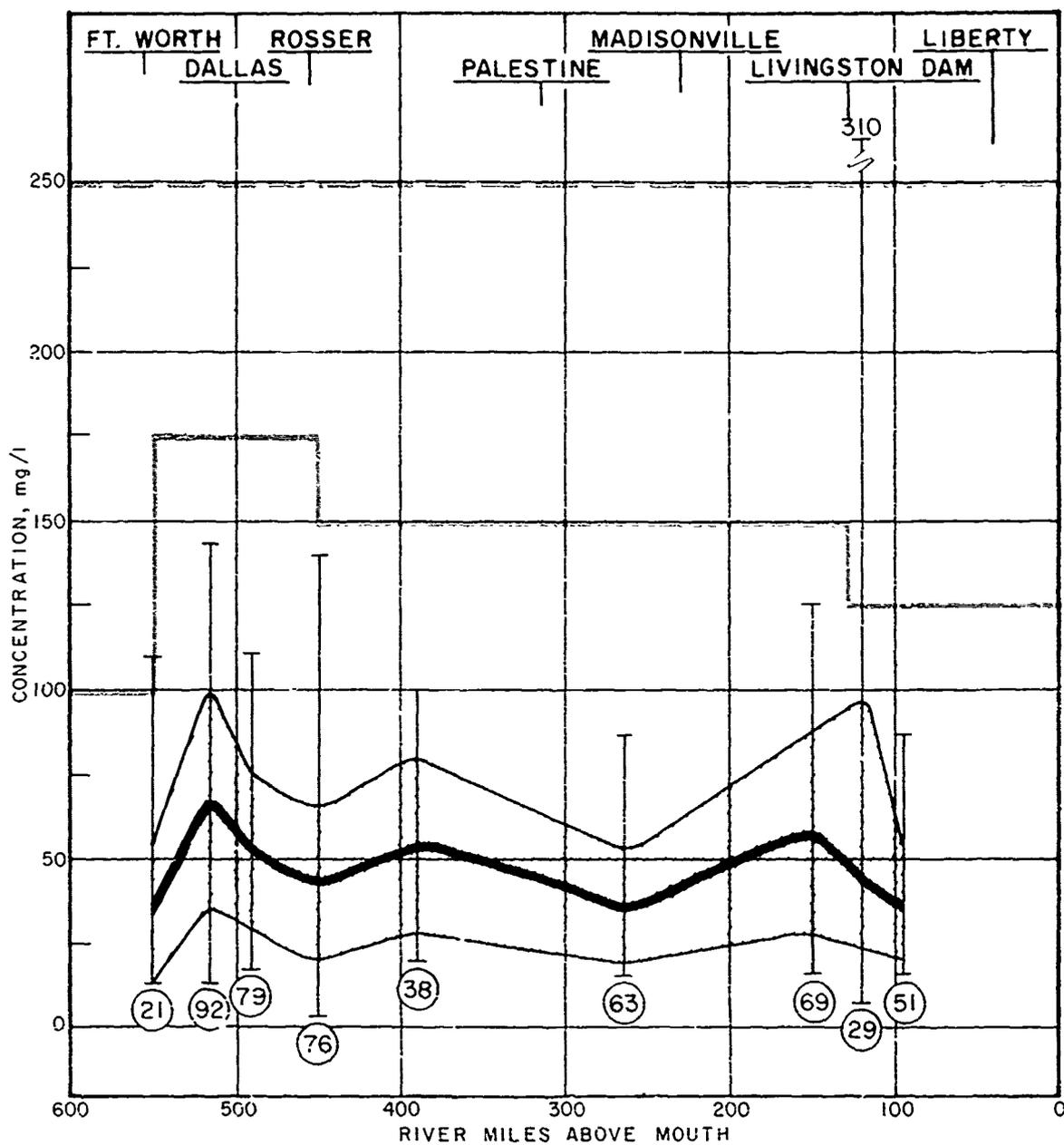
LEGEND



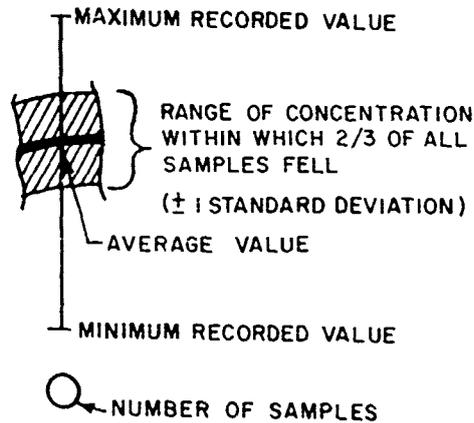
TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT
WATER QUALITY PARAMETERS
pH

U.S. ARMY ENGINEER DIST, FT WORTH
TO ACCOMPANY ENVIRONMENTAL STATEMENT



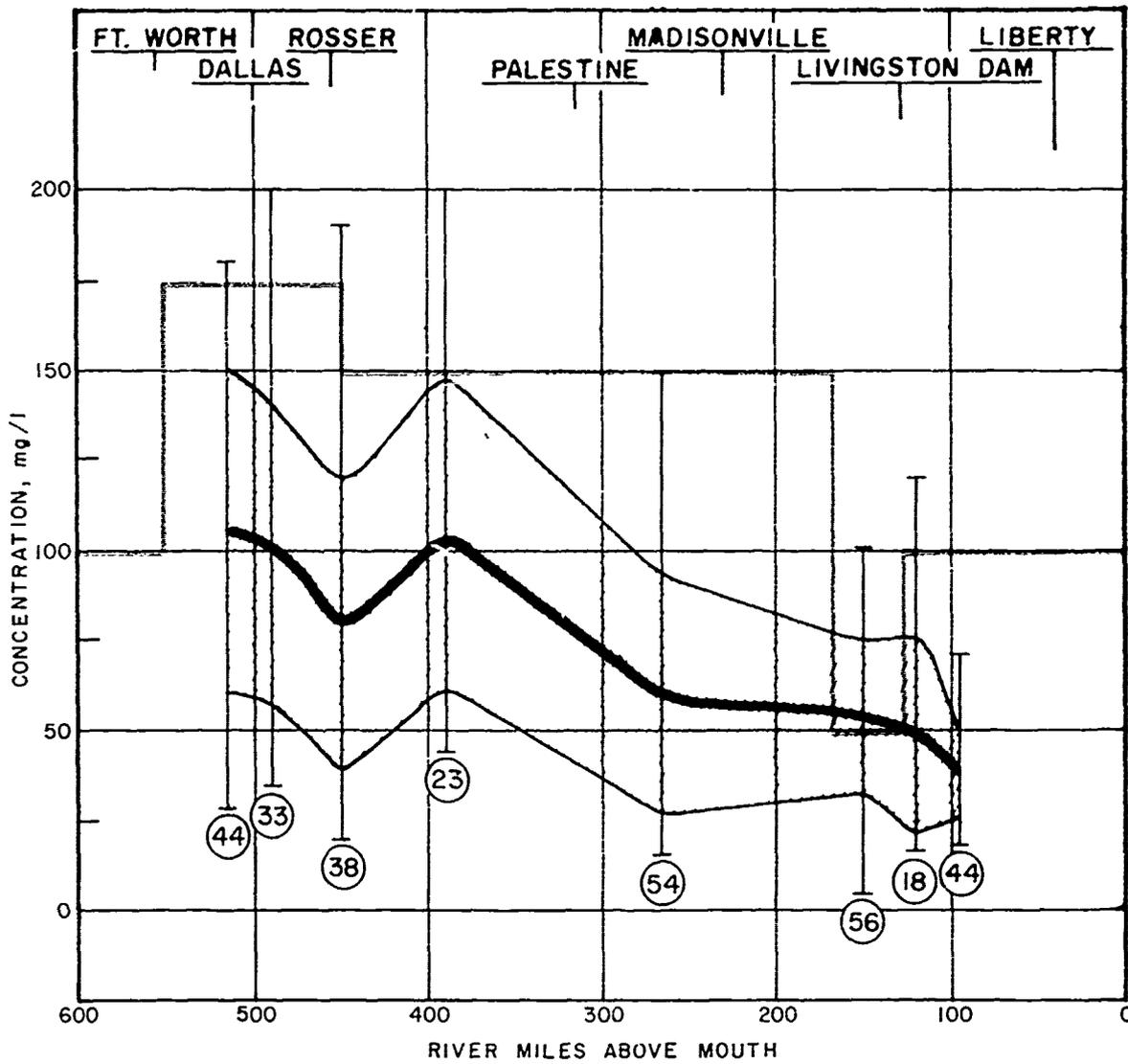


LEGEND



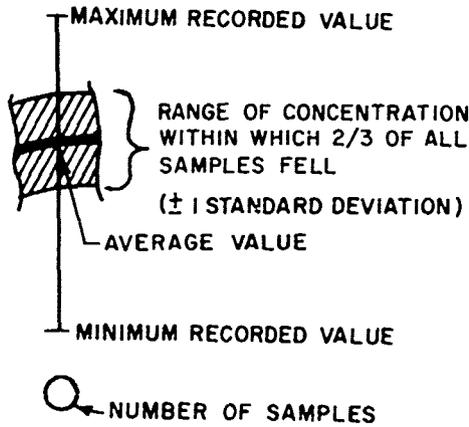
——— Maximum (25, tidal to Livingston Dam, 150 Lake Livingston to S H 34 near Rosser; 175 S H 34 to Fort Worth; Texas Water Quality Standards, Oct 1973)
 - - - 250 recommended limit, USPHS Drinking Water Standards, 1962

TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
WATER QUALITY PARAMETERS
CHLORIDES
 U.S. ARMY ENGINEER DIST., FT. WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT
 PLATE 159

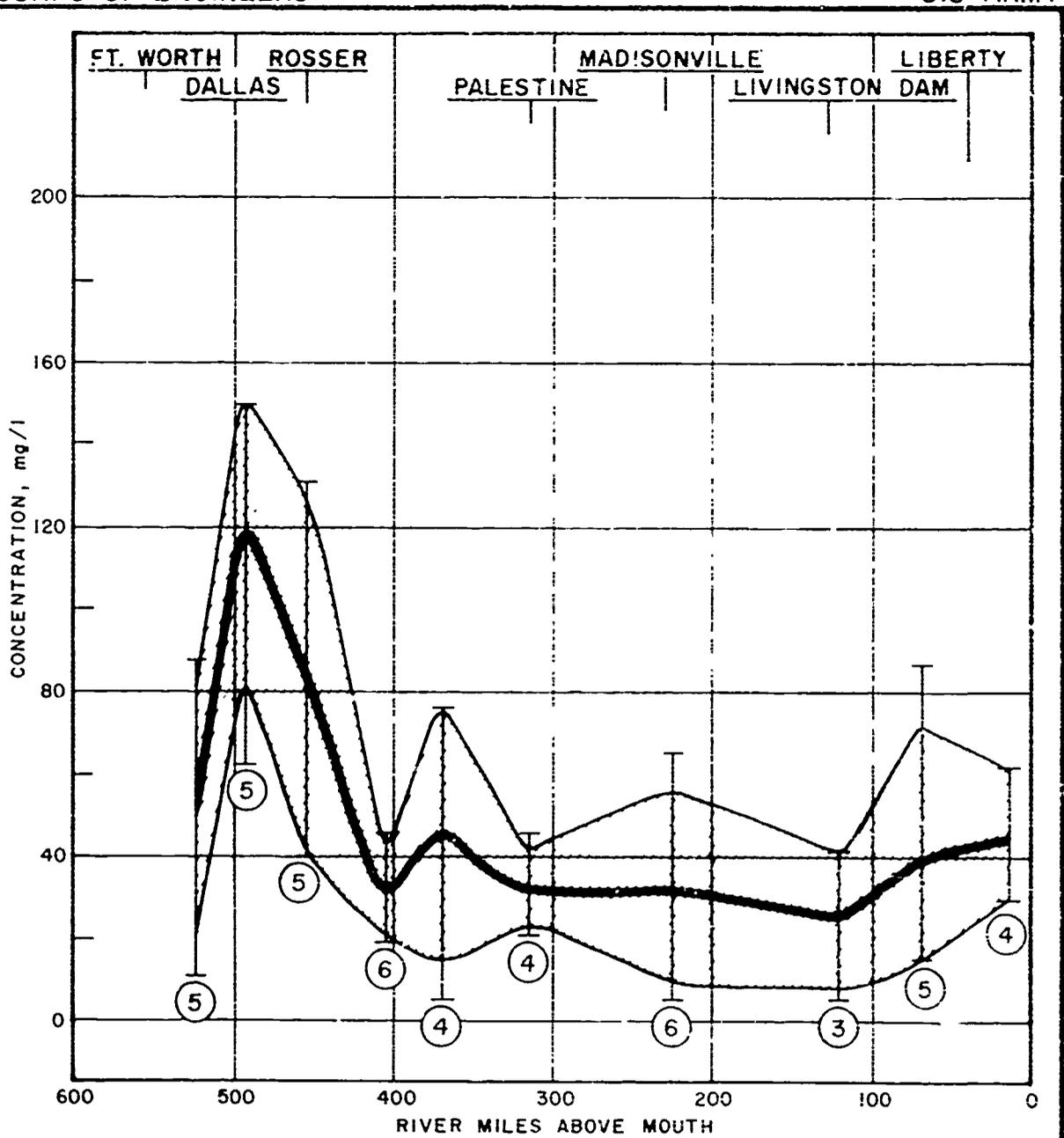


— Maximum 100 mg/l, tidal to Livingston; 50 mg/l, Lake Livingston; 150 mg/l, Lake Livingston headwater to S.H. 34 near Rosser; 175 mg/l, S.H. 34 to Fort Worth; Texas Water Quality Standards, October 1973

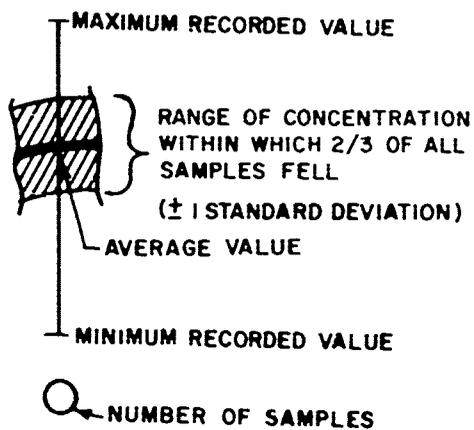
LEGEND



TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
**WATER QUALITY PARAMETERS
 SULFATES**
 U.S. ARMY ENGINEER DIST., FT. WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT
 PLATE 15.10

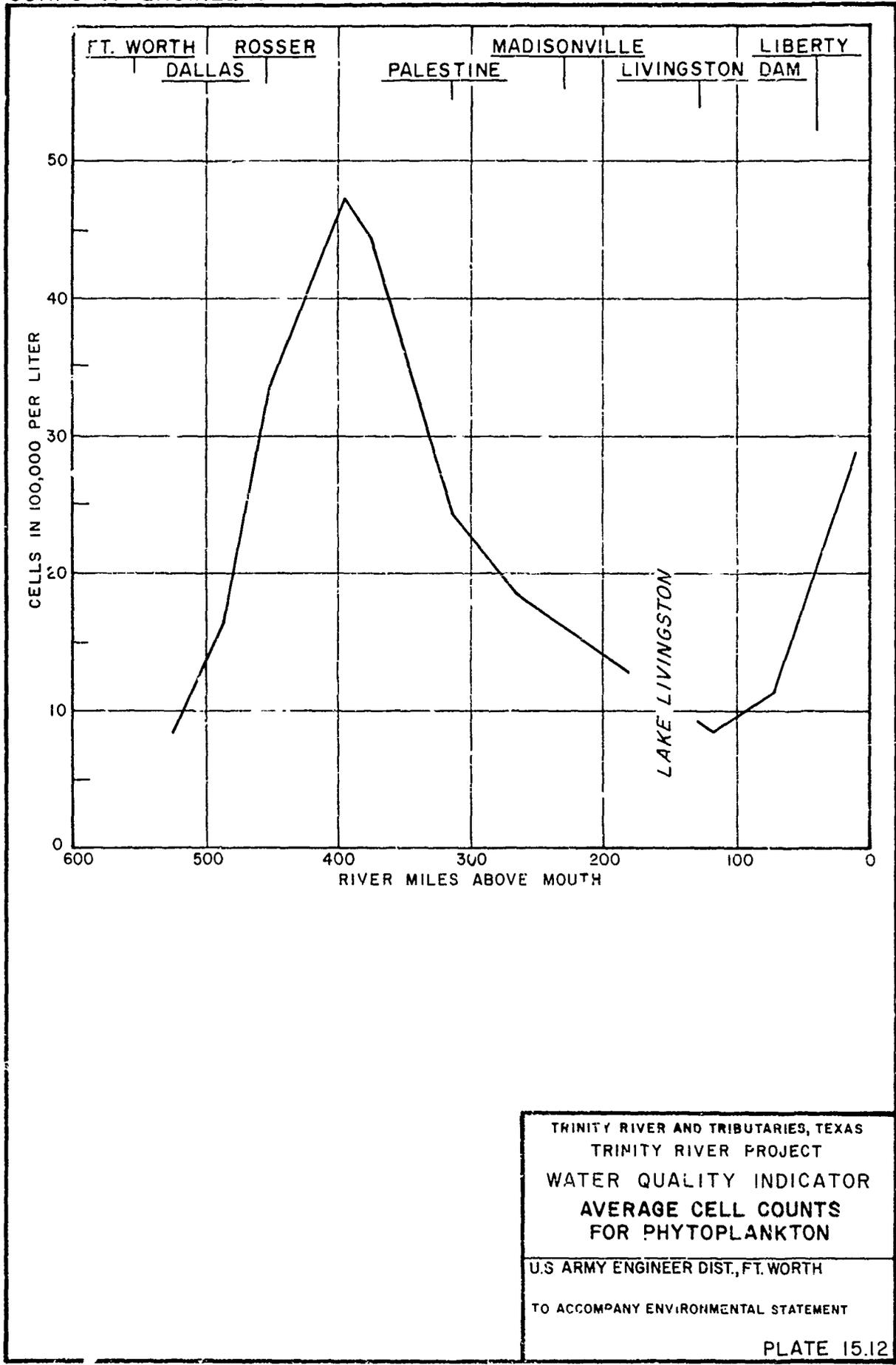


LEGEND

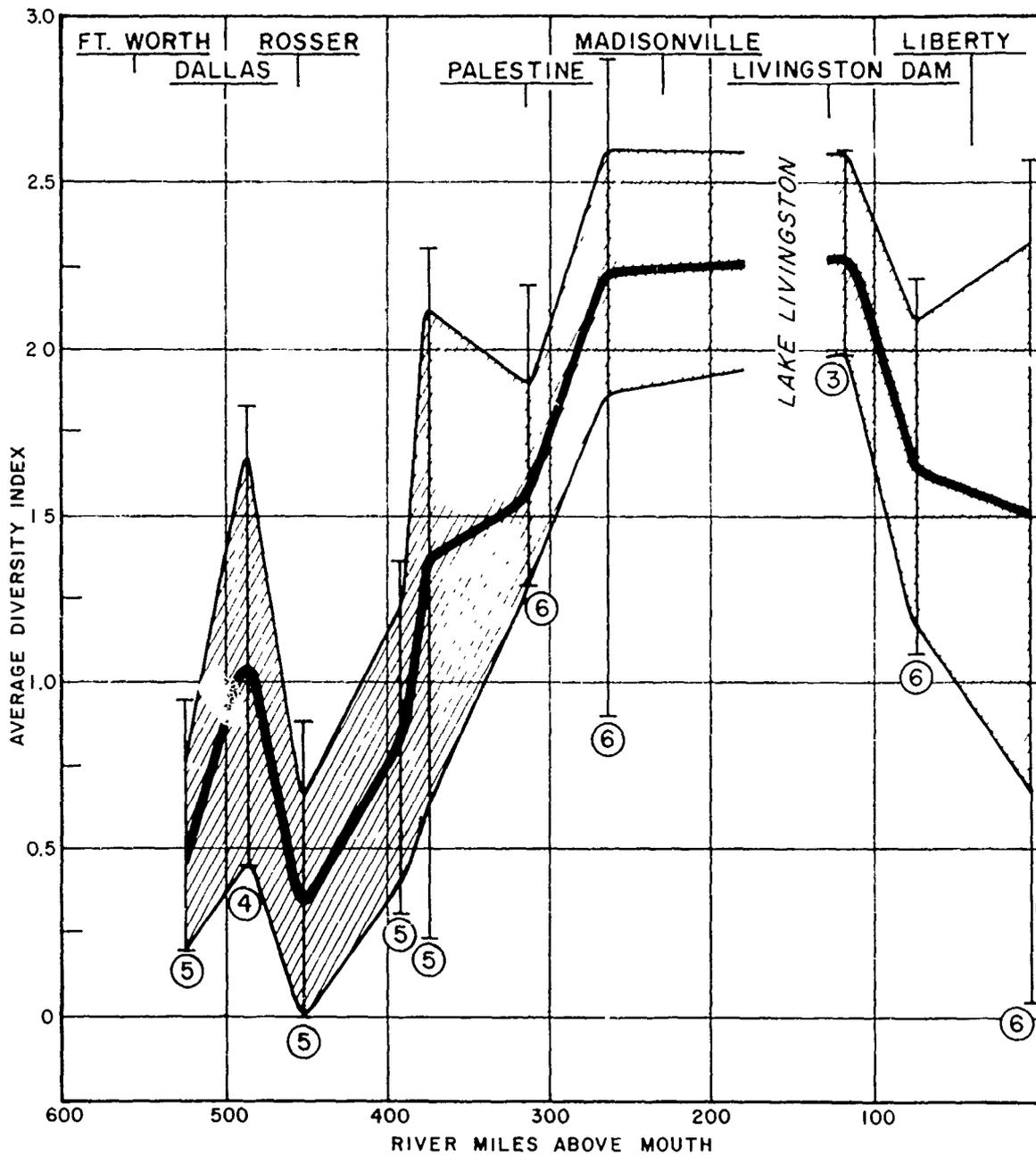


See text for discussion

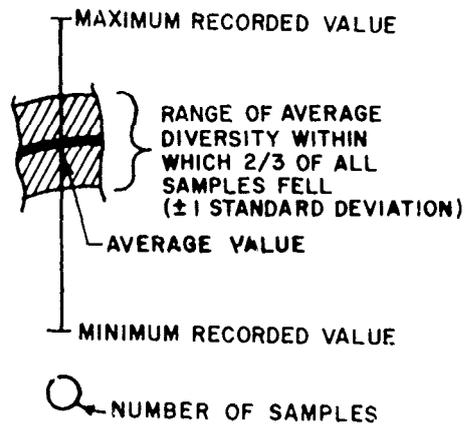
TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
WATER QUALITY PARAMETERS
TOTAL ORGANIC CARBON
 U.S. ARMY ENGINEER DIST., FT. WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT
 PLATE 15.11



TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT
WATER QUALITY INDICATOR
AVERAGE CELL COUNTS
FOR PHYTOPLANKTON
U.S. ARMY ENGINEER DIST., FT. WORTH
TO ACCOMPANY ENVIRONMENTAL STATEMENT
PLATE 15.12

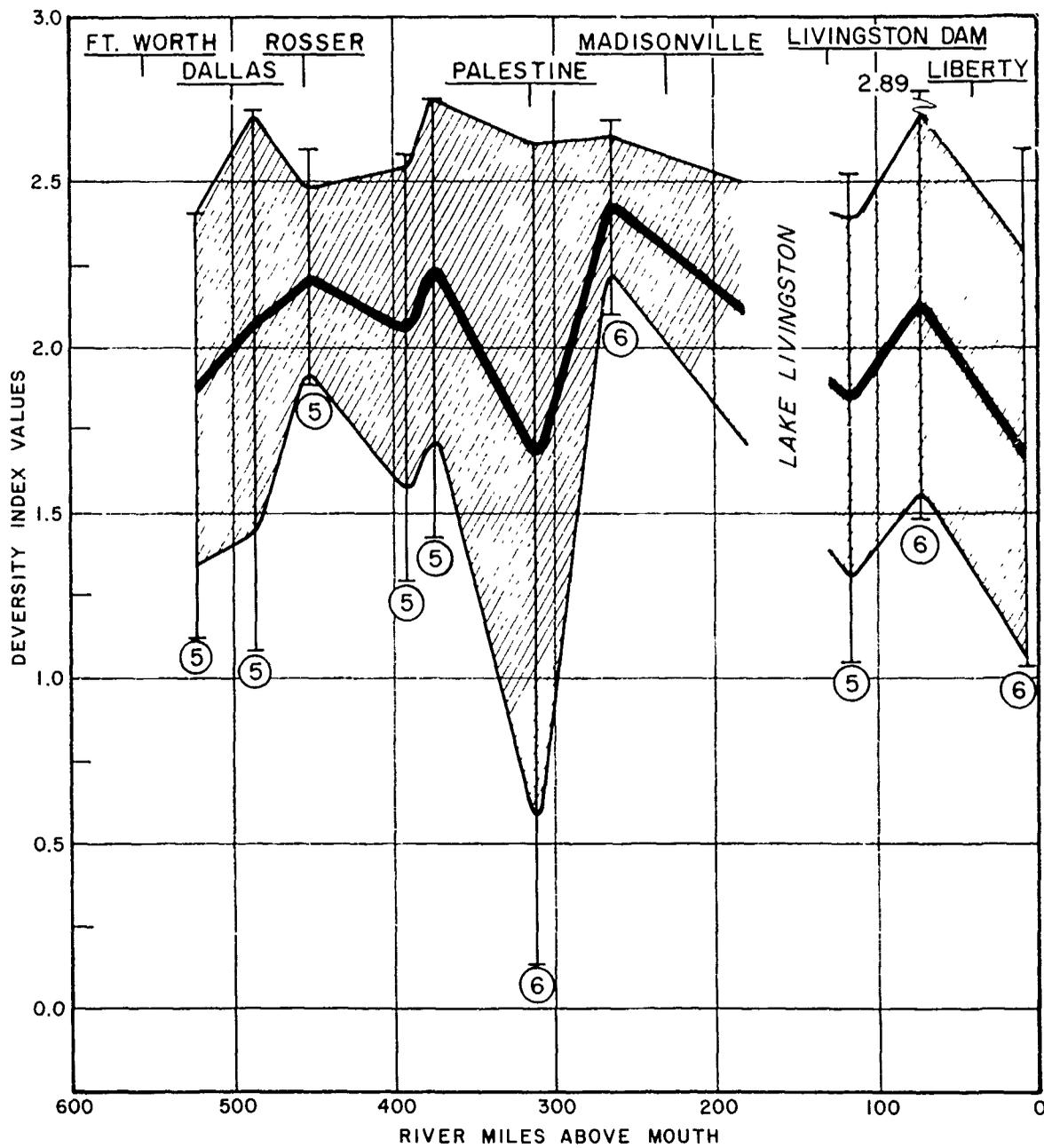


LEGEND

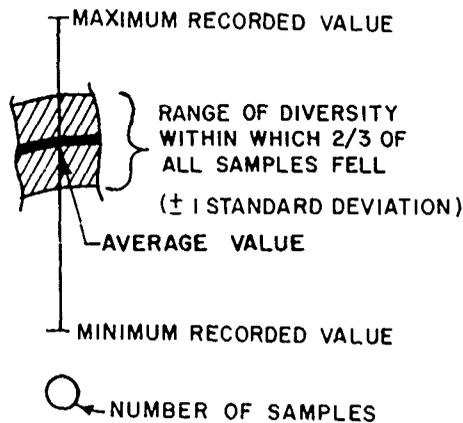


Index values of less than 1.0 are indicative of heavy pollution; values from 1.0 to 3.0 are indicative of moderate pollution; and values above 3.0 are representative of clean water. Values based on sampling at 10 stations between September 1972 and April 1973.

TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
 WATER QUALITY INDICATOR
 AVERAGE DIVERSITY INDEX
 FOR BENTHIC ORGANISMS
 U.S. ARMY ENGINEER DIST, FT WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT
 PLATE 15.13



LEGEND



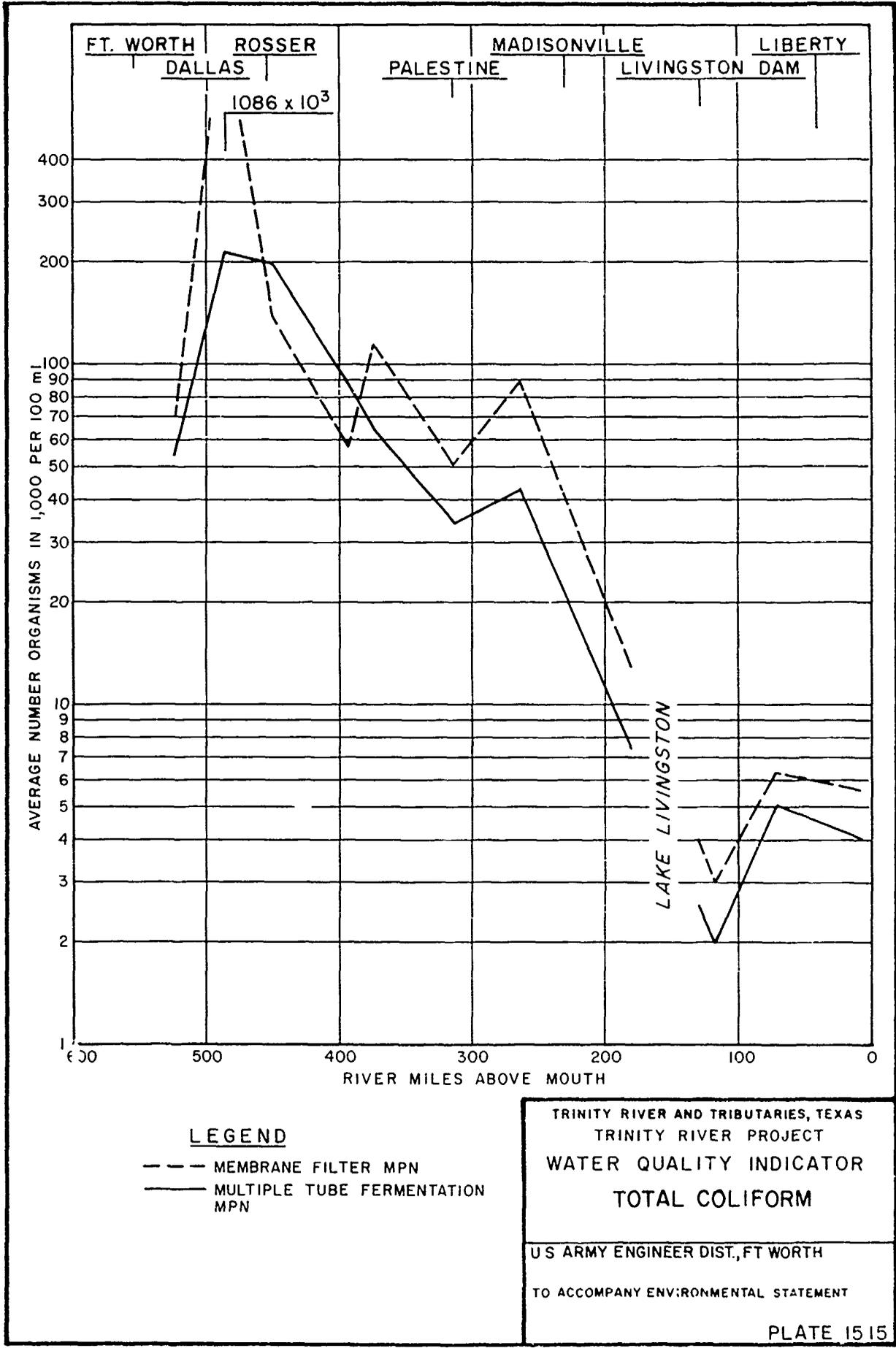
Index values of less than 1.0 are indicative of heavy pollution; values from 1.0 to 3.0 are indicative of moderate pollution; and values above 3.0 are representative of clean water.

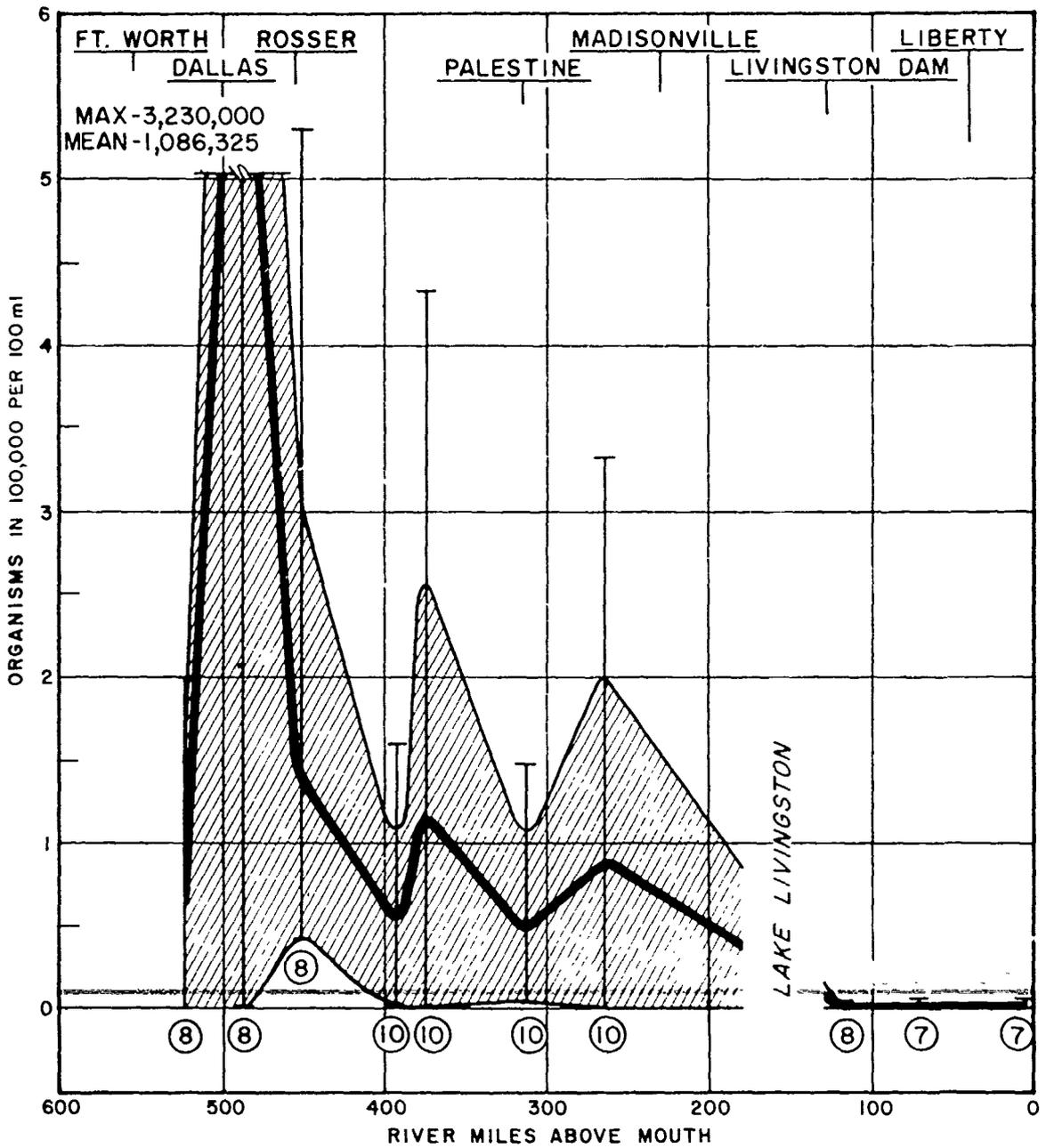
See text for the explanation of the relatively high diversity values show in area of Dallas to Rosser.

TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
WATER QUALITY INDICATOR
AVERAGE ZOOPLANKTON
DIVERSITY INDEX

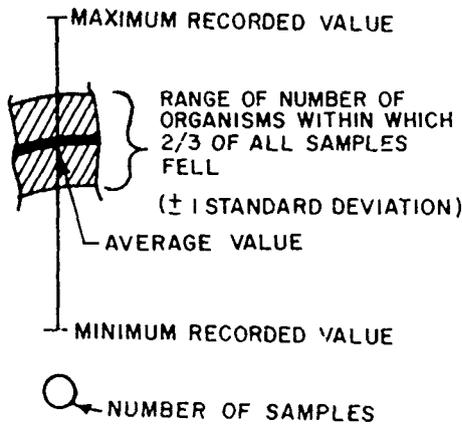
U.S. ARMY ENGINEER DIST, FT. WORTH

TO ACCOMPANY ENVIRONMENTAL STATEMENT





LEGEND

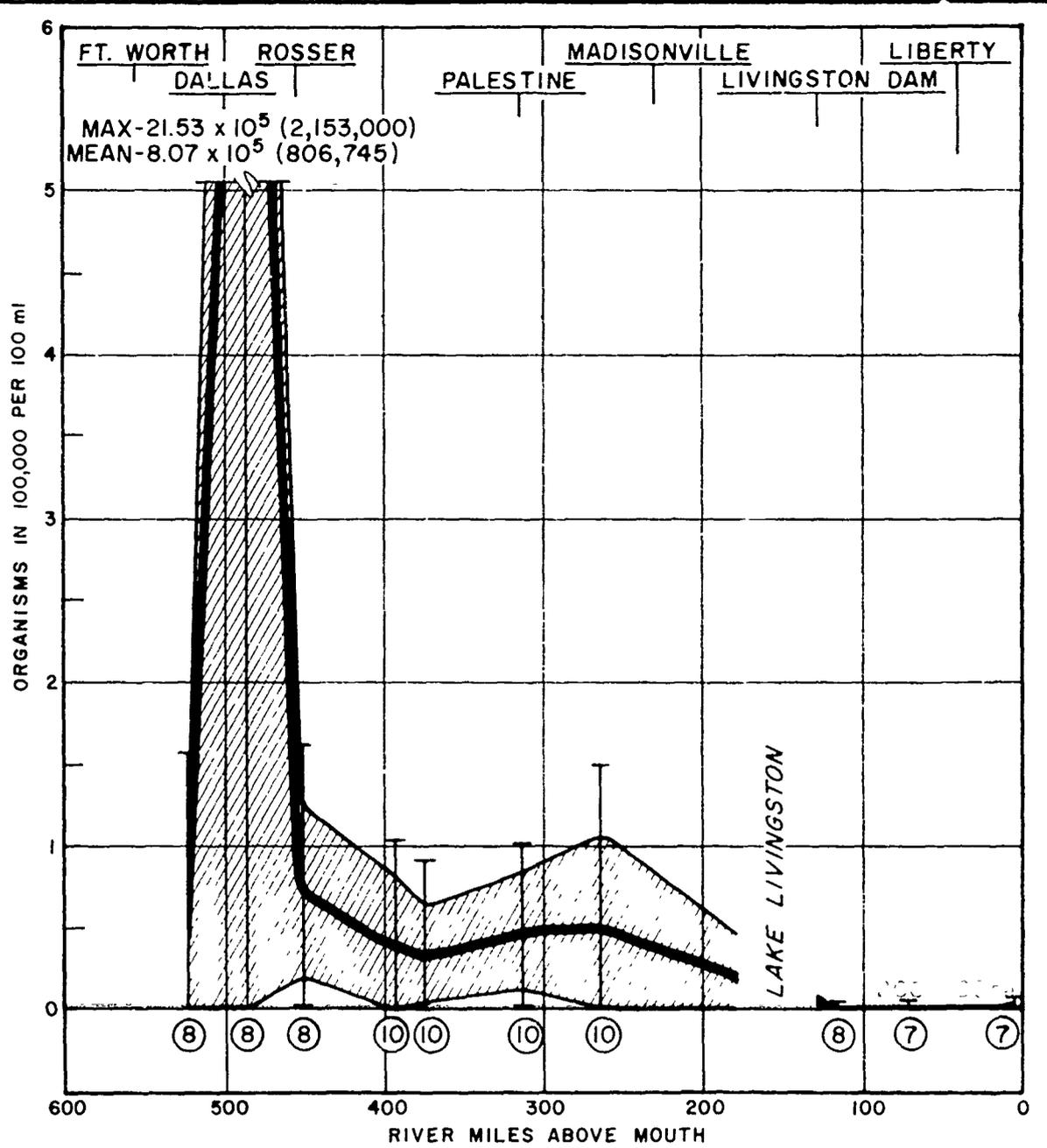


It is desirable that the total coliform content should not exceed 100 per 100 ml, and where surface waters have a mean monthly total coliform content in excess of 10,000 per 100 ml they are deemed unsatisfactory for raw water supply; Texas Water Quality Board, October 1973

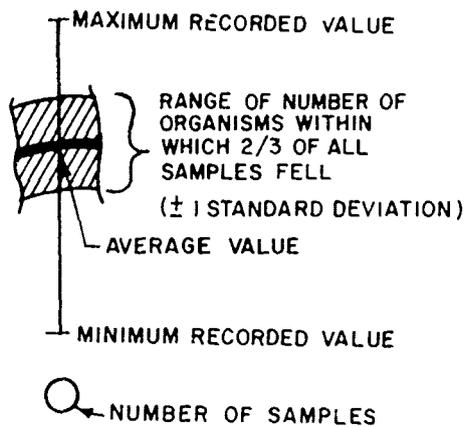
TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT
WATER QUALITY INDICATOR
TOTAL COLIFORM

U.S. ARMY ENGINEER DIST., FT. WORTH
TO ACCOMPANY ENVIRONMENTAL STATEMENT

PLATE 1516



LEGEND



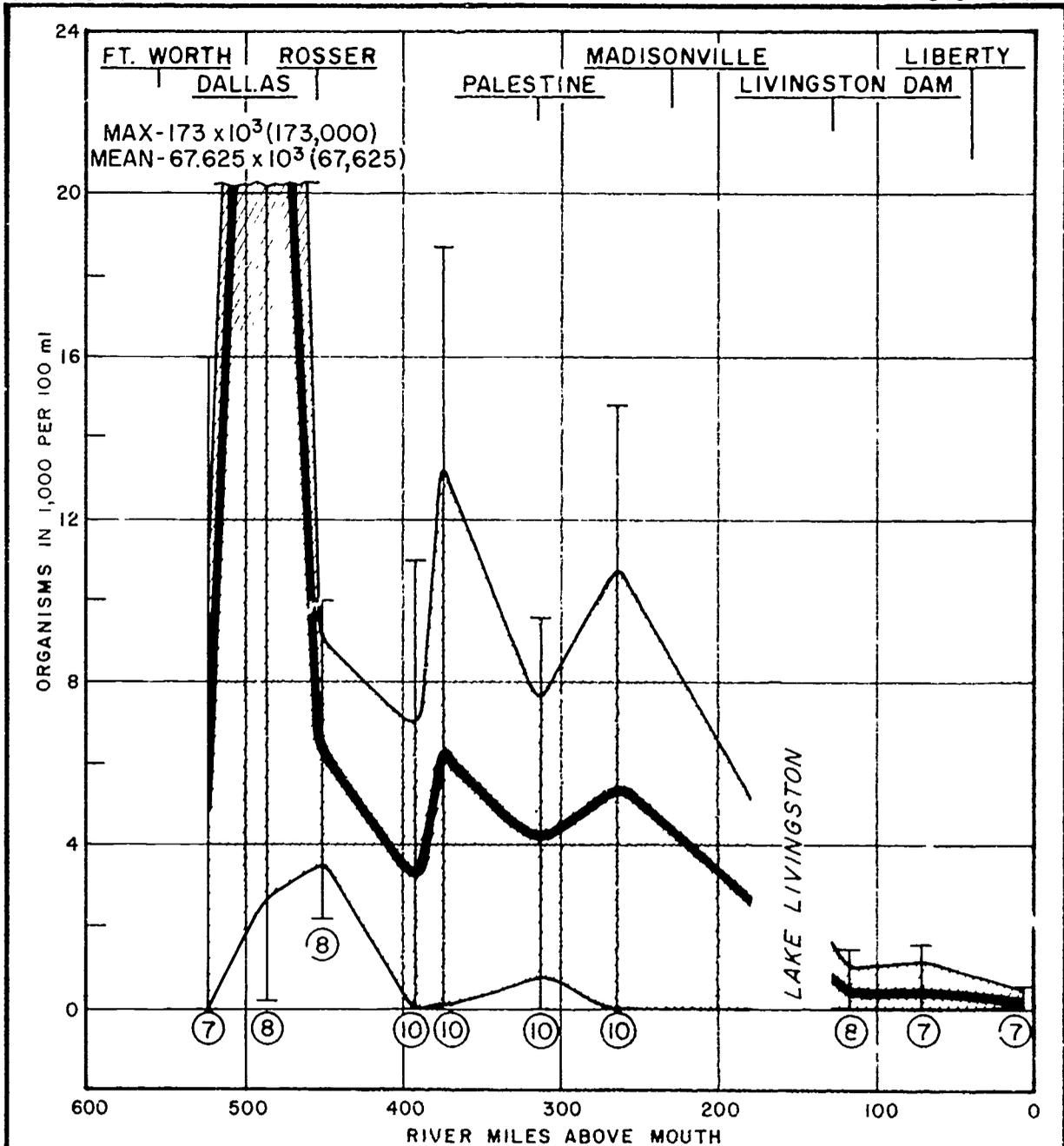
Surface waters suitable for contact recreation should not exceed a mean fecal coliform count of 200 per 100 ml, nor should more than 10 percent of total samples in any 30 day period exceed 400 per 100 ml; Texas Water Quality Board, October 1973

TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
**WATER QUALITY INDICATOR
 FECAL COLIFORM**

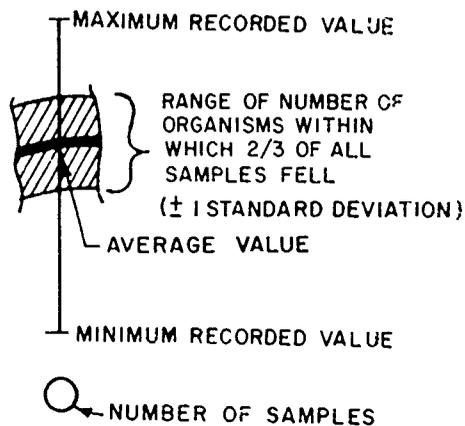
U.S. ARMY ENGINEER DIST, FT WORTH

TO ACCOMPANY ENVIRONMENTAL STATEMENT

PLATE 15.17



LEGEND



NOTE

Although fecal streptococci here include organisms from humans as well as other warm-blooded animals, separate analyses were carried out which indicated contamination by animals in various regions of the Trinity River basin.

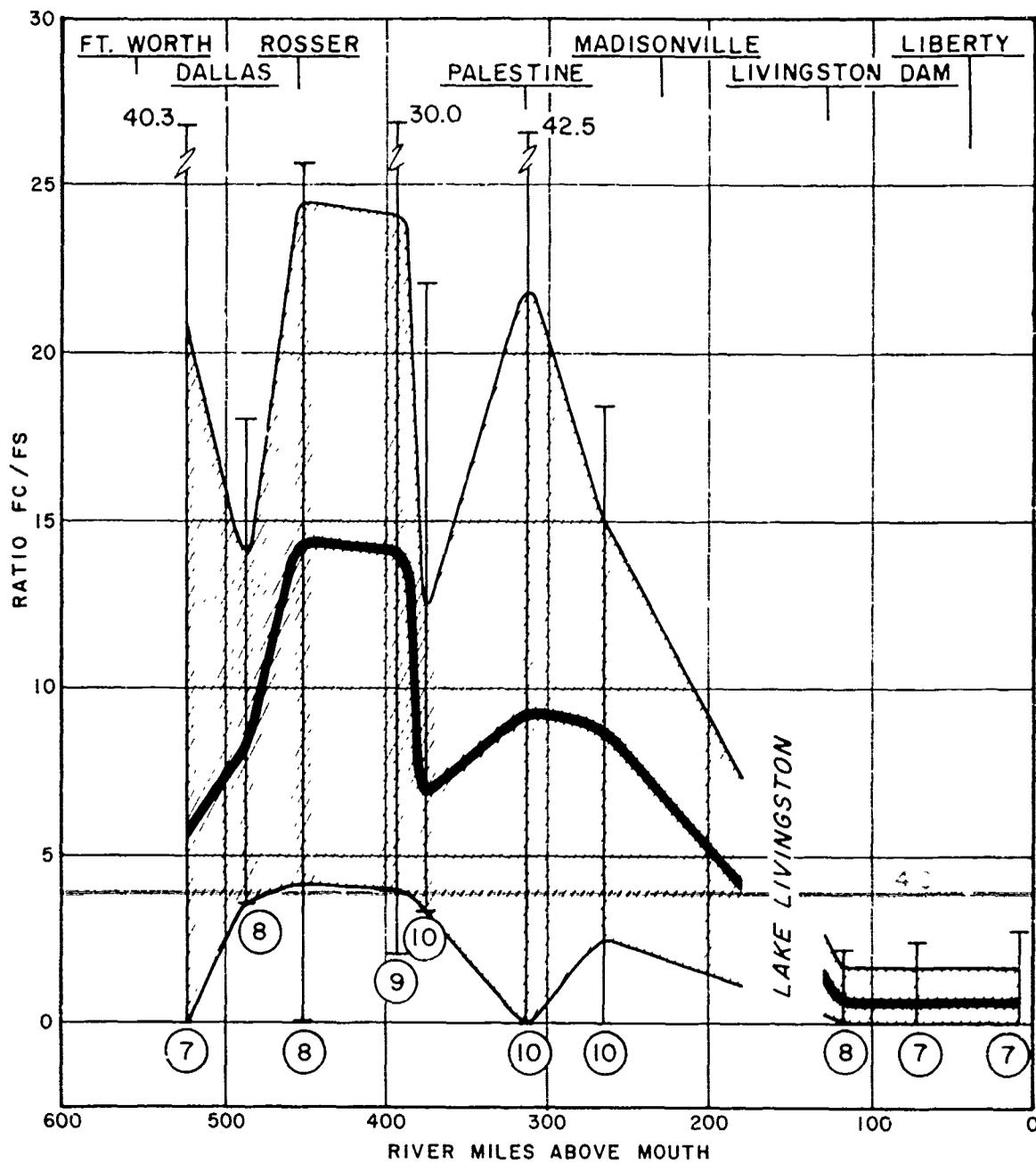
TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT

**WATER QUALITY INDICATOR
 FECAL STREPTOCOCCUS**

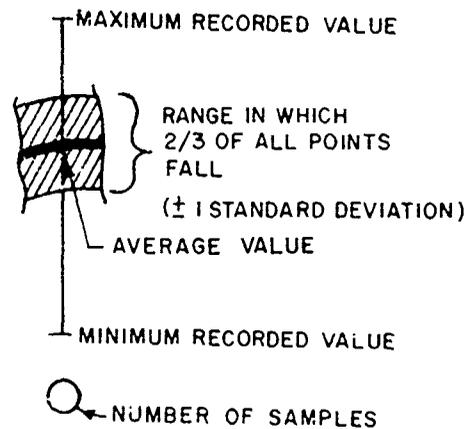
U.S. ARMY ENGINEER DIST., FT. WORTH

TO ACCOMPANY ENVIRONMENTAL STATEMENT

PLATE 1518

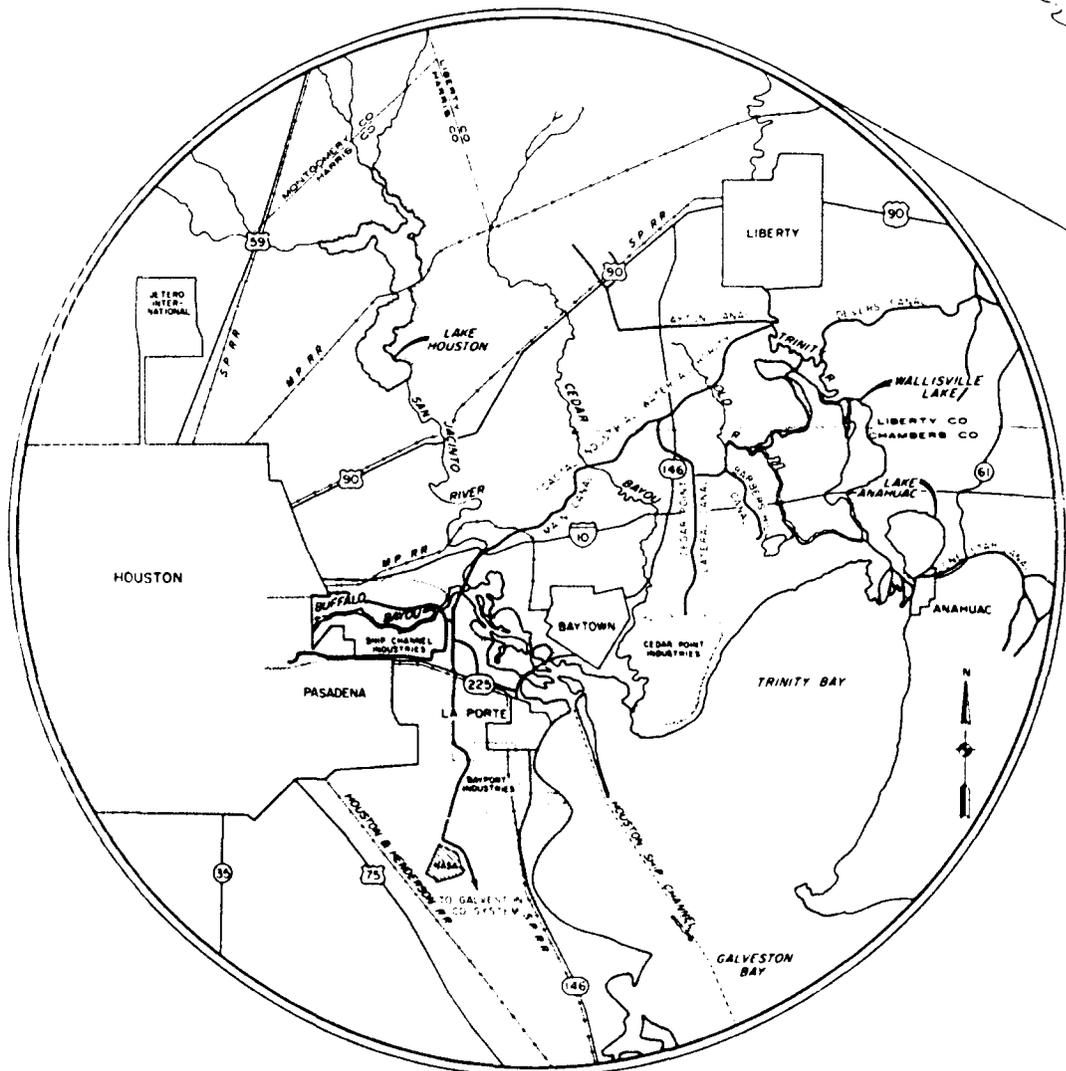
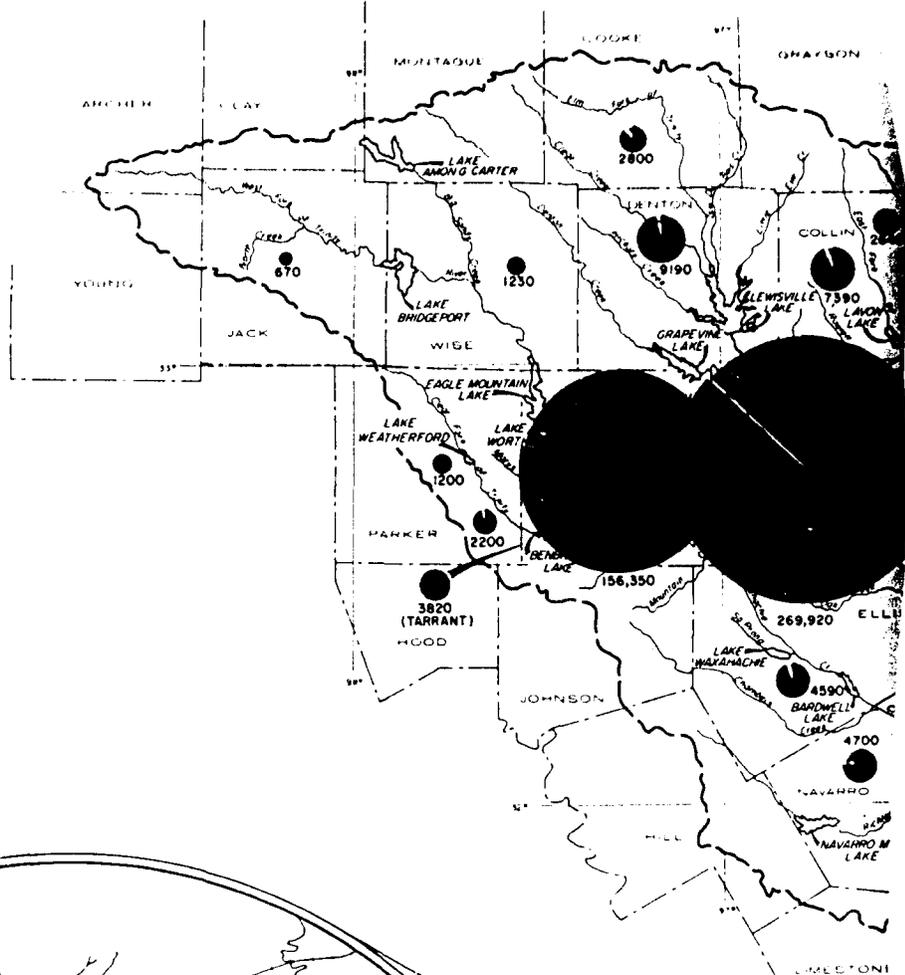


LEGEND



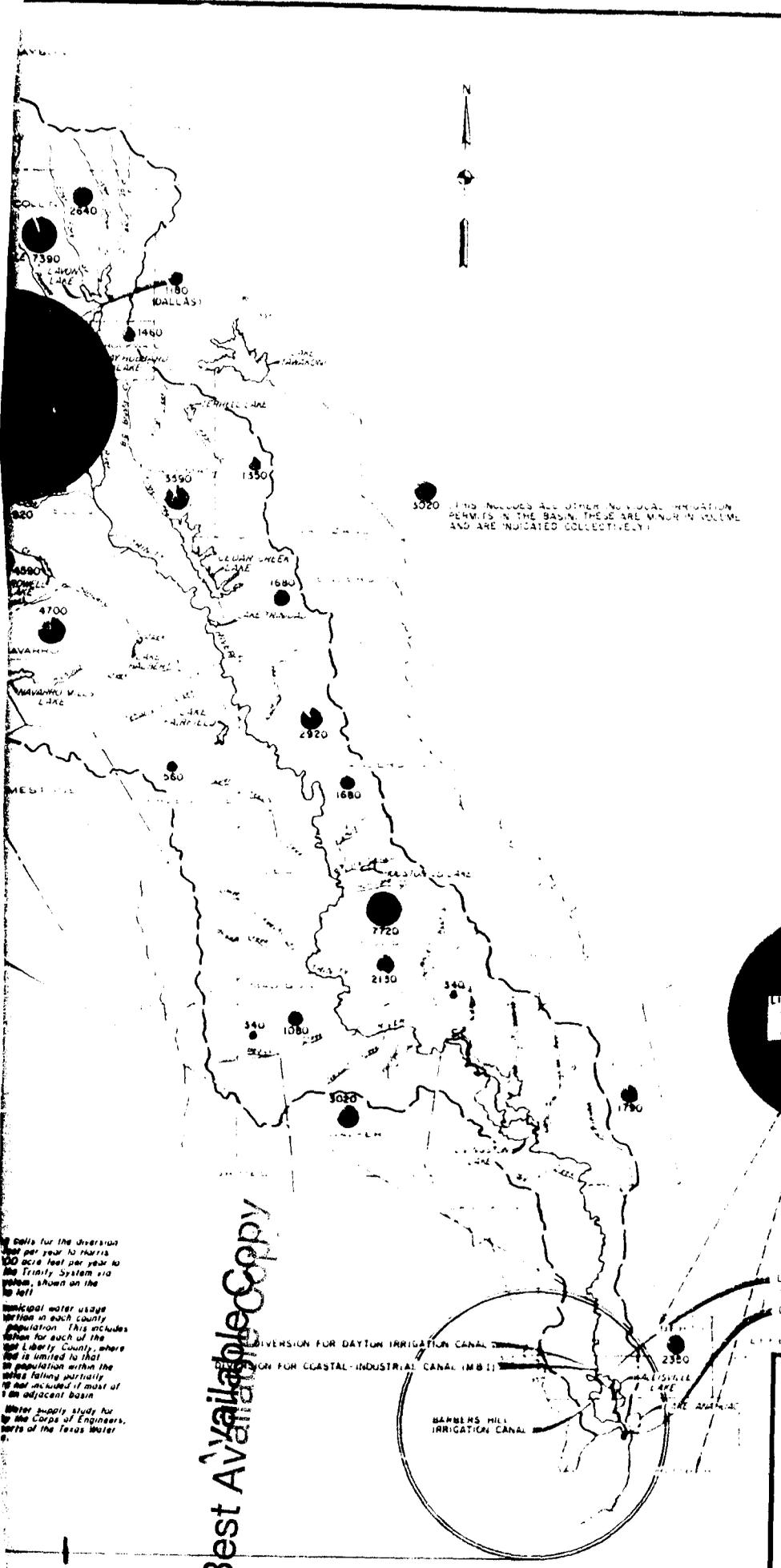
----- A ratio of fecal coliform to fecal streptococcus of 4.0 or greater is an indication of human contamination, Geldreich and Kenner, 1969

TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
WATER QUALITY INDICATOR
RATIO OF FECAL COLIFORM
TO FECAL STREPTOCOCCUS
 U.S. ARMY ENGINEER DIST., FT. WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT
 PLATE 15.19



NOTES

1. Current planning calls for the of 750,000 acre-foot per year for County and 220,000 acre-foot for Galveston Co from the Trinity Spill the CWA canal system, shown on enlarged map to the left.
2. The values for municipal water reflect only that portion in used by the urban population. For all the urban population for each counties listed except Liberty Co water usage indicated is limited to portion of the urban population in Trinity Basin. Counties falling within the basin are not included in the population is in an adjacent.
3. Data Source: Water supply the Trinity Basin by the Corps and the annual reports of the Civil Rights Commission.



THIS INCLUDES ALL OTHER NON-LOCAL IRRIGATION PERMITS IN THE BASIN. THESE ARE MINOR IN VOLUME AND ARE INDICATED COLLECTIVELY.

LEGEND

- BLUE AREA INDICATES PROPORTIONAL PART FOR MUNICIPAL PURPOSES
- RED AREA INDICATES PROPORTIONAL PART FOR INDUSTRIAL PURPOSES
- 23000 INDICATED IN ACRE FEET TOTAL ANNUAL WATER USE (MUNICIPAL AND INDUSTRIAL) FOR THE COUNTY. THE SIZE OF THE CIRCLE IS PROPORTIONAL TO THE ANNUAL USE.
- GREEN AREA INDICATES ANNUAL IRRIGATION USAGE BY COUNTIES EXCEPT THOSE UNDER 1000 ACRE FEET.
- 11,370

LIBERTY, CHAMBERS AND JEFFERSON COUNTIES IRRIGATION USAGE 273,000 ACRE-FEET

Dolls for the diversion of water per year to Harris County per year to the Trinity System via system, shown on the left.

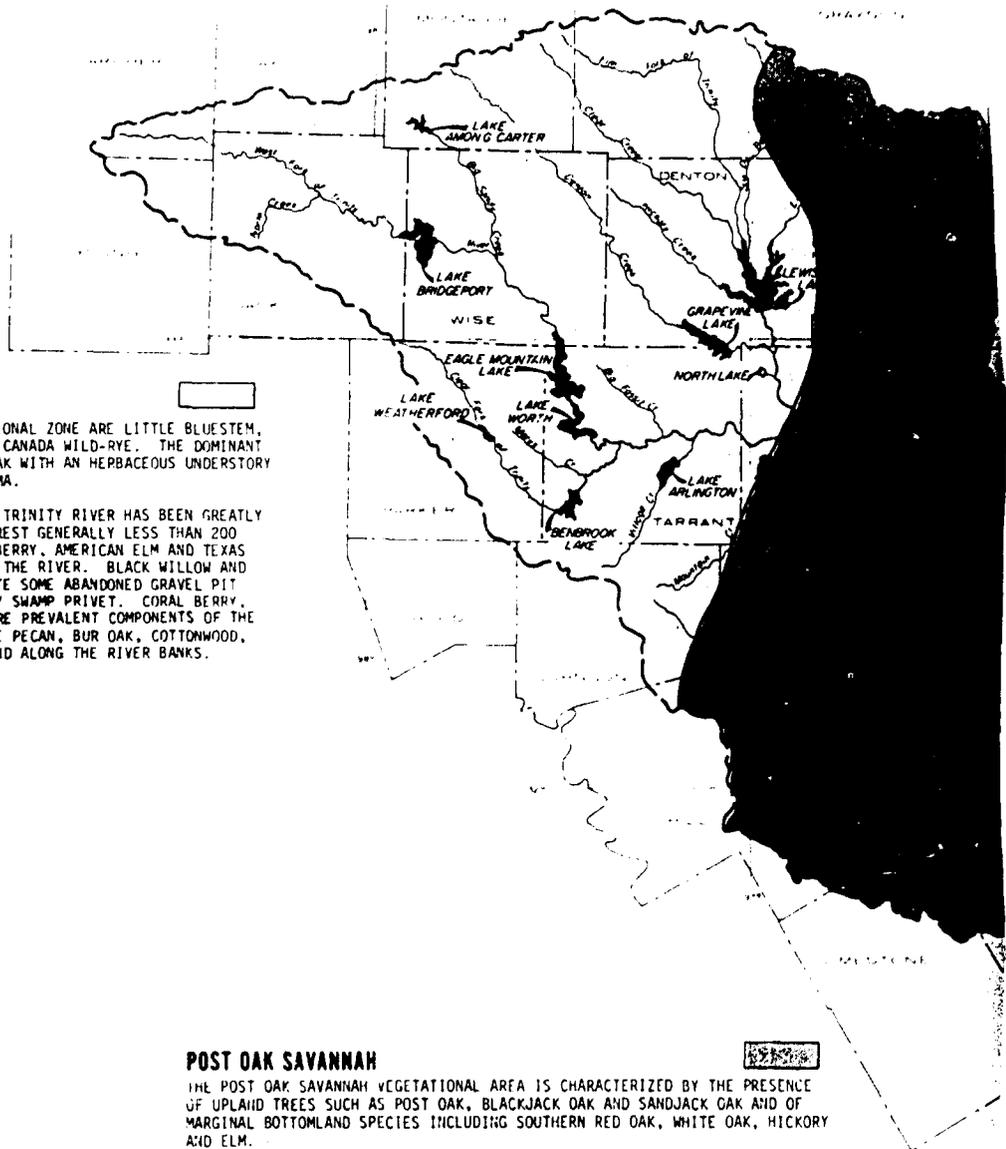
Municipal water usage within each county population. This includes water for each of the Liberty County, where use is limited to that population within the water falling partially or not included, if most of 100 adjacent basin.

Water supply study for the Corps of Engineers, Texas of the Texas Water

Best Available Copy

DIVERSION FOR DAYTON IRRIGATION CANAL
 DIVERSION FOR COASTAL-INDUSTRIAL CANAL (MBI)
 DIVERSION FOR DAYTON IRRIGATION CANAL
 DIVERSION FOR COASTAL-INDUSTRIAL CANAL (MBI)
 DIVERSION FOR DAYTON IRRIGATION CANAL
 DIVERSION FOR COASTAL-INDUSTRIAL CANAL (MBI)

TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
 BASIN WATER USE MAP
 U.S. ARMY ENGINEER DISTRICT, FORT WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT



CROSS TIMBERS AND PRAIRIES

PREDOMINANT NATIVE GRASSES IN THIS VEGETATIONAL ZONE ARE LITTLE BLUESTEM, BIG BLUESTEM, INDIANGRASS, SWITCHGRASS AND CANADA WILD-RYE. THE DOMINANT TREES PRESENT ARE POST-OAK AND BLACKJACK OAK WITH AN HERBACEOUS UNDERSTORY WHICH INCLUDES HAIRY TRIDENS AND TEXAS GRAMA.

THIS FLAT TO GENTLY ROLLING AREA ALONG THE TRINITY RIVER HAS BEEN GREATLY EXPLOITED LEAVING ONLY SMALL PATCHES OF FOREST GENERALLY LESS THAN 200 ACRES IN SIZE. CEDAR ELM, GREEN ASH, SOAPBERRY, AMERICAN ELM AND TEXAS SUGARBERRY ARE DOMINANT IN THIS SECTION OF THE RIVER. BLACK WILLOW AND COTTONWOOD ARE LOCALLY FREQUENT AND DOMINATE SOME ABANDONED GRAVEL PIT AREAS. SLOUGHS ARE GENERALLY SURROUNDED BY SWAMP PRIVET, CORAL BERRY, POISON IVY AND GREENBRIER ARE AMONG THE MORE PREVALENT COMPONENTS OF THE UNDERSTORY WOODY SPECIES. OCCASIONAL LARGE PECAN, BUR OAK, COTTONWOOD, AMERICAN ELM, AND TEXAS SUGARBERRY ARE FOUND ALONG THE RIVER BANKS.

POST OAK SAVANNAH

THE POST OAK SAVANNAH VEGETATIONAL AREA IS CHARACTERIZED BY THE PRESENCE OF UPLAND TREES SUCH AS POST OAK, BLACKJACK OAK AND SANDJACK OAK AND OF MARGINAL BOTTOMLAND SPECIES INCLUDING SOUTHERN RED OAK, WHITE OAK, HICKORY AND ELM.

THIS SECTION OF THE RIVER IS BORDERED BY A LAND WHICH IS FLAT TO GENTLY ROLLING. A LARGE PART OF THE BOTTOMLAND IN THIS VEGETATIONAL AREA HAS BEEN CLEARED, LEAVING BANDS OF WOODED AREAS ALONG THE RIVER. THESE STRIPS HAVE OFTEN BEEN PARTIALLY CLEARED FOR PASTURE LAND, AND THE LARGER AND MORE COMMERCIALY DESIRABLE TREES HAVE BEEN LOGGED. THE MAJOR WOODY SPECIES, BASED ON ABUNDANCE, ARE BLACK WILLOW, SWAMP PRIVET (IN THE POORLY DRAINED AREAS), CEDAR ELM, PEPPERVINE, HONEY LOCUST, GREEN ASH, WATER OAK, AND SOUTHERN RED OAK. LESS NUMEROUS, BUT OFTEN FOUND ON MORE ELEVATED SITES ARE SWEETGUM, BLUE BEECH, WATER OAK, BLACKGUM, SMOOTH ALDER, AND AMERICAN ELM.

Data Taken From:

Gould, Frank W. 1969. Texas plants: A checklist and ecological summary. Texas A & M University, College Station, Texas

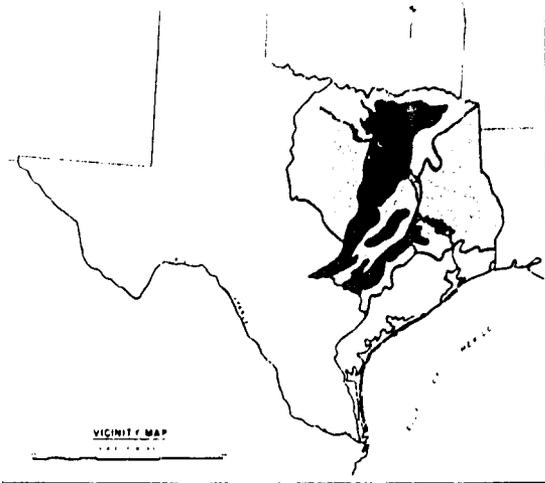
and

Nixon, Elray S. 1972. Biological elements; In: "A Survey of the Environmental and Cultural Resources of the Trinity River." Stephen F. Austin State University, Nacogdoches, Texas.

GULF PRAIRIES A

THE CLIMAX VEGETATION IS LARGELY GRASSLAND OR BIG BLUESTEM, INDIAN CHARACTERIC OF THE

ALTHOUGH THIS SOUTHERN SINGLE VEGETATIONAL AREA ALONG THE TRINITY WITH MANY SMALL PONDS THE MOST FREQUENTLY SWAMP PRIVET, HONEY CYPRESS. IN MANY PLACES FOUND SUCH SPECIES AS OAK, BOX ELDER, ROUND COMMON BUTTONBUSH.



VICINITY MAP

BLACKLAND PRAIRIES

THE BLACKLAND PRAIRIES, UNDER NATURAL CONDITIONS, WOULD BE DOMINATED BY GRASSES SUCH AS LITTLE BLUESTEM, BIG BLUESTEM, SWITCHGRASS, INDIANGRASS, AND SIDEOTS GRAMA.

LAND IN THE NORTHERNMOST PART OF THIS AREA IS MOSTLY UNDER CULTIVATION WITH THE CROPLAND PROTECTED BY LEVEES ADJACENT TO THE RIVER. WOODY SPECIES ARE CONFINED TO RATHER NARROW BANDS BETWEEN THE LEVEES. THE MOST FREQUENTLY FOUND WOODY SPECIES ARE TEXAS SUGARBERRY, SWAMP PRIVET, CEDAR ELM, GREEN ASH, CEDAR ELM, PECAN, GREENBRIER AND POISON IVY. FURTHER SOUTH, LAND HAS BEEN CLEARED FOR GRAZING IN THE BOTTOMLAND AND WOODY VEGETATION FOUND HERE IS DOMINATED BY WATER ELM, BLACK WILLOW, COMMON BUTTONBUSH AND POSSUM-HAW. ALSO FOUND ARE SMOOTH ALDER, AMERICAN ELM, OVERCUP OAK AND RED-BERRIED MOONSEED.

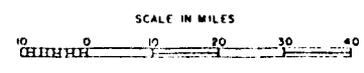
PINEWOODS

THE PINEWOODS VEGETATION AREA IS DEPICTED BY TREES SUCH AS SHORTLEAF PINE, LOBLOLLY PINE, POST OAK, BLACKJACK OAK, RED OAK, SWEETGUM AND BLACK HICKORY IN THE UPLANDS. THE BOTTOMLANDS ARE CHARACTERIZED BY OVERCUP OAK, WILLOW OAK, TEXAS SUGARBERRY, CEDAR ELM, AND BUSH PALMETTO.

THE LAND BORDERING THE RIVER IS GENERALLY FLAT TO GENTLY ROLLING, BUT SOUTH OF LAKE LIVINGSTON ONE ENCOUNTERS NUMEROUS SWAMPY AREAS AND OXBOW LAKES AS WELL AS SOME STEEP BLUFFS AND SANDY BEACHES. MUCH OF THE NORTHERN PORTION OF THIS AREA HAS BEEN CLEARED FOR PASTURE AND FARMING AND COUNTRY HOME DEVELOPMENTS ARE FOUND BOTH ABOVE AND BELOW LAKE LIVINGSTON. DOMINANT SPECIES IN THIS AREA ARE BOX ELDER, PECAN, SWEETGUM, SYCAMORE, CEDAR ELM, BLACK WILLOW, MUSTANG GRAPE AND POISON IVY. LOW-LYING AREAS SUPPORT BALD CYPRESS, TUPELO AND COMMON BUTTONBUSH WITH GRIER MARGINAL AREAS INHABITED BY RED MULBERRY, GREEN ASH, CEDAR ELM AND WATER OAK. THE HIGHER AREAS ARE DOMINATED BY LOBLOLLY AND SHORTLEAF PINE AND SWEETGUM.

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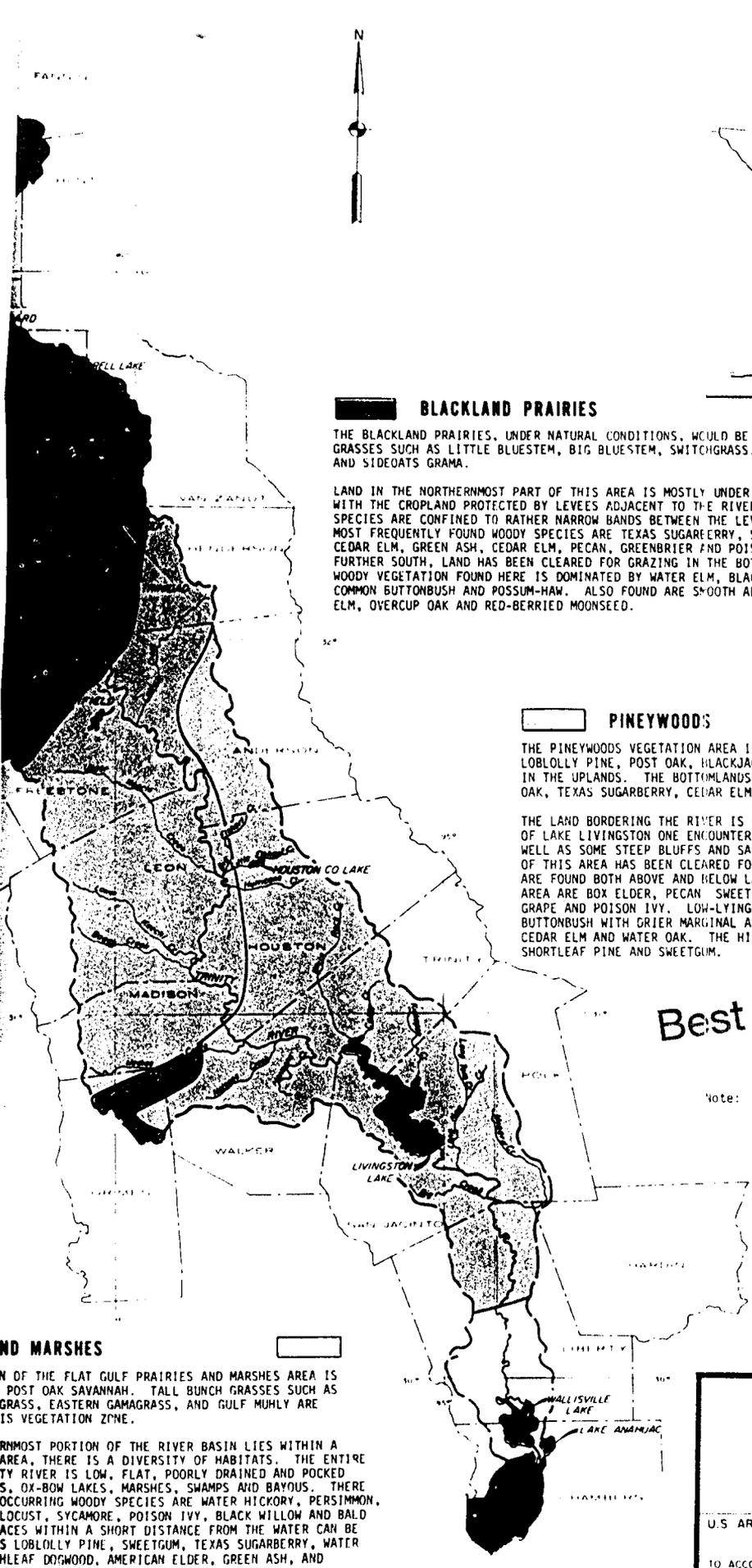
Note: Vegetational Areas after Gould, 1969.



WATER AND MARSHES

PORTION OF THE FLAT GULF PRAIRIES AND MARSHES AREA IS IN POST OAK SAVANNAH. TALL BUNCH GRASSES SUCH AS SWITCHGRASS, EASTERN GAMAGRASS, AND GULF MUHLY ARE THIS VEGETATION ZONE.

NORTHERNMOST PORTION OF THE RIVER BASIN LIES WITHIN A FLAT AREA, THERE IS A DIVERSITY OF HABITATS. THE ENTIRE TRINITY RIVER IS LOW, FLAT, POORLY DRAINED AND POKED WITH ISLANDS, OX-BOW LAKES, MARSHES, SWAMPS AND BAYOUS. THERE ARE OCCURRING WOODY SPECIES ARE WATER HICKORY, PERSIMMON, LOCUST, SYCAMORE, POISON IVY, BLACK WILLOW AND BALD CYPRESS WITHIN A SHORT DISTANCE FROM THE WATER CAN BE FOUND AS LOBLOLLY PINE, SWEETGUM, TEXAS SUGARBERRY, WATER HICKORY, DOGWOOD, AMERICAN ELDER, GREEN ASH, AND



TRINITY RIVER AND TRIBUTARIES, TEXAS

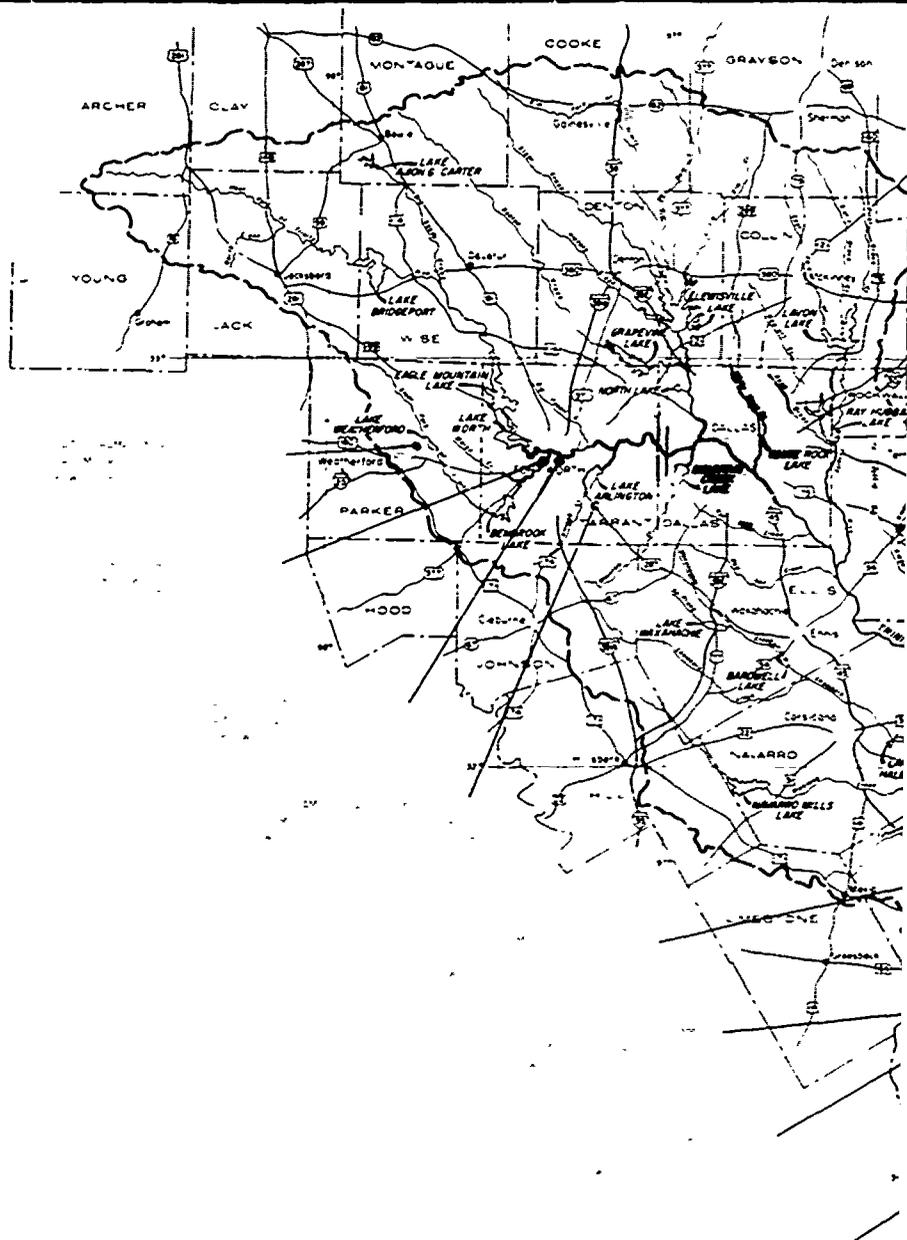
TRINITY RIVER PROJECT

BASIN VEGETATION AREAS

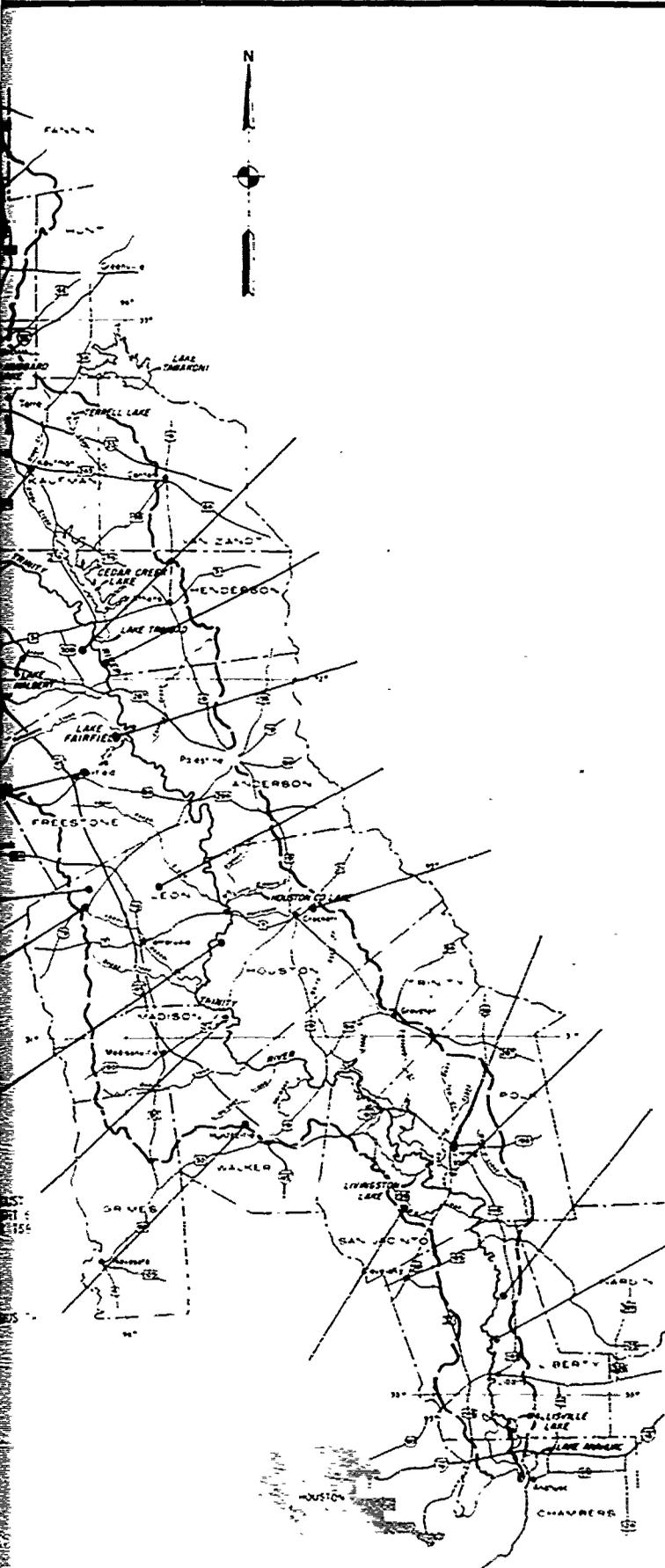
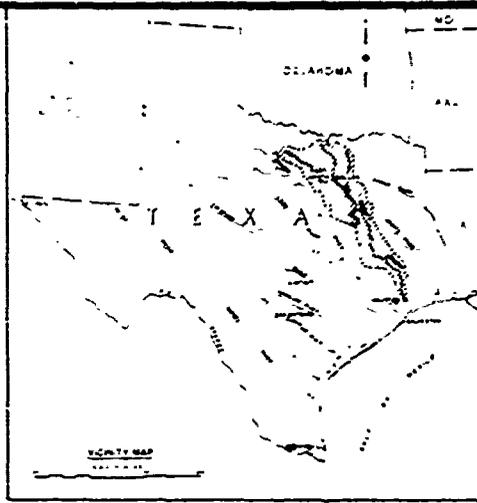
U.S. ARMY ENGINEER DISTRICT, FORT WORTH

TO ACCOMPANY ENVIRONMENTAL STATEMENT

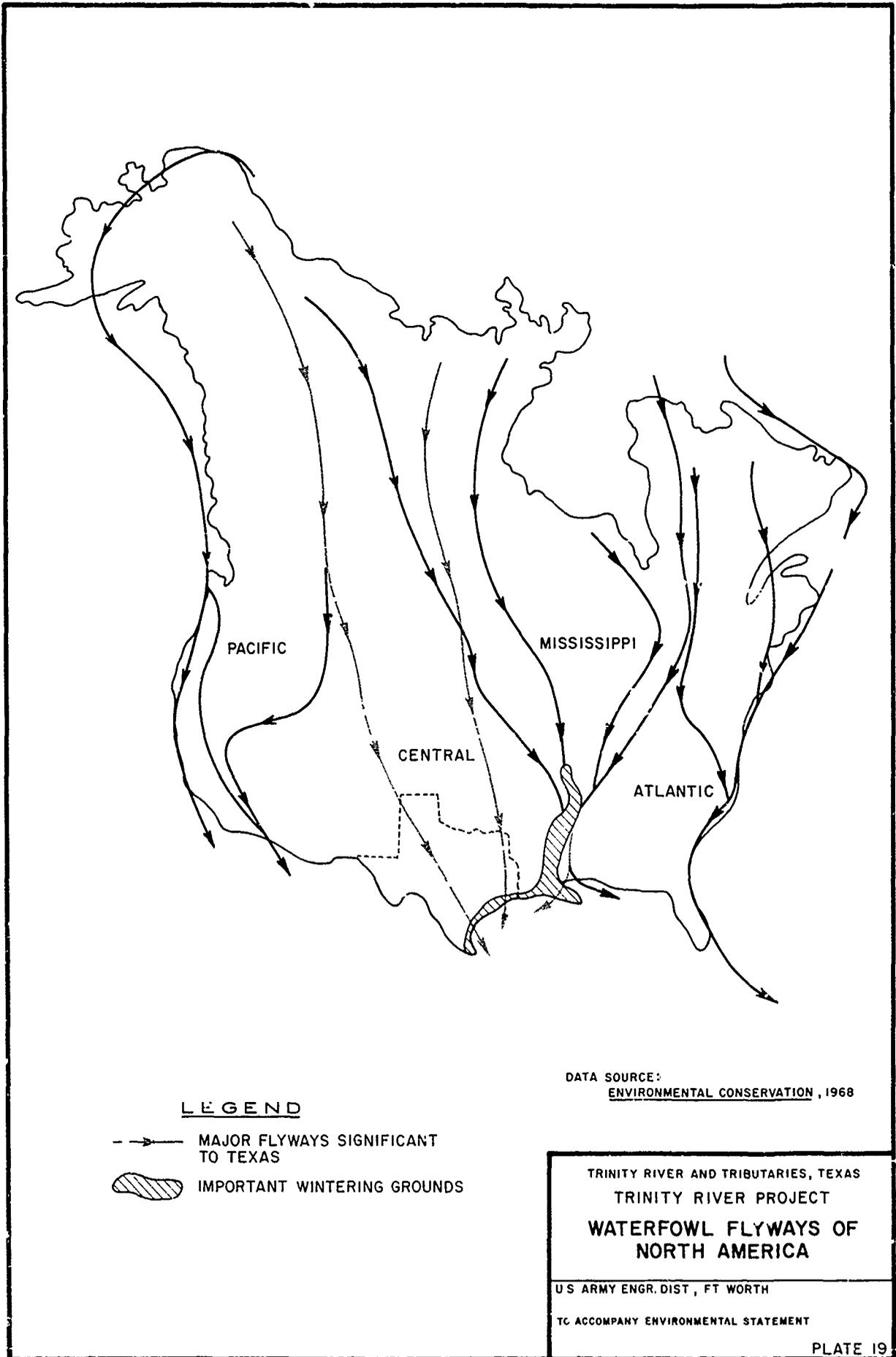
PLATE 17



1



TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
CHAMPION AND FAMOUS TREES
 U.S. ARMY ENGINEER DISTRICT, FORT WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT

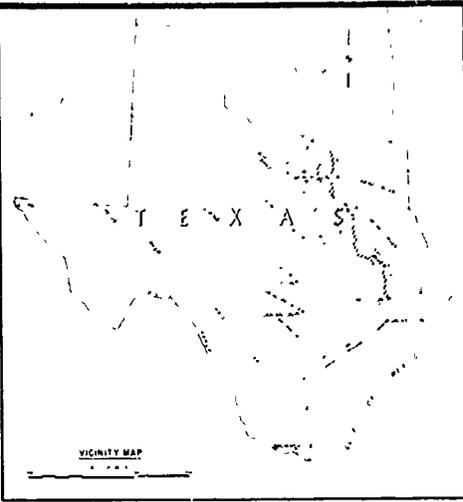
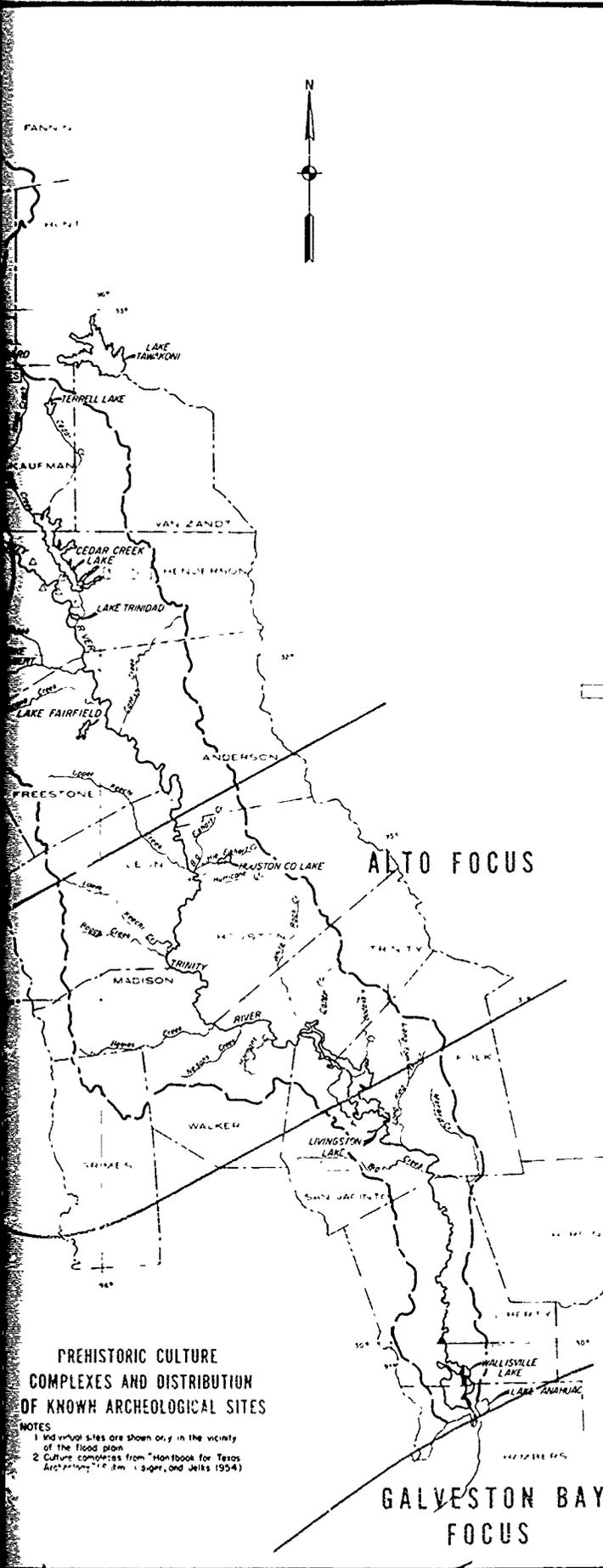


LEGEND

- > MAJOR FLYWAYS SIGNIFICANT TO TEXAS
- ▨ IMPORTANT WINTERING GROUNDS

DATA SOURCE:
ENVIRONMENTAL CONSERVATION, 1968

TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT
WATERFOWL FLYWAYS OF NORTH AMERICA
U S ARMY ENGR. DIST., FT WORTH
TO ACCOMPANY ENVIRONMENTAL STATEMENT
PLATE 19

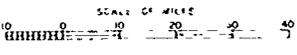


LEGEND

- ▲ NEO-AMERICAN SITE
- ▲ ARCHAIC SITE
- △ EARLY MAN SITE
- - - TEXAS ARCHEOLOGICAL SALVAGE PROJECT RECONNAISSANCE
- ▭ RESERVOIR SALVAGE PROJECT

PALEO INDIAN	9500-5500 BC	MAMMOTH, BISON HUNTING, SEASONAL MOVEMENT; SMALL BANDS COMPOSED OF SEVERAL FAMILIES
ARCHAIC	5500 BC - AD 800	HUNTING OF SMALL GAME, GATHERING WILD PLANTS, SEASONAL MOVEMENT; SMALL BANDS COMPOSED OF SEVERAL FAMILIES (TRINITY ASPECT)
NEO-AMERICAN	AD 800-1600	HUNTING AND GATHERING, MARGINAL AGRICULTURE IN SAME AREAS, TRIBAL AND CONFEDERACY GROUPS (HENRIETTA, WYLIF, ALTO AND GALVESTON BAY FOCI)
HISTORIC	AD 1600-1800	INTRODUCTION OF HORSE AND EVENTUAL EXTERMINATION OR REMOVAL OF INDIANS

Chronology and description from Handbook for Texas Archeology (Summ Kreiger and Jells 1954), cited by S. Alan Sawyer - "Environmental and Cultural Resources within the Trinity River Basin 1972"



PREHISTORIC CULTURE COMPLEXES AND DISTRIBUTION OF KNOWN ARCHEOLOGICAL SITES

NOTES
 1. All known sites are shown only in the vicinity of the flood plain.
 2. Culture complexes from "Handbook for Texas Archeology" (Summ Kreiger and Jells 1954).

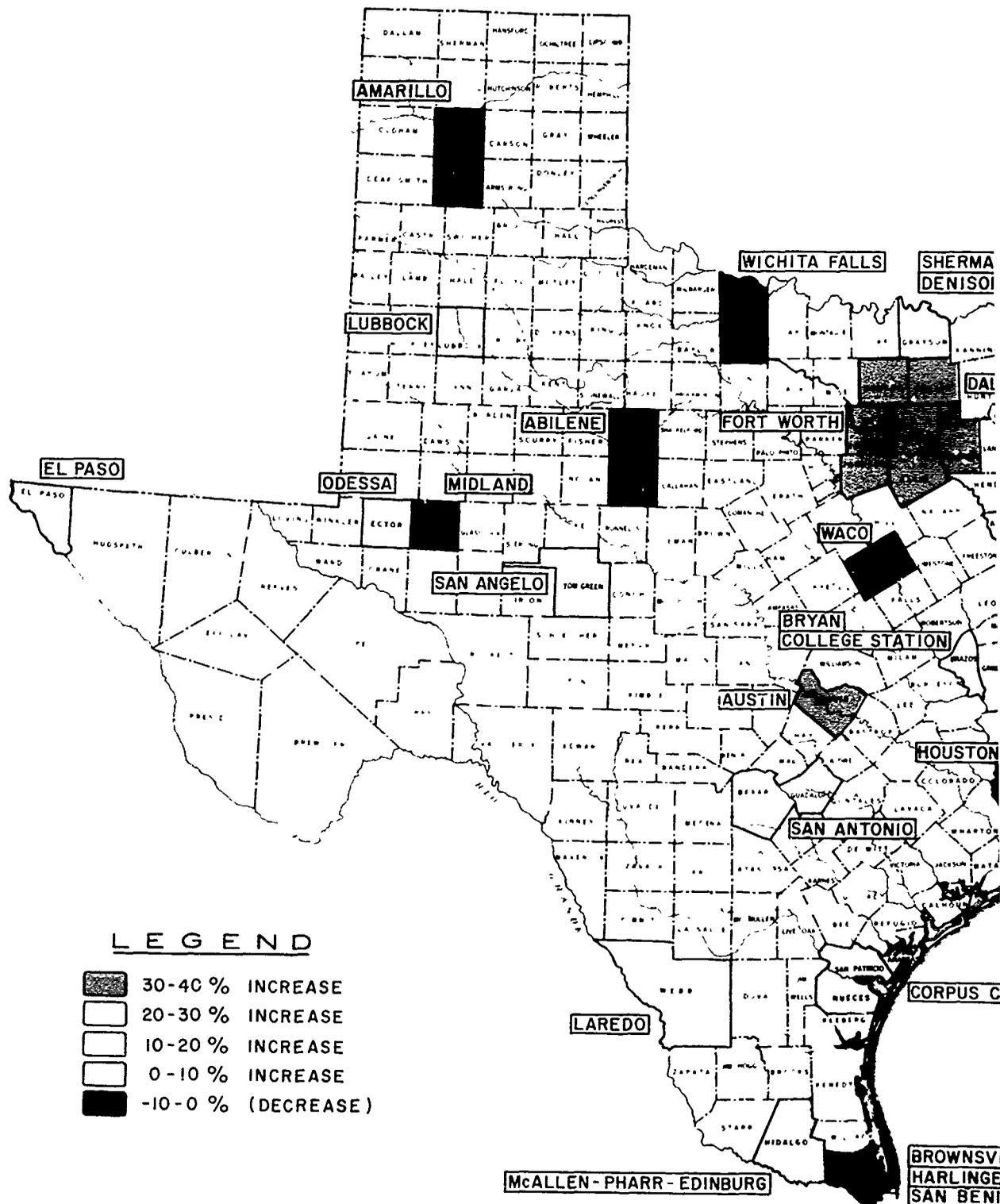
TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT

ARCHEOLOGY

SCALES AS SHOWN
 U.S. ARMY ENGINEER DISTRICT, FORT WORTH

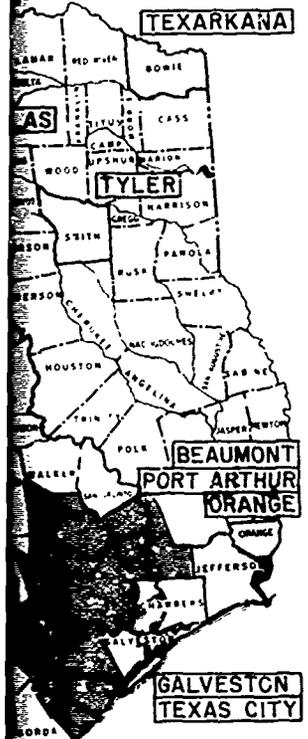
TO ACCOMPANY ENVIRONMENTAL STATEMENT

CORPS OF ENGINEERS



POPULATION OF TEXAS
SMSAs, 1970 AND 1960

SMSA	1970	1960	PERCENT CHANGE
ABILENE	113,959	120,377	-5.3
AMARILLO	144,396	149,493	-3.4
AUSTIN	295,516	212,136	39.3
BEAUMONT-PORT ARTHUR-ORANGE	315,943	306,016	3.2
BROWNSVILLE-HARLINGEN-SAN BENITO	140,368	151,098	-7.1
BRYAN-COLLEGE STATION	57,978	44,895	29.1
CORPUS CHRISTI	284,832	266,594	6.8
DALLAS	1,555,950	1,119,410	38.9
EL PASO	359,291	314,070	14.4
FORT WORTH	762,086	573,215	32.9
GALVESTON-TEXAS CITY	169,812	140,364	21.0
HOUSTON	1,985,031	1,418,323	39.9
LAREDO	72,859	64,791	12.5
LUBBOCK	179,295	156,271	14.7
McALLEN-PHARR-EDINBURG	181,535	180,904	0.3
MIDLAND	65,433	67,717	-3.4
ODESSA	91,805	90,995	0.9
SAN ANGELO	71,047	64,630	9.9
SAN ANTONIO	864,014	716,168	20.6
SHERMAN-DENISON	83,225	73,043	13.9
TEXARKANA	101,198	91,657	10.4
TYLER	97,096	86,350	12.4
WACO	147,553	150,091	-1.7
WICHITA FALLS	127,621	129,638	-1.6



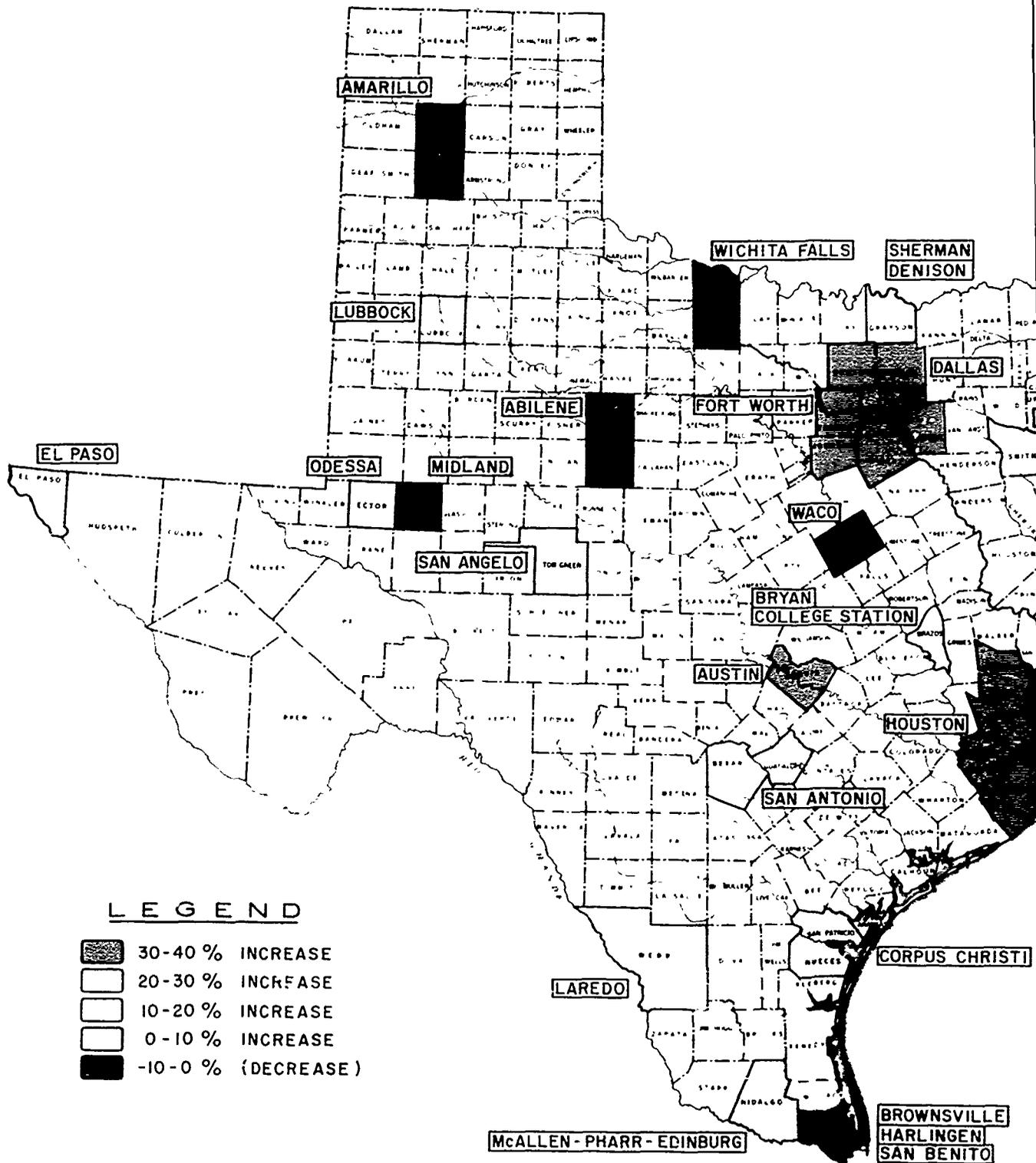
Data Source:

Texas Almanac and State Industrial Guide, 1972-73. A H. Bell Corp.

TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT
STANDARD METROPOLITAN STATISTICAL AREAS OF TEXAS
U S ARMY ENGINEER DIST, FT WORTH
TO ACCOMPANY ENVIRONMENTAL STATEMENT
PLATE 22

CHRISTI
LILLE
EN
TO

CORPS OF ENGINEERS



NOTE:

A Standard Metropolitan Statistical Area (SMSA) consists of a county with one or more cities of at least 50,000 population, plus any adjacent counties that are metropolitan in character and economically integrated with the central county.

POPULATION OF TEXAS
SMSAs, 1970 AND 1960

SMSA	1970	1960	PERCENT CHANGE
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Data Source:

Texas Almanac and State Industrial
Guide, 1972-73. A. H. Bell Corp.

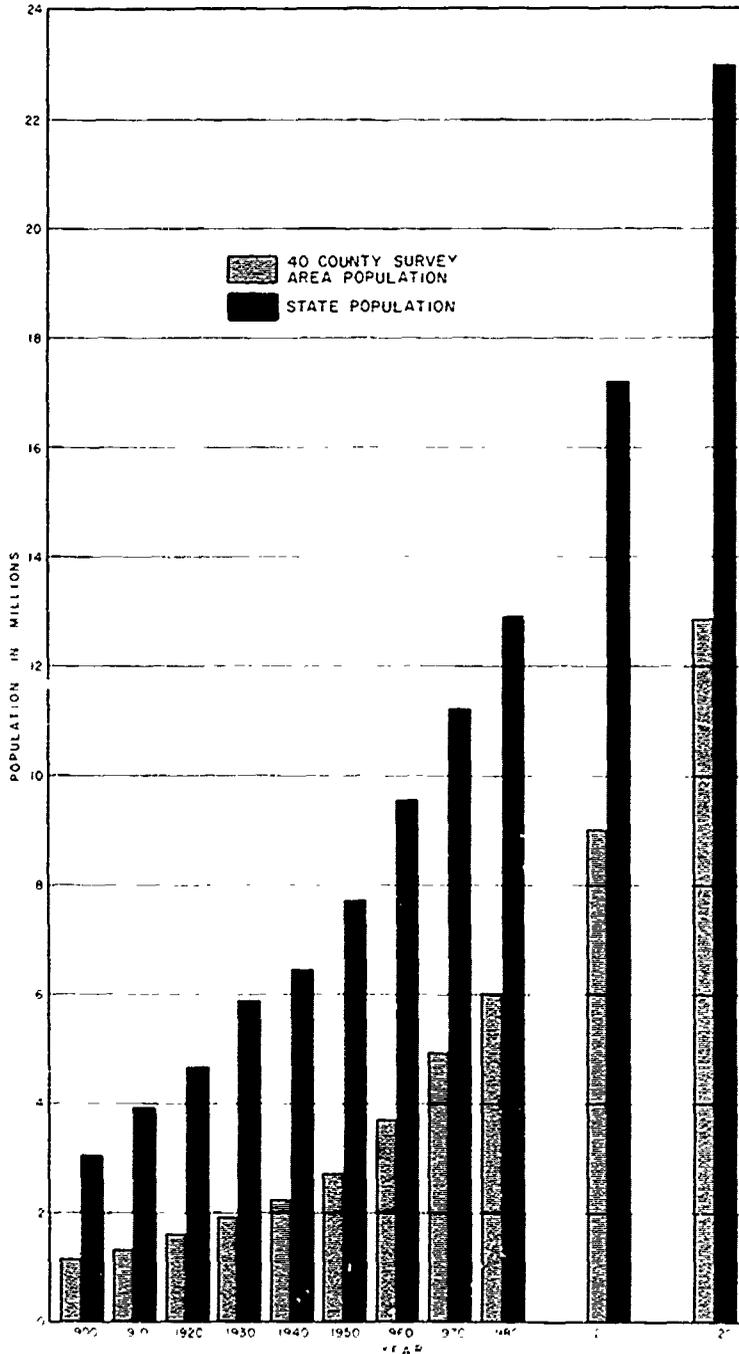
TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT
STANDARD METROPOLITAN
STATISTICAL AREAS
OF TEXAS

U. S. ARMY ENGINEER DIST., FT. WORTH

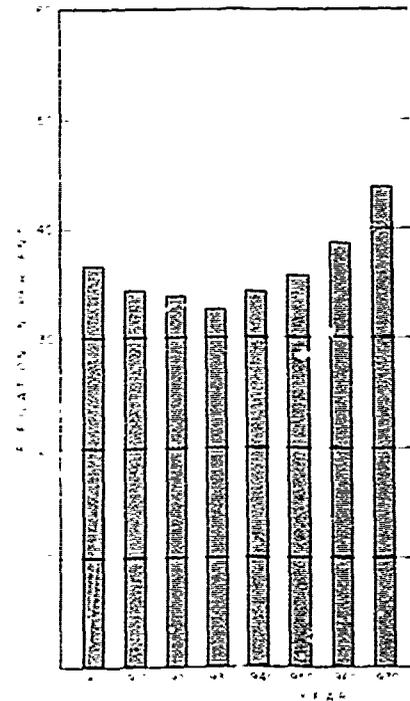
TO ACCOMPANY ENVIRONMENTAL STATEMENT

PLATE 22

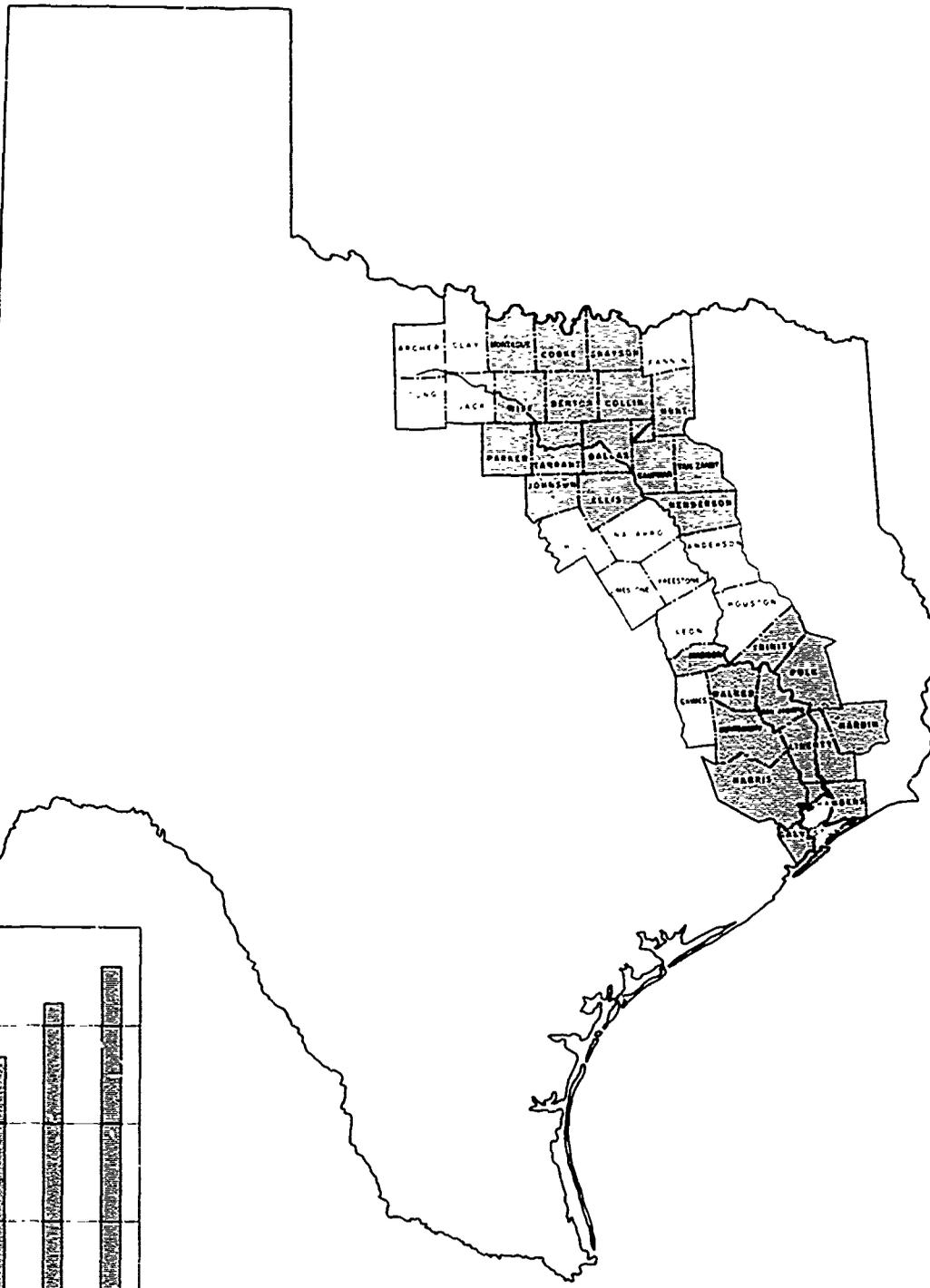
CORPS OF ENGINEERS



POPULATION CHANGE FROM 1900 TO 2020



40 COUNTY SURVEY AREA AS PERCENT OF STATE POPULATION



40 COUNTY SURVEY AREA

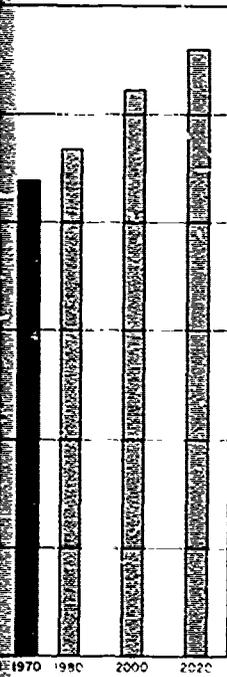
AREA OR COUNTY	NO OF PEOPLE (LOSS)	15	10	5	0
STATE SURVEY AREA					
ARCHER	351				
CLAY	272				
MONTAGUE					
COOKE					
GRAYSON					
FANNIN	1175				
YOUNG	1854				
JACK	707				
WISE					
DENTON					
COLLIN					
HUNT					
PARKER					
TARRANT					
DALLAS					
ROCKWALL					
KAUFMAN					
VAN ZANDT					
JOHNSON					
ELLIS					
HILL	1054				
NAVARRO	3273				
HENDERSON					
LIMESTONE	2313				
FREESTONE	1409				
ANDERSON	373				
LEON	1213				
HOUSTON	1521				
MADISON					
GRIMES	854				
WALKER					
TRINITY					
SAN JACINTO					
POLK					
MONTGOMERY					
LIBERTY					
HARDIN					
HARRIS					
CHAMBERS					
GALVESTON					

40 COUNTY TOTALS 16,369 (TOTAL LOSS)

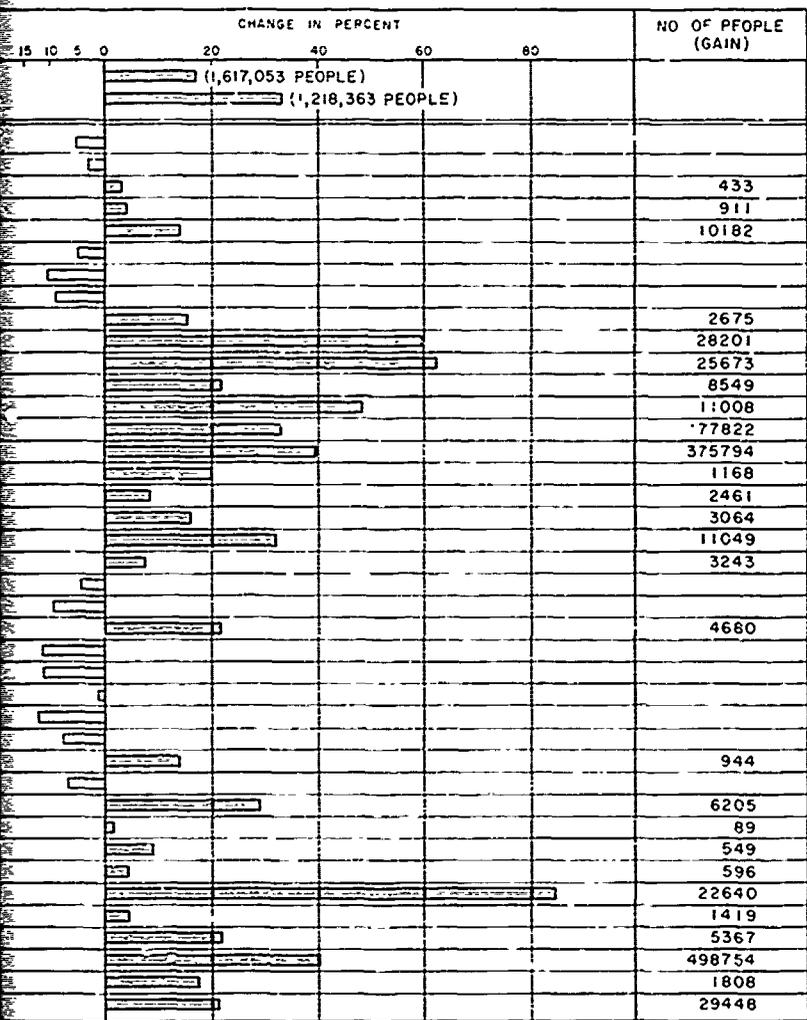
POPULATION

Note: Counties generally basin to lower 1

- Data Source:
- 1. U.S. Bureau of the Census
 - 2. U.S. Water Resources Council, Bureau of Economic Analysis and Economic Research Service (OBERS)
 - 3. Corps of Engineers, Southwestern Division



AREA POPULATION
STATE POPULATION

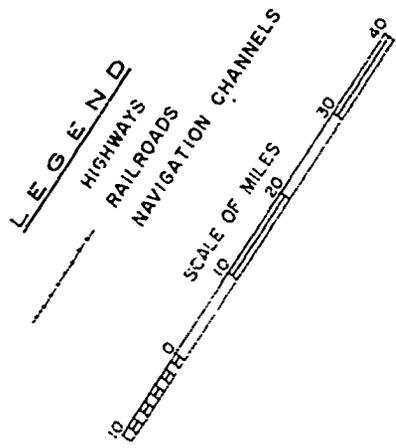
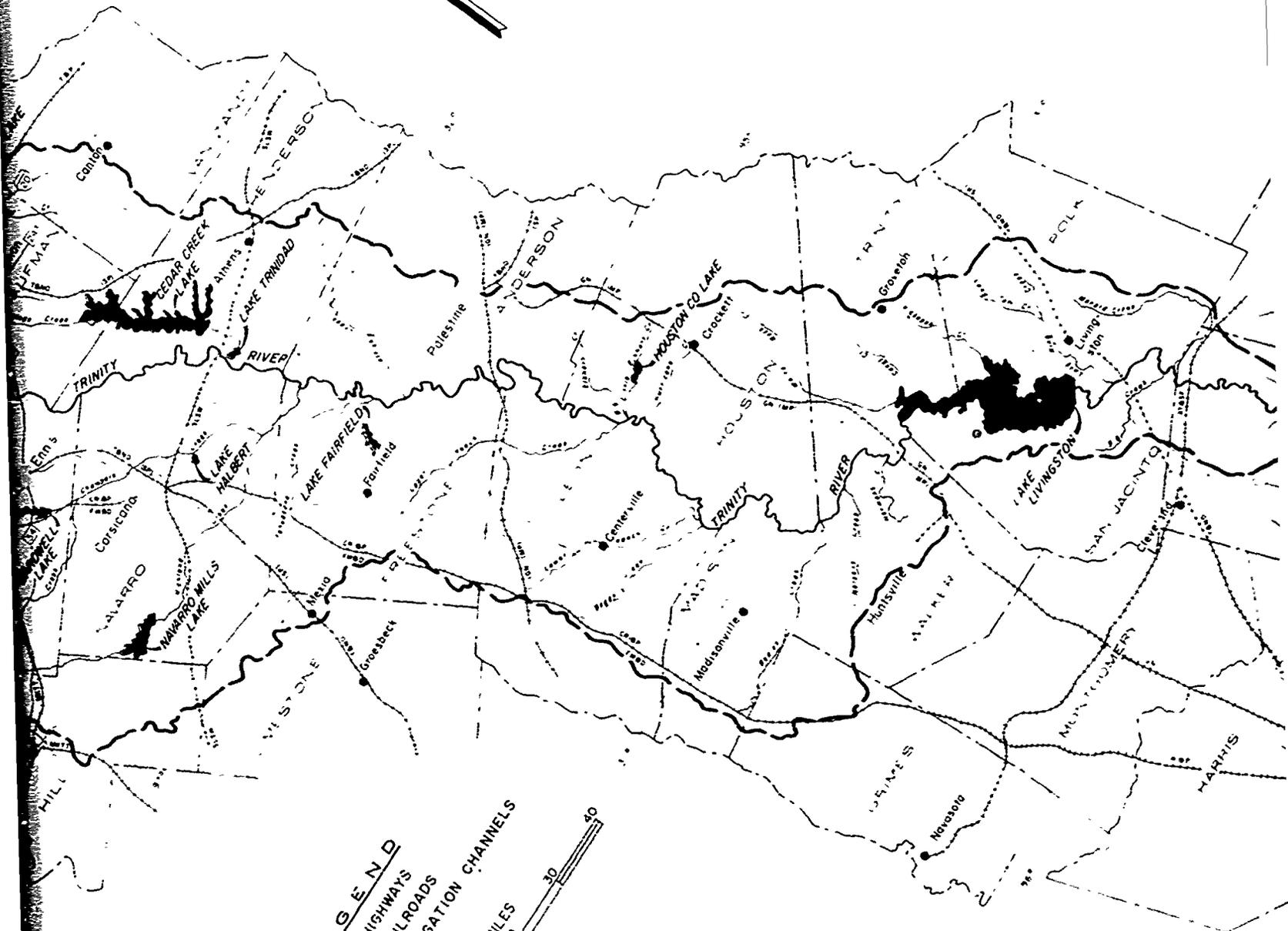
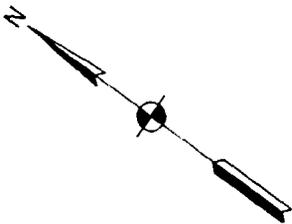


LOSS) NET GAIN 1,218,363 1,234,732 (TOTAL GAIN)

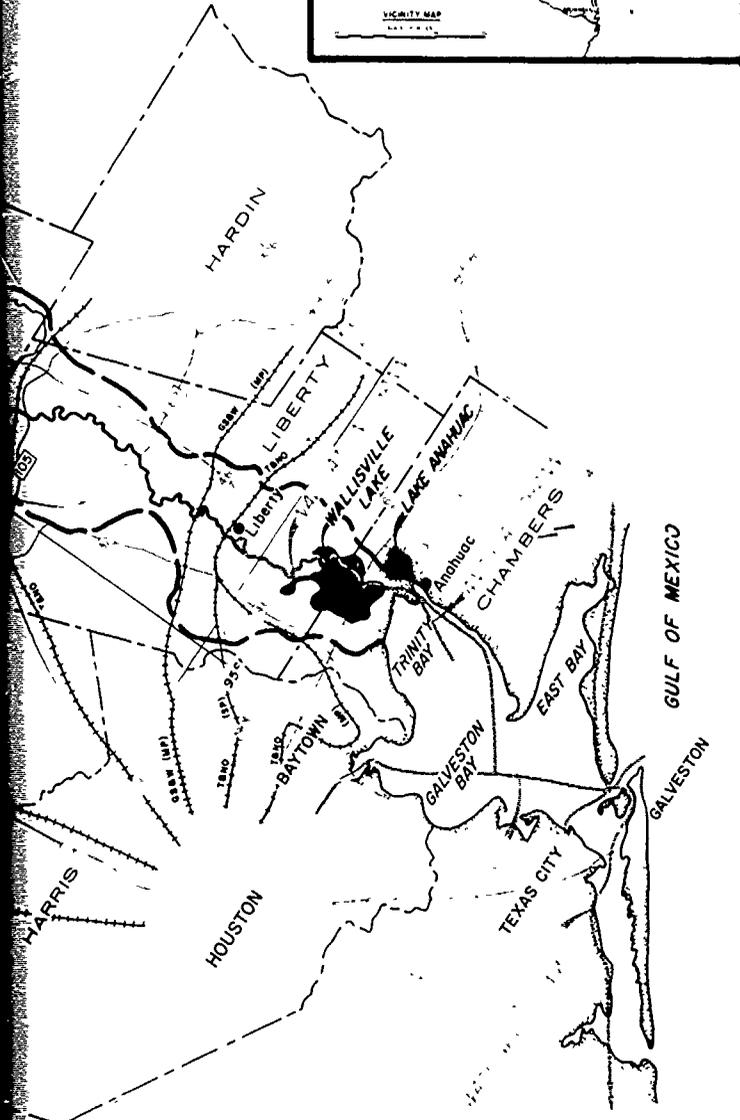
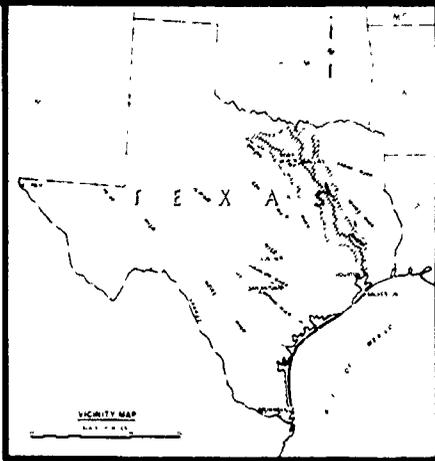
POPULATION CHANGE FROM 1960 TO 1970

Note
 Counties generally arranged from upper basin to lower basin

TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
**POPULATION CHANGES
 40 COUNTY SURVEY AREA**
 U.S. ARMY ENGINEER DIST., FT. WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT



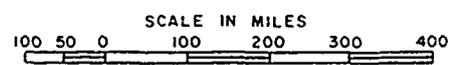
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TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT
SURFACE
TRANSPORTATION SYSTEMS

U.S. ARMY ENGINEER DIST., FORT WORTH

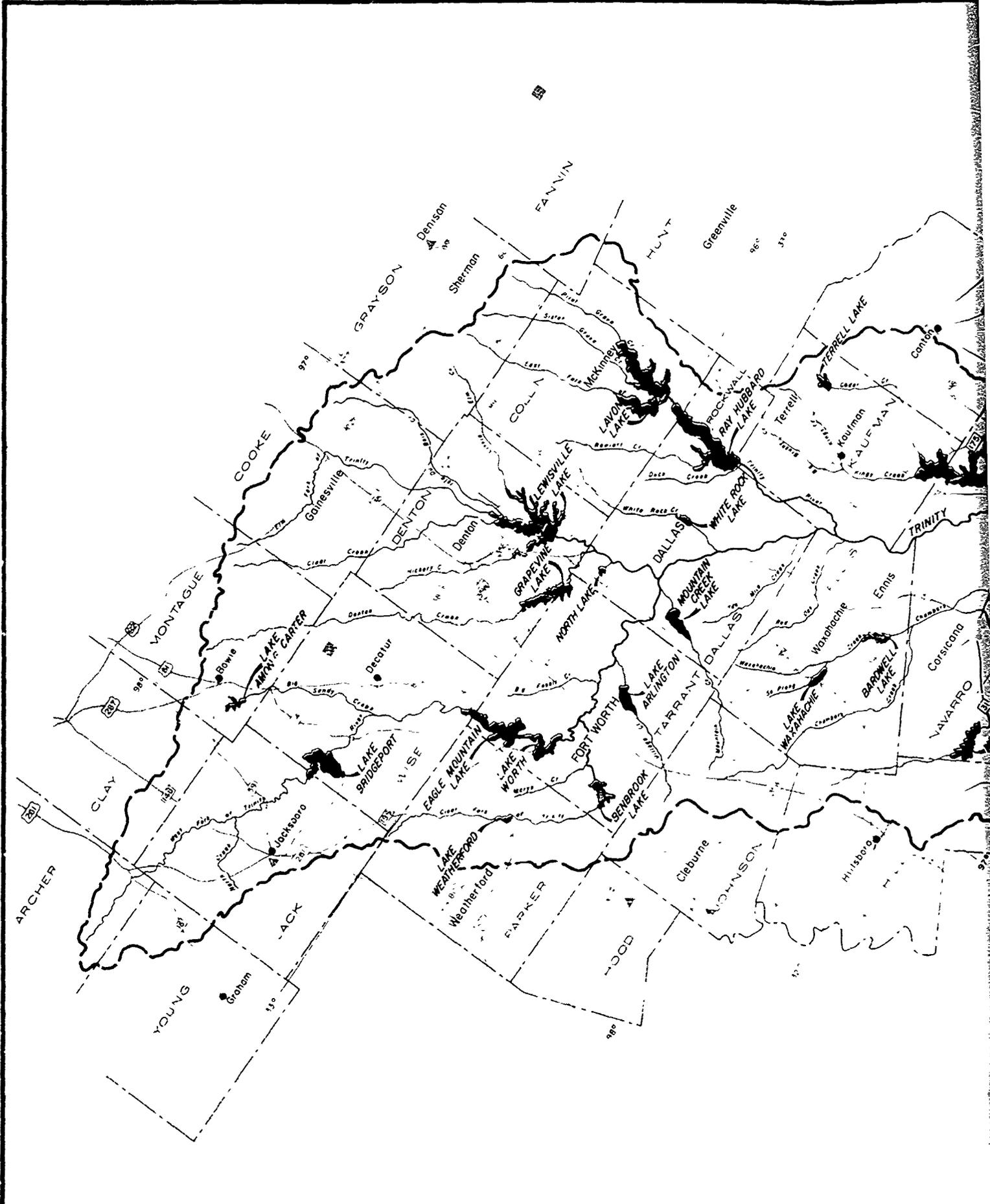
TO ACCOMPANY ENVIRONMENTAL STATEMENT

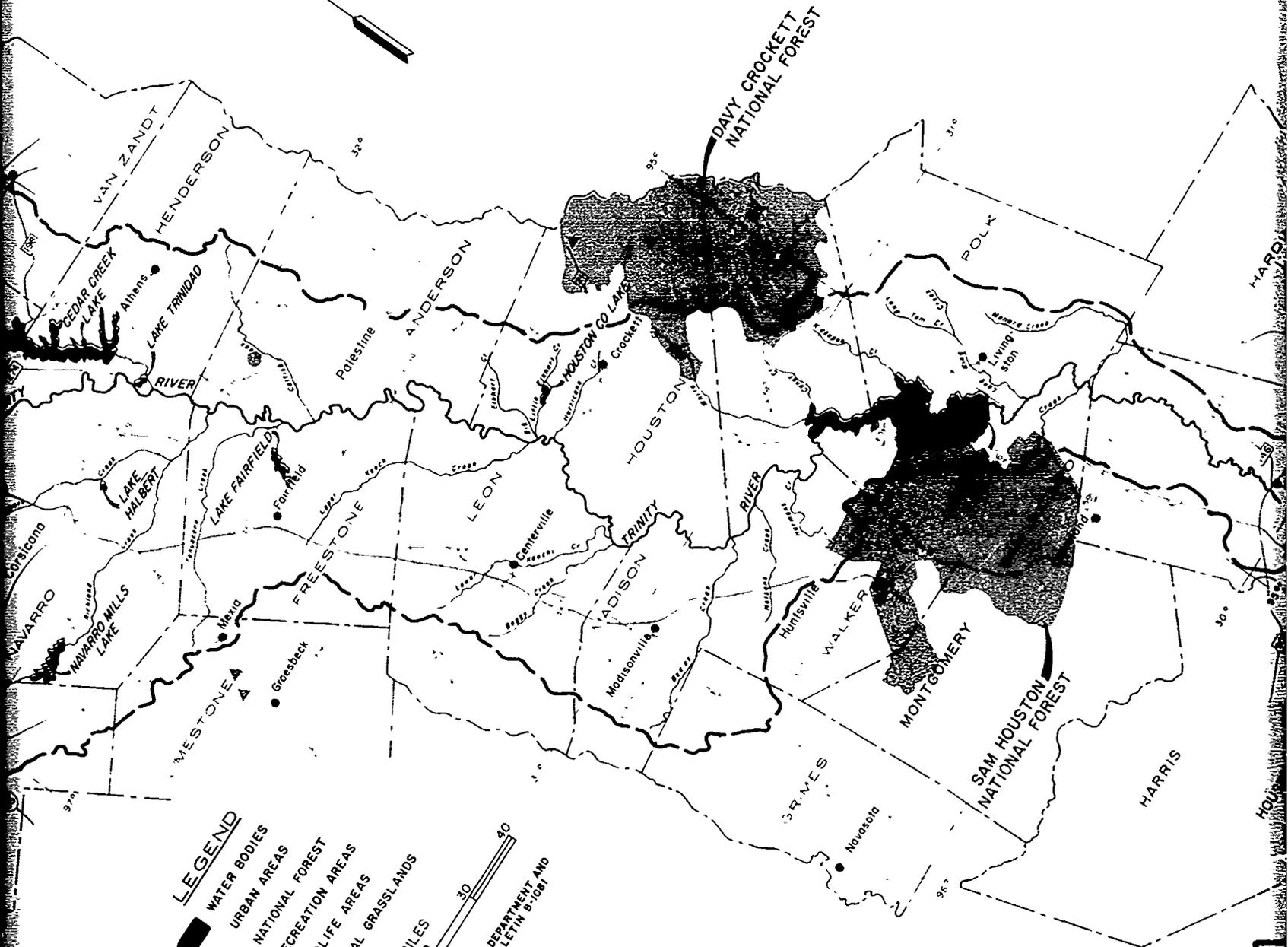
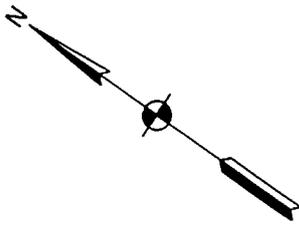


LEGEND

- PRINCIPAL IMPROVED WATERWAYS (EXISTING OR UNDER CONSTRUCTION)
- - - AUTHORIZED FOR IMPROVEMENT
- PROPOSED WATERWAY TO FORT WORTH

TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
 PRINCIPAL COASTAL AND INLAND WATERWAYS
 U.S. ARMY ENGR DIST, FT WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT



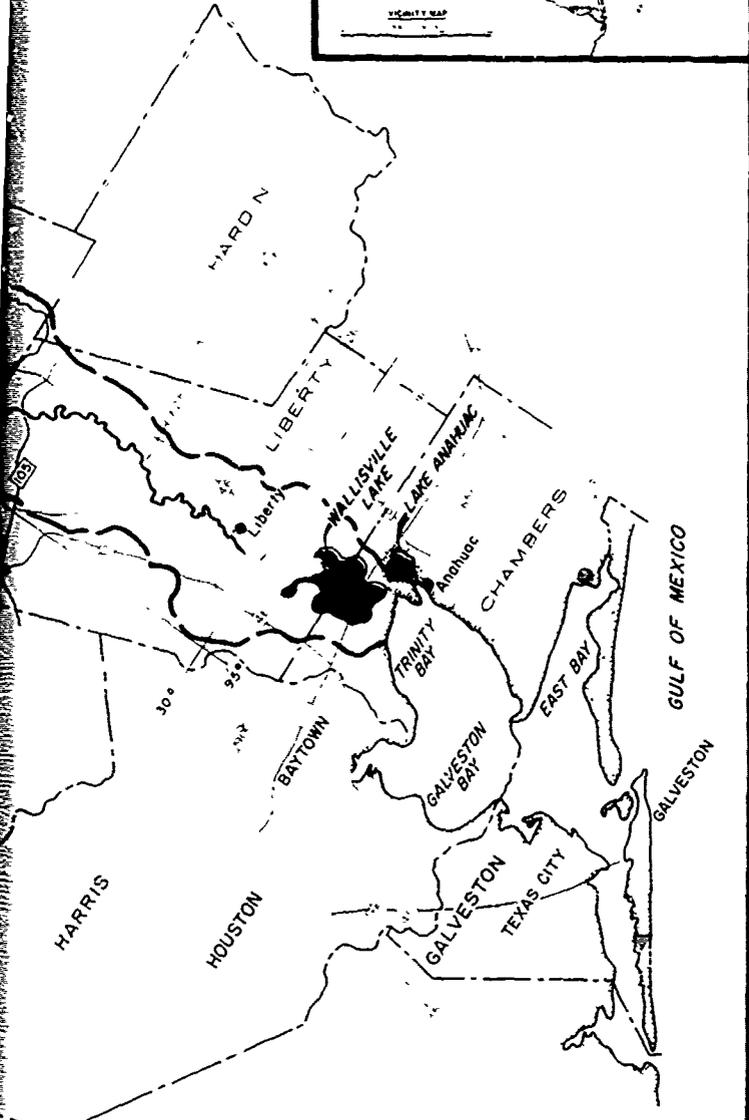


LEGEND

- WATER BODIES
- ▨ URBAN AREAS
- ▨ NATIONAL FOREST
- ▨ RECREATION AREAS
- ▨ WILDLIFE AREAS
- ▨ NATIONAL GRASSLANDS



DATA FROM TEXAS HIGHWAY DEPARTMENT AND
TEXAS A & M UNIVERSITY BULLETIN 8-1087

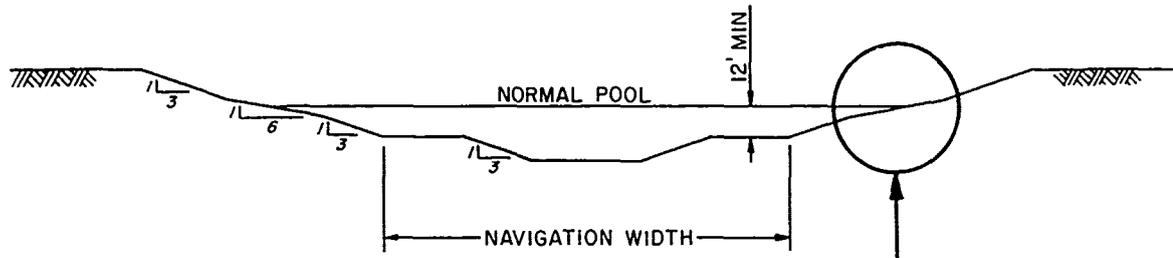


TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT
STATE AND FEDERAL PUBLIC
OUTDOOR RECREATION AREAS

U S ARMY ENGINEER DIST, FORT WORTH

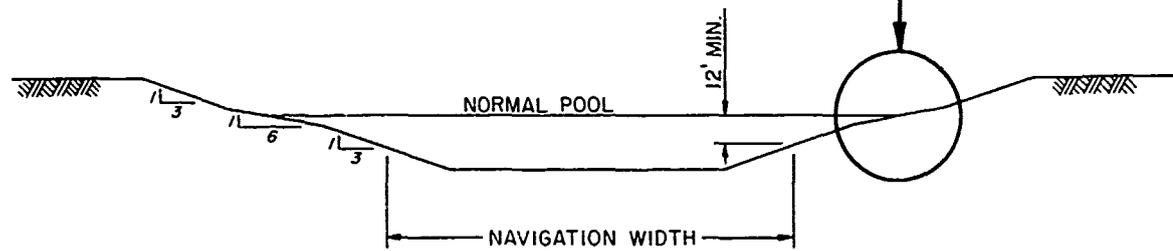
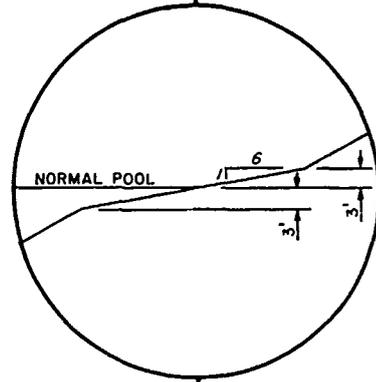
TO ACCOMPANY ENVIRONMENTAL STATEMENT

PLATE 26



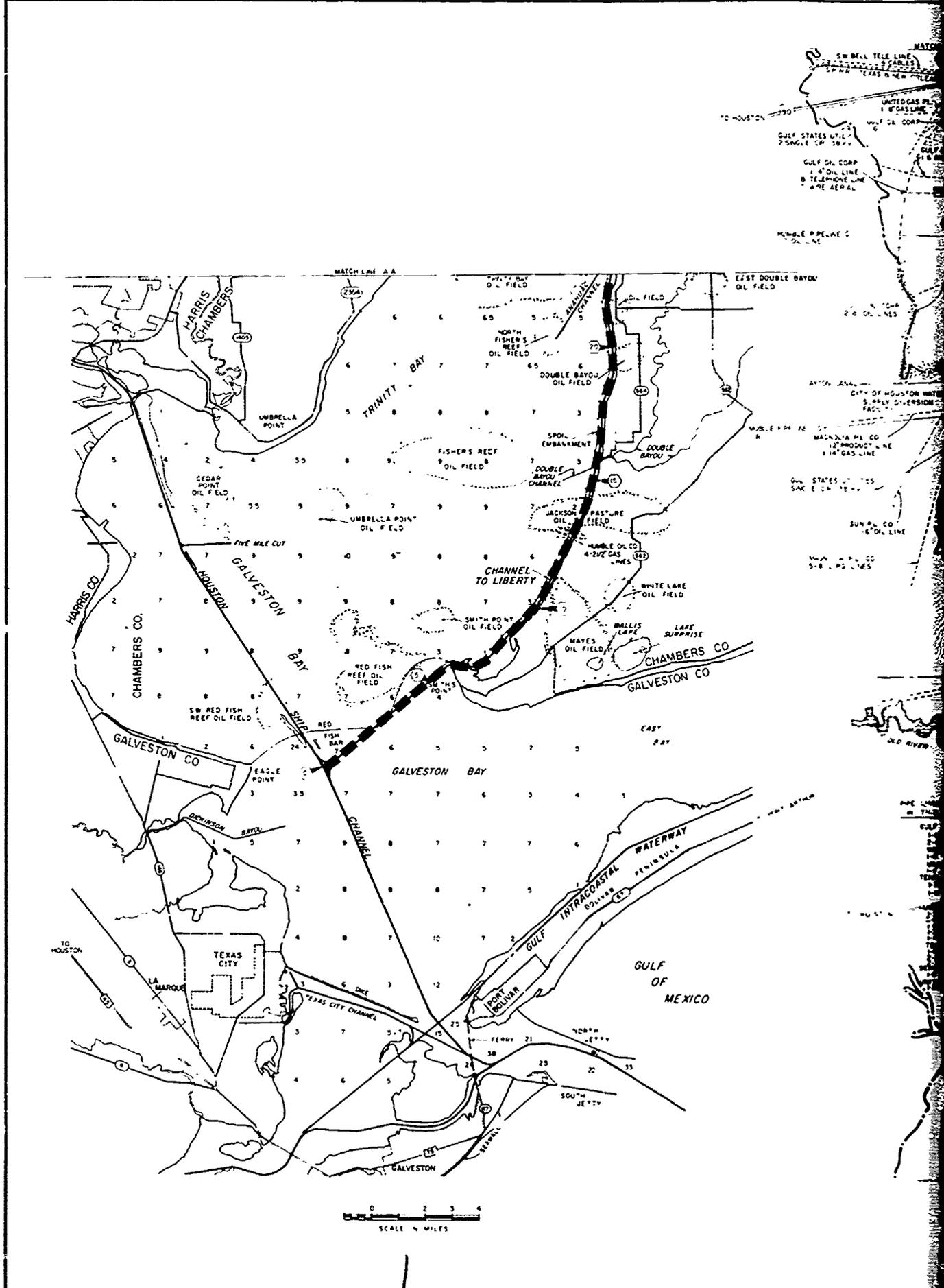
TYPE 1
N.T.S.

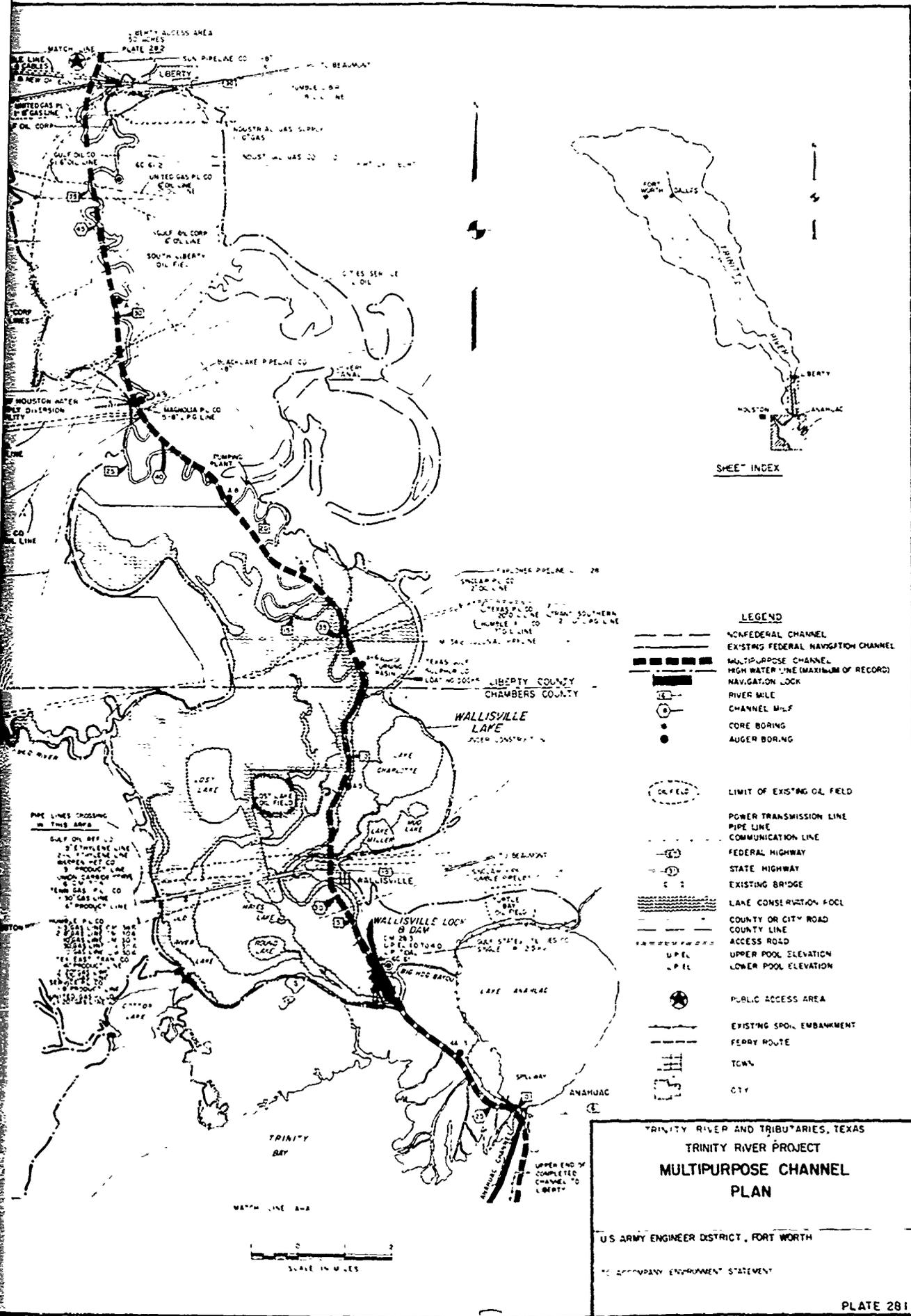
EXPANDED VIEW OF SLOPE
AT NORMAL POOL LEVEL



TYPE 2
N.T.S.

TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT
MULTIPURPOSE CHANNEL SECTIONS
U.S. ARMY ENGR. DIST., FT. WORTH
TO ACCOMPANY ENVIRONMENTAL STATEMENT





SHEET INDEX

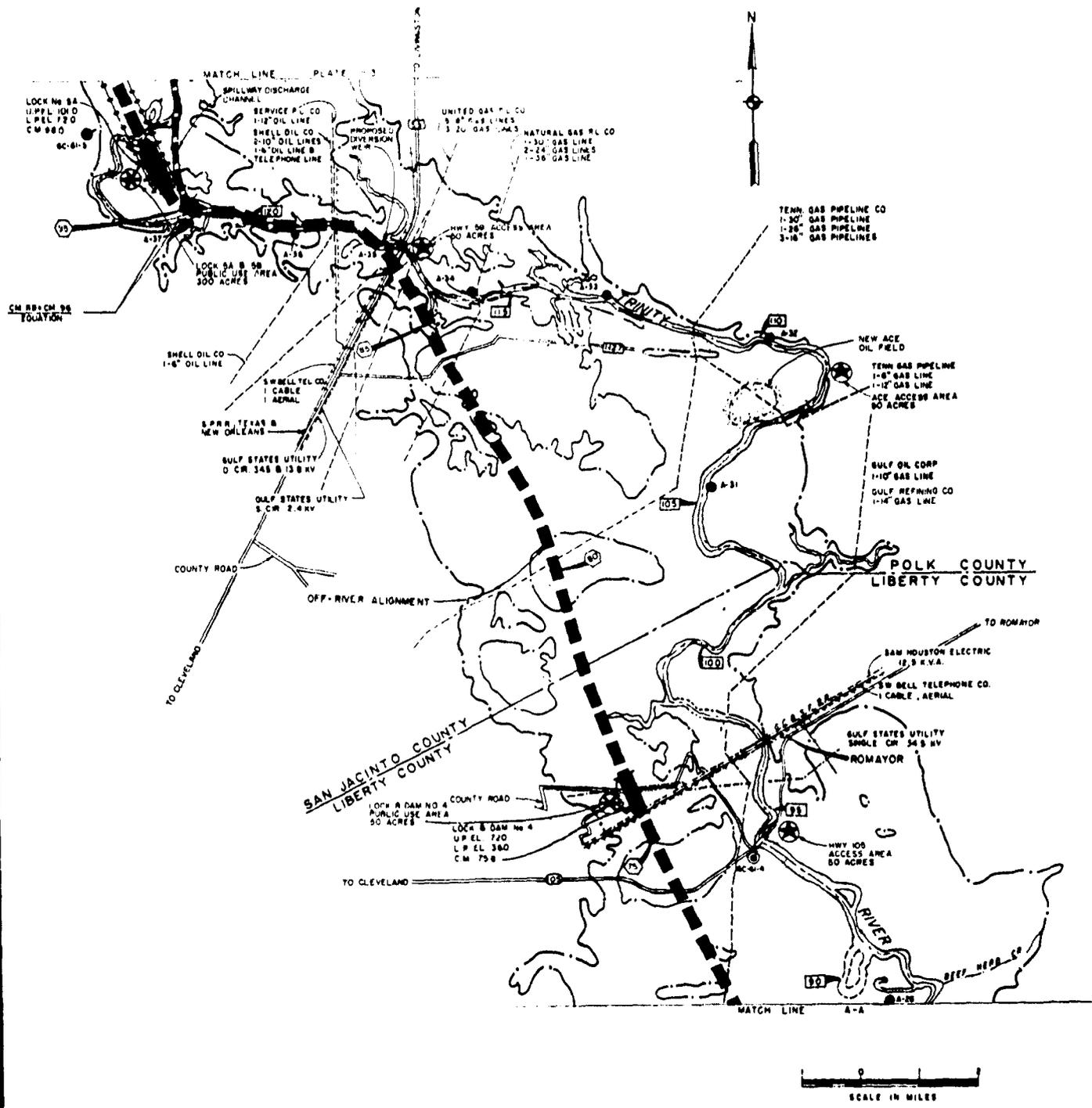
LEGEND

- NONFEDERAL CHANNEL
- EXISTING FEDERAL NAVIGATION CHANNEL
- MULTIPURPOSE CHANNEL
- HIGH WATER LINE (MAXIMUM OF RECORD)
- NAVIGATION LOCK
- RIVER MILE
- CHANNEL MILE
- CORE BORING
- AUGER BORING
- LIMIT OF EXISTING OIL FIELD
- POWER TRANSMISSION LINE
- PIPE LINE
- COMMUNICATION LINE
- FEDERAL HIGHWAY
- STATE HIGHWAY
- EXISTING BRIDGE
- LAKE CONSERVATION FOUL
- COUNTY OR CITY ROAD
- COUNTY LINE
- ACCESS ROAD
- UPPER POOL ELEVATION
- LOWER POOL ELEVATION
- PUBLIC ACCESS AREA
- EXISTING SPILL EMBANKMENT
- FERRY ROUTE
- TOWN
- CITY

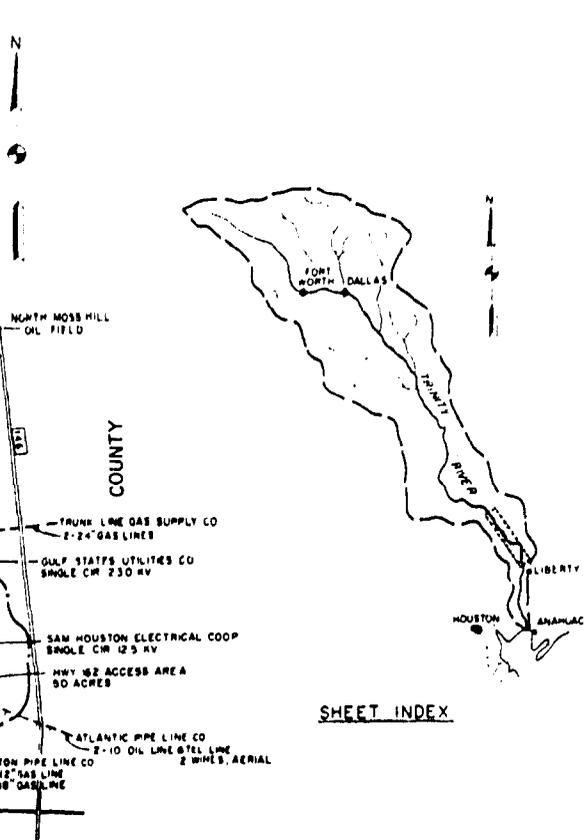
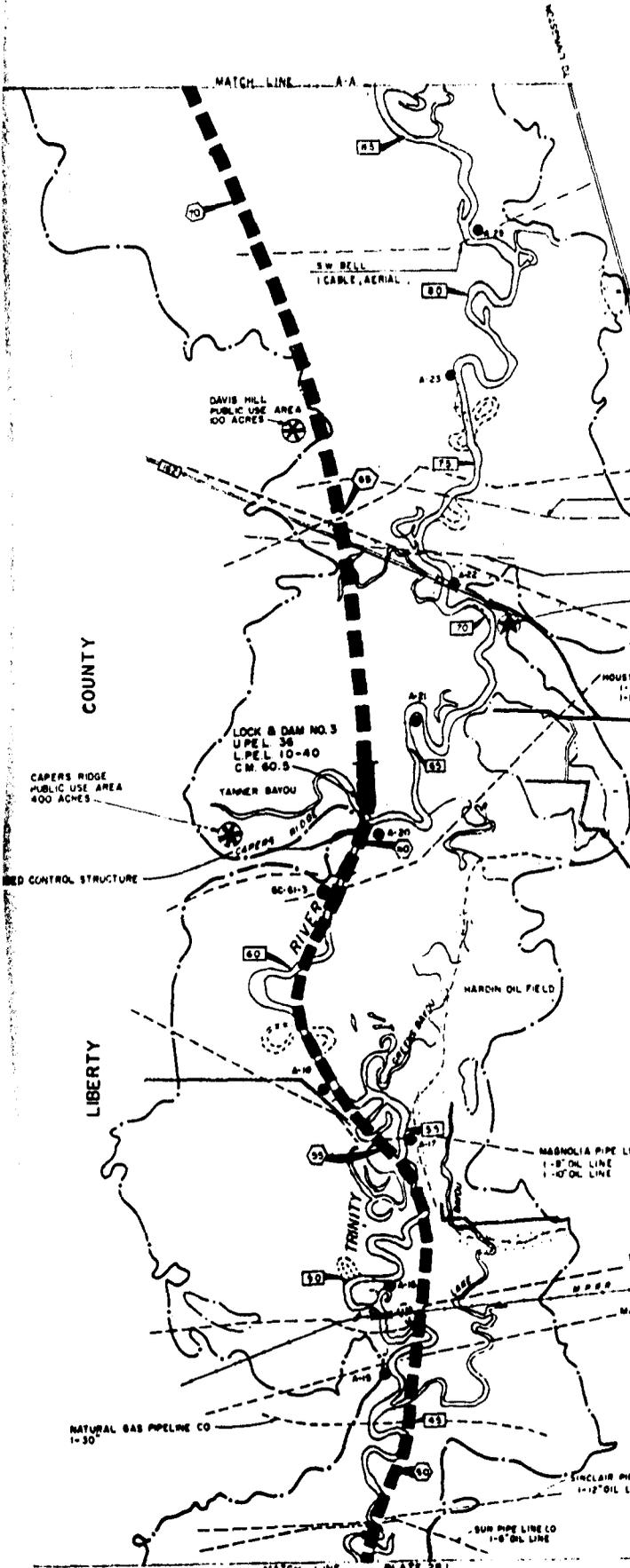
TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
**MULTIPURPOSE CHANNEL
 PLAN**

U.S. ARMY ENGINEER DISTRICT, FORT WORTH

TO ACCOMPANY ENVIRONMENT STATEMENT



PRC



SHEET INDEX

- LIBERTY**
- MULTIPURPOSE CHANNEL
 - HIGH WATER LINE (MAXIMUM OF RECORD)
 - NAVIGATION LOCK
 - RIVER MILE
 - CHANNEL MILE
 - CORF BORING
 - AUGER BORING
 - DISCHARGE CHANNEL
 - LIMIT OF EXISTING OIL FIELD
 - POWER TRANSMISSION LINE
 - PIPE LINE
 - COMMUNICATION LINE
 - FEDERAL HIGHWAY
 - STATE HIGHWAY
 - EXISTING BRIDGE
 - RAILROAD
 - COUNTY ROAD
 - COUNTY LINE
 - ACCESS ROAD
 - UPPER POOL ELEVATION
 - LOWER POOL ELEVATION
 - PUBLIC USE AREA
 - FARM TO MARKET ROAD
 - PROPOSED LEVEE EMBANKMENT
 - ACCESS AREA

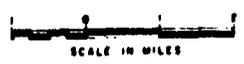
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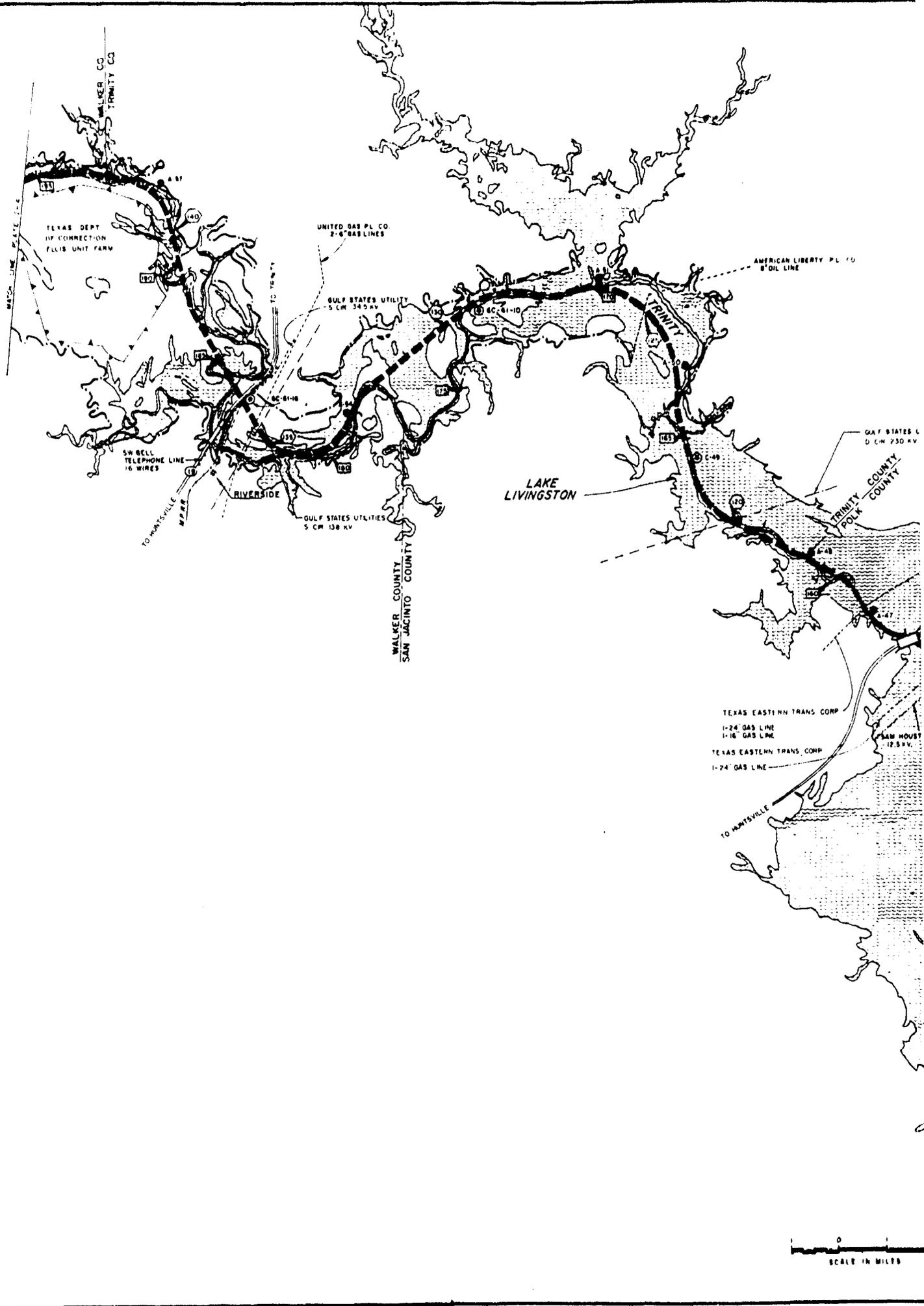
TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
 MULTIPURPOSE CHANNEL
 PLAN

U.S. ARMY ENGINEER DISTRICT, FORT WORTH

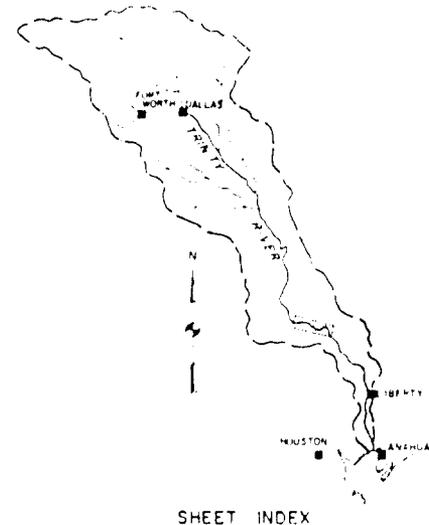
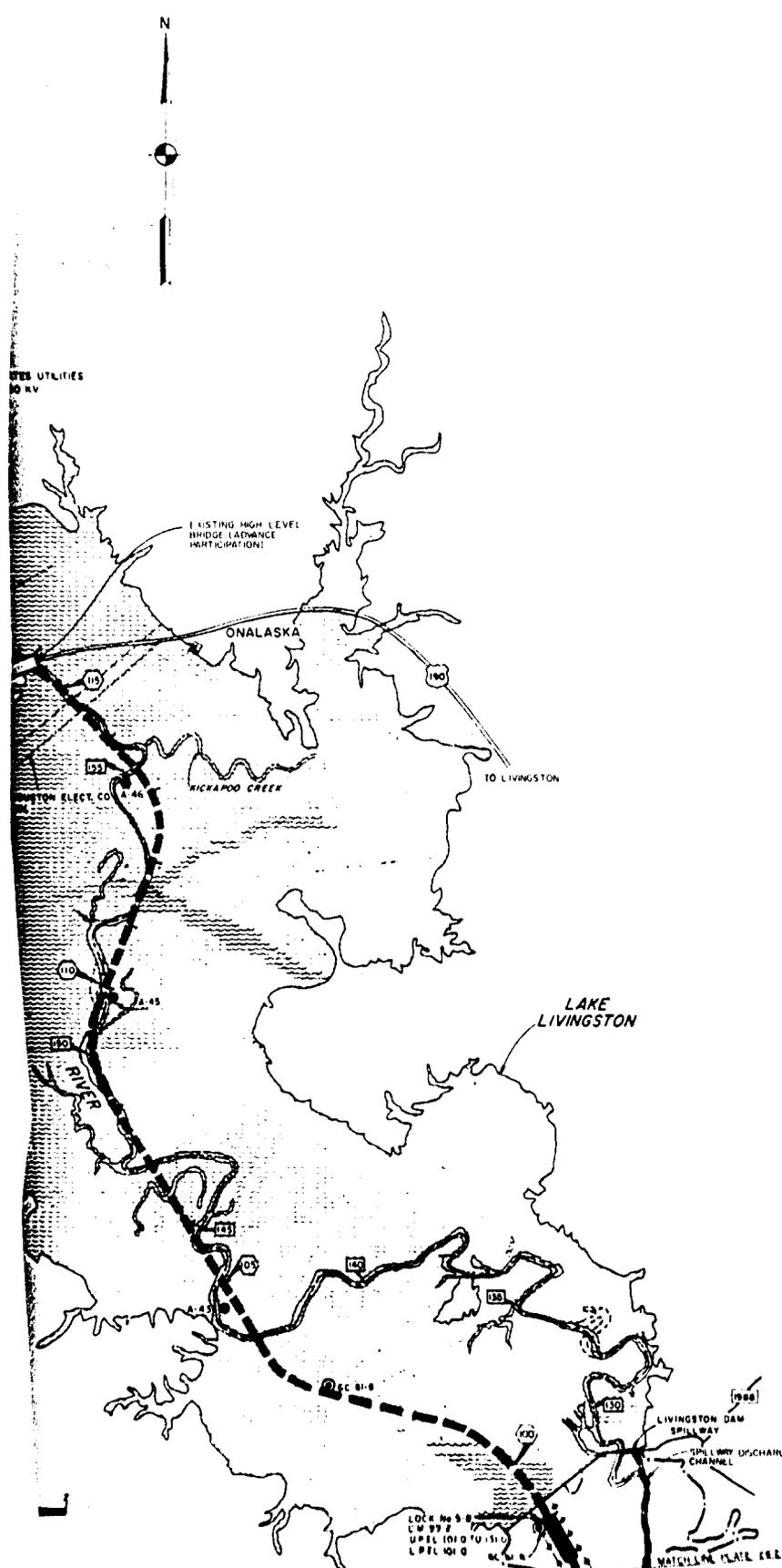
TO ACCOMPANY ENVIRONMENTAL STATEMENT

PLATE 28.2





SCALE IN MILES



LEGEND

	MULTIPURPOSE CHANNEL
	HIGH WATER LINE (MAXIMUM OF RECORD)
	NAVIGATION LOCK
	RIVER MILE
	CHANNEL MILE
	CORE BORING
	AUGER BORING
	LAKE CONSERVATION
	POWER TRANSMISSION LINE
	PIPE LINE
	COMMUNICATION LINE
	FEDERAL HIGHWAY
	STATE HIGHWAY
	EXISTING BRIDGE
	EXISTING LEVEE
	RAILROAD
	COUNTY LINE
	UPPER POOL ELEVATION
	LOWER POOL ELEVATION
	PROPOSED LEVEE EMBANKMENT
	DISCHARGE CHANNEL
	TOWN

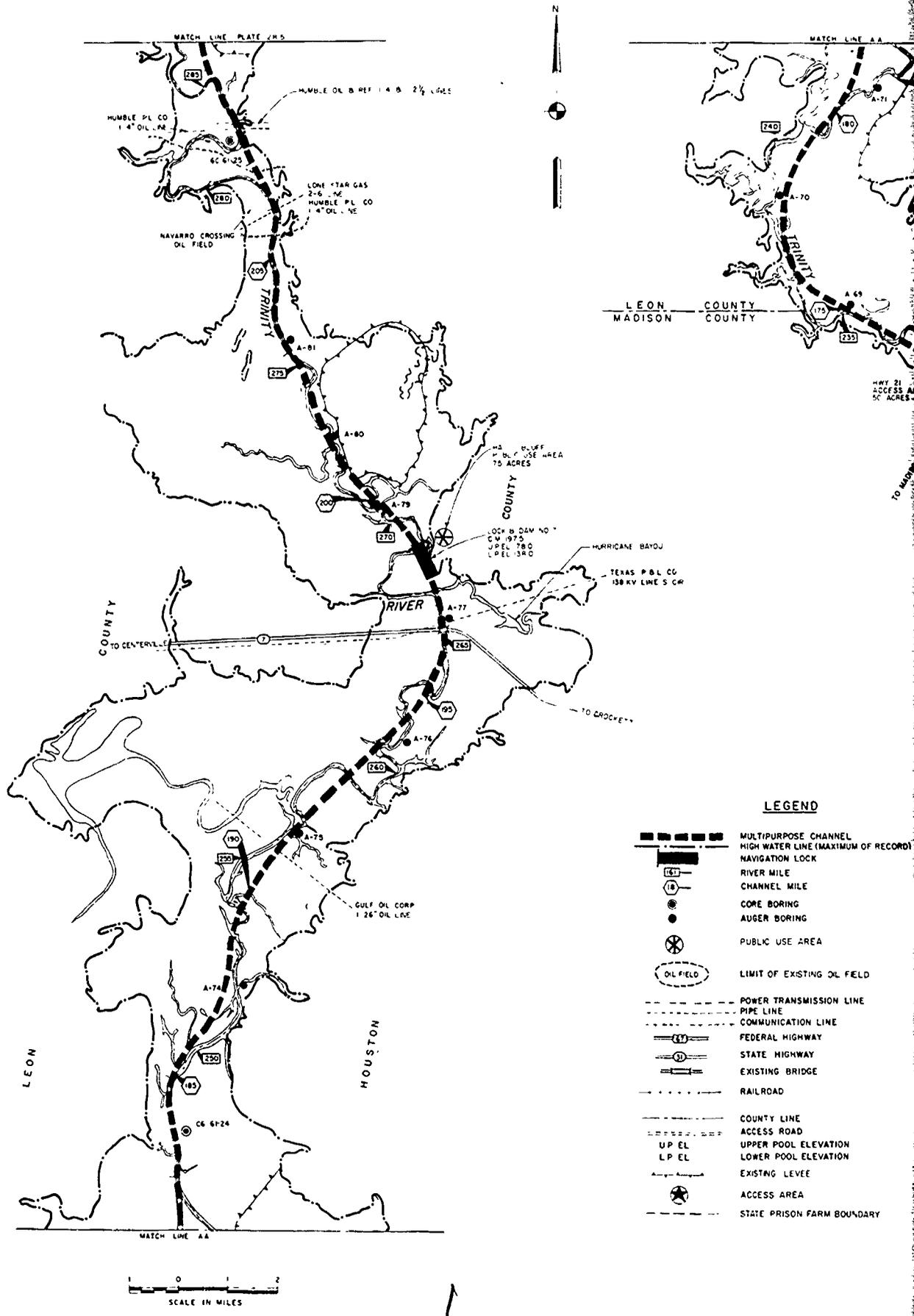
TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
 MULTIPURPOSE CHANNEL
 PLAN

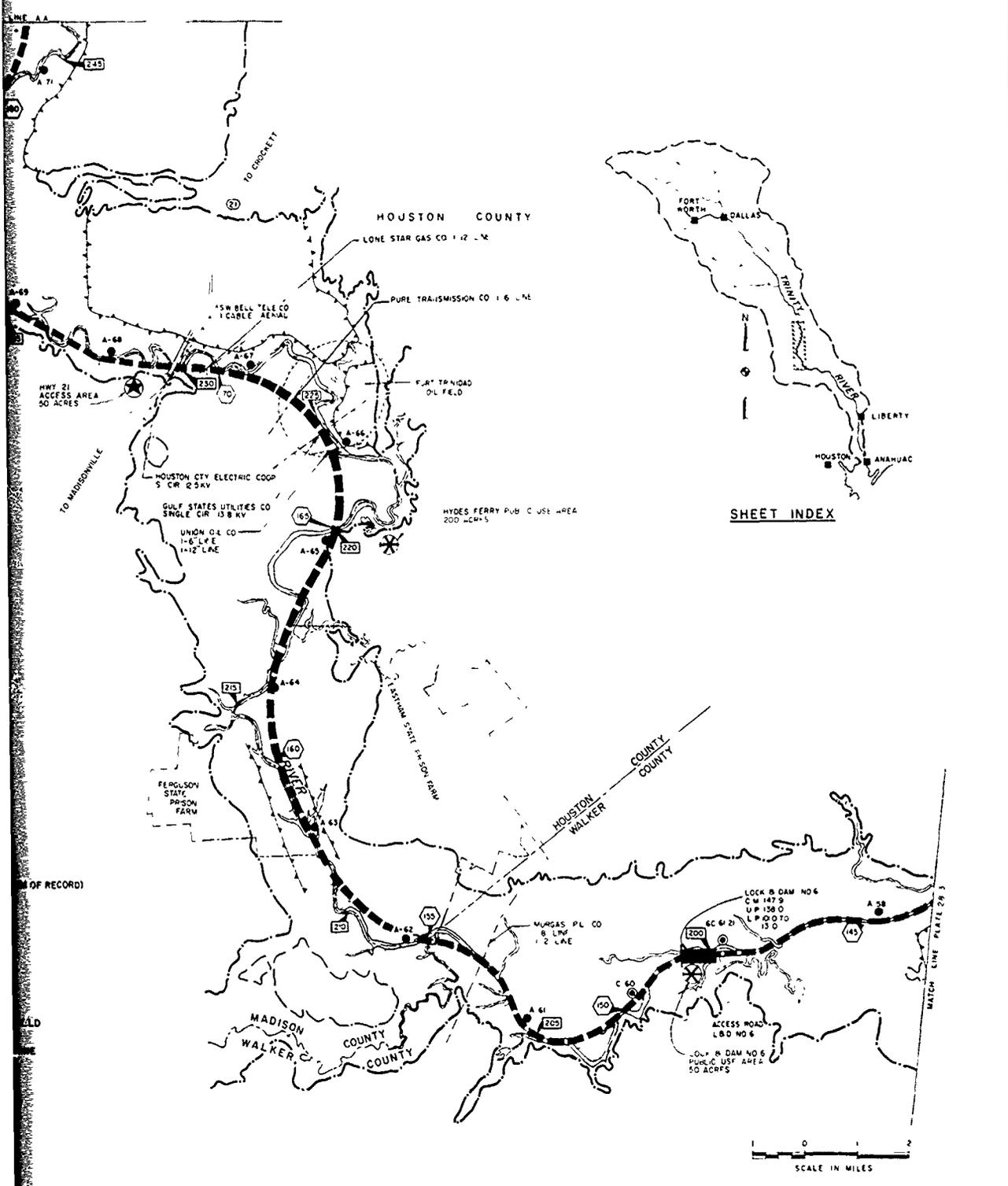
U.S. ARMY ENGINEER DISTRICT, FORT WORTH

TO ACCOMPANY ENVIRONMENTAL STATEMENT

PLATE 283

Best Available Copy





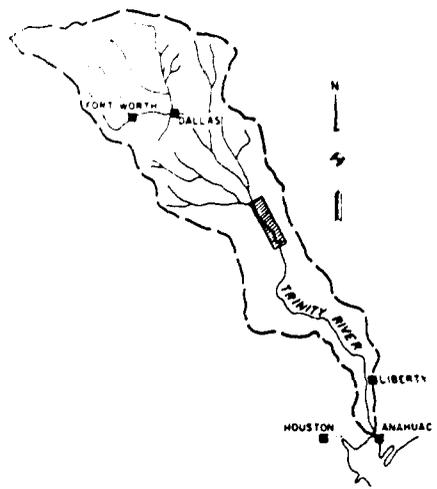
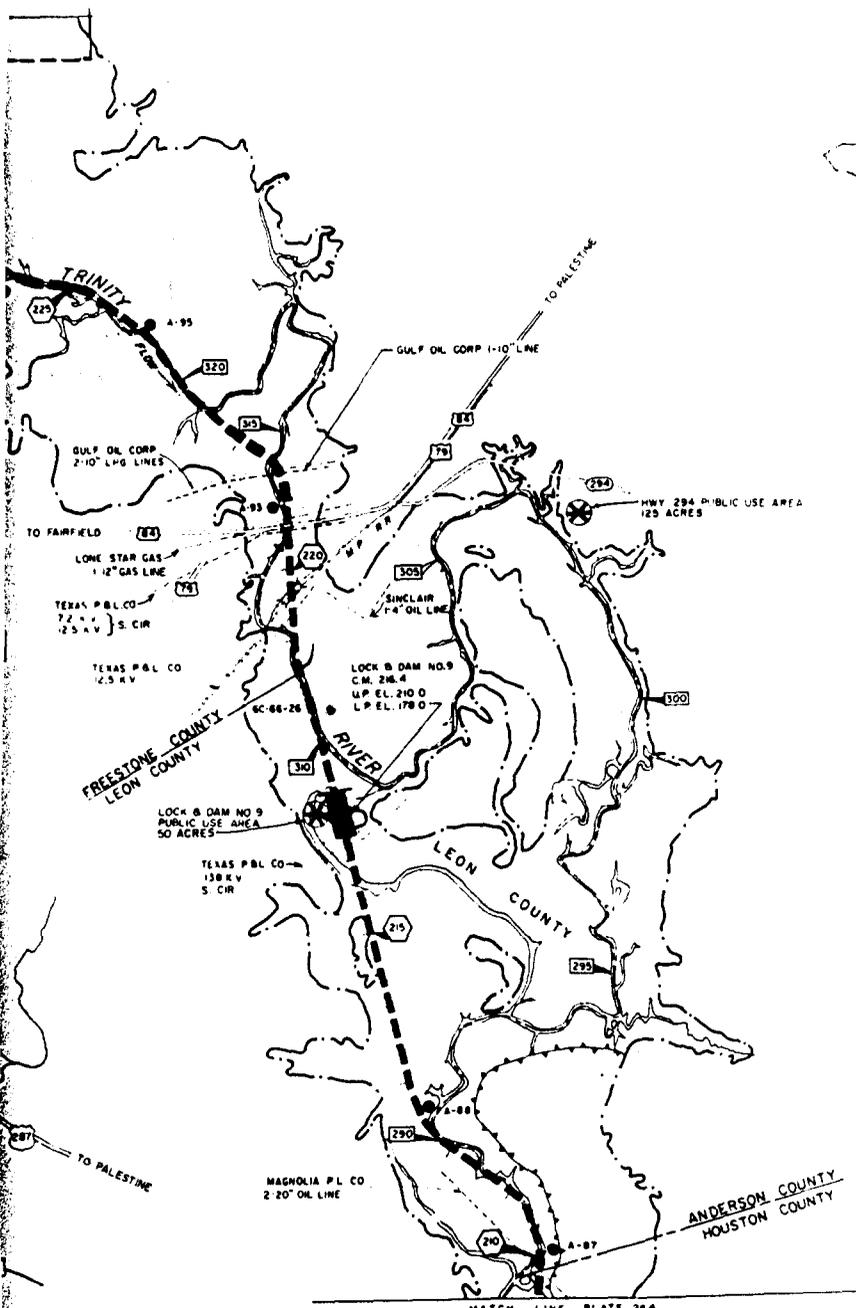
TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
 MULTIPURPOSE CHANNEL
 PLAN

U S ARMY ENGINEER DISTRICT, FORT WORTH

TO ACCOMPANY ENVIRONMENT STATEMENT

PLATE 28.4

1 2



SHEET INDEX

LEGEND

- DISCHARGE CHANNEL
- MULTIPURPOSE CHANNEL
- HIGH WATER LINE (MAXIMUM OF RECORD)
- NAVIGATION LOCK
- RIVER MILE
- CHANNEL MILE
- CORE BORING
- AUGER BORING
- PROPOSED LAKE
- CONSERVATION POOL
- POWER TRANSMISSION LINE
- PIPE LINE
- COMMUNICATION LINE
- FEDERAL HIGHWAY
- STATE HIGHWAY
- EXISTING BRIDGE
- COUNTY LINE
- COUNTY LINE
- ACCESS ROAD
- UPPER POOL ELEVATION
- LOWER POOL ELEVATION
- PUBLIC USE AREA
- PROPOSED LEVEE EMBANKMENT
- EXISTING LEVEE
- FARM TO MARKET ROAD
- TOWN
- PROPERTY LINE

COLONY
UNIMPROVED SITE NO. 2A)

Best Available Copy



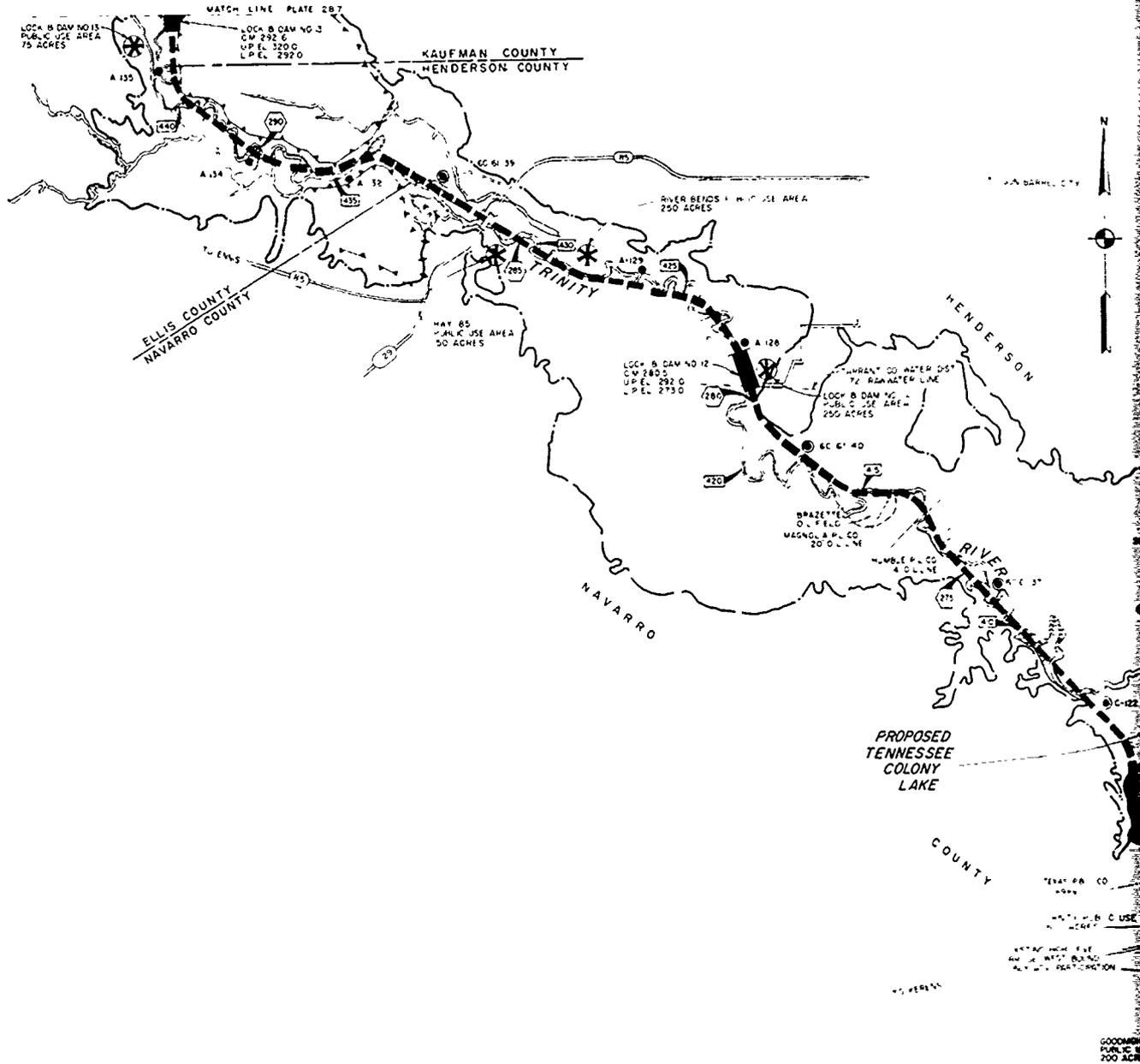
TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
 MULTIPURPOSE CHANNEL
 PLAN

U.S. ARMY ENGINEER DISTRICT, FORT WORTH

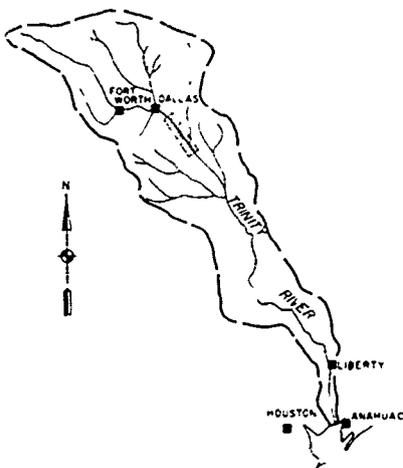
TO ACCOMPANY ENVIRONMENTAL STATEMENT

PLATE 28.5

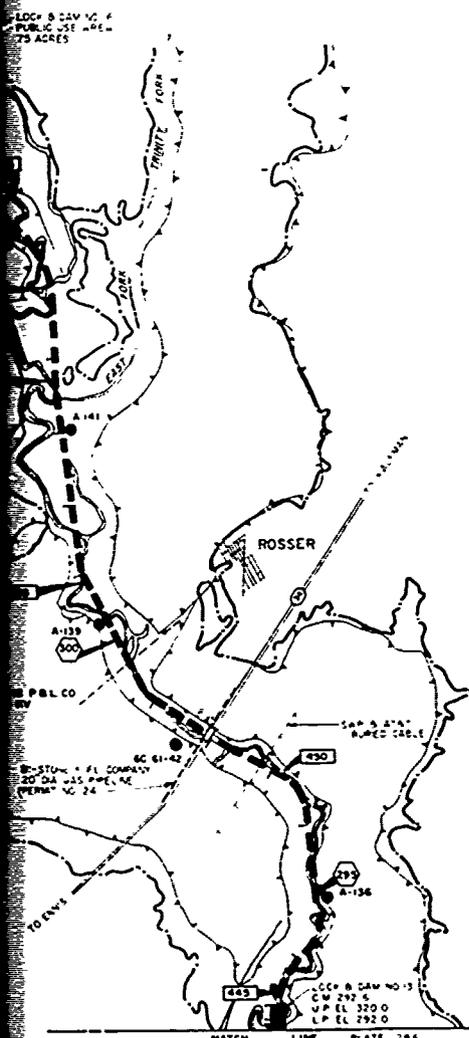
CORPS OF ENGINEERS



GOODMAN
PUBLIC USE AREA
200 ACRES

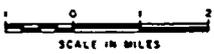


SHEET INDEX



LEGEND

- MULTIPURPOSE CHANNEL
- HIGH WATER LINE (MAXIMUM OF RECORD)
- RIVER MILE
- CHANNEL MILE
- CORE BORING
- AUGER BORING
- NAVIGATION LOCK
- POWER TRANSMISSION LINE
- PIPE LINE
- COMMUNICATION LINE
- FEDERAL HIGHWAY
- STATE HIGHWAY
- EXISTING BRIDGE
- RAILROAD
- COUNTY ROAD
- COUNTY LANE
- ACCESS ROAD
- UPPER POOL ELEVATION
- LOWER POOL ELEVATION
- PUBLIC USE AREA
- EXISTING LEVEL
- TOWN



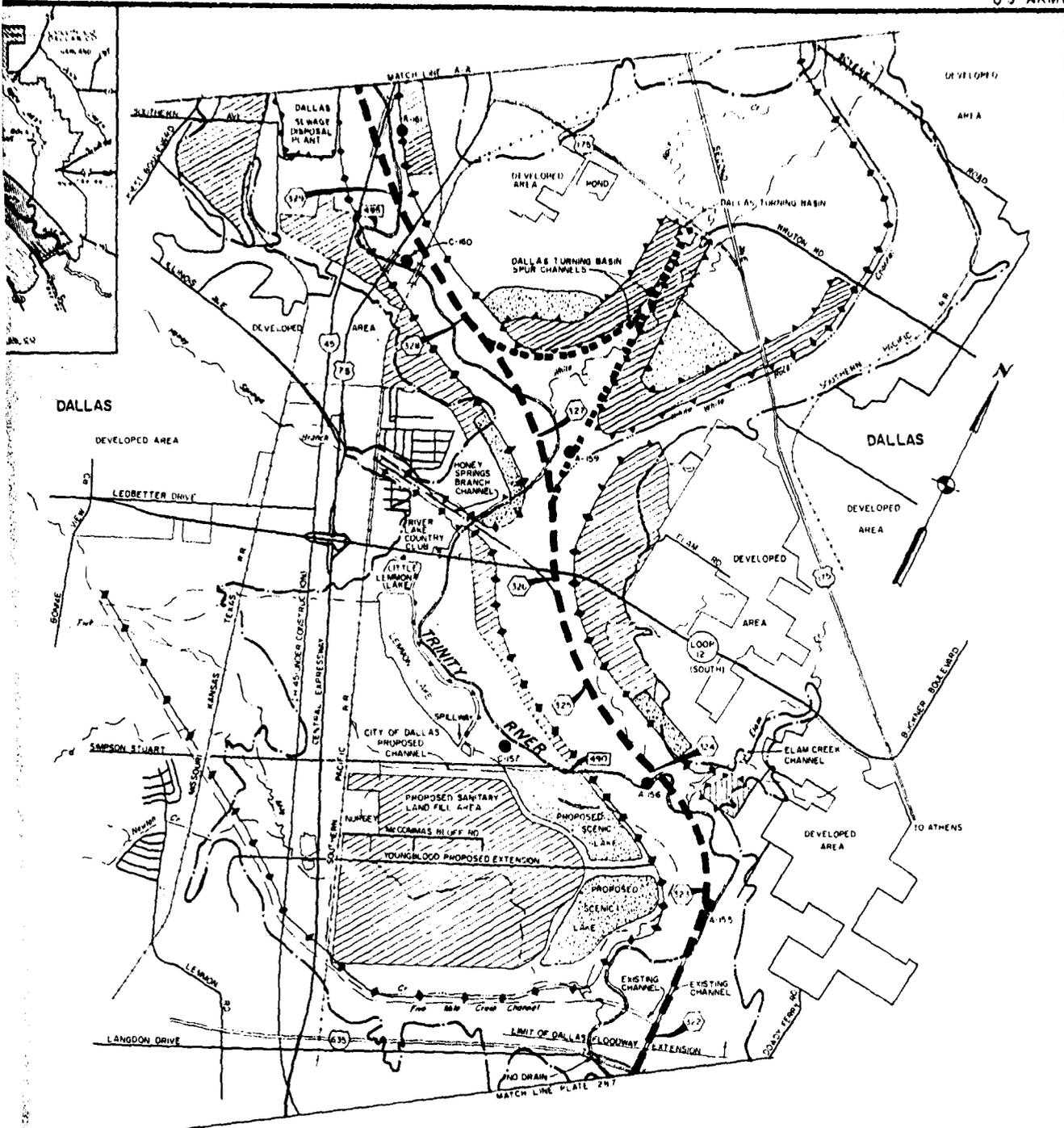
TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT
MULTIPURPOSE CHANNEL
PLAN

U.S. ARMY ENGINEER DISTRICT, FORT WORTH

** ACCOMPANY EXPLANATORY STATEMENTS **

PLATE 287

2

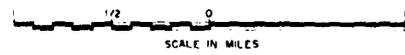


DALLAS

DALLAS

LEGEND

- SPUR CHANNEL
- NAVIGATION LOCK
- STATE HIGHWAY
- EXISTING LEVEE
- PROPOSED LEVEE
- SWAMP AREA, PROPOSED
- FULL AREA, PROPOSED
- HIGH WATER LINE (MAXIMUM OF RECORD)
- RAIL ROAD
- U.S. HIGHWAY
- PUBLIC USE AREA
- RIVER MILE
- DIVERSION CHANNEL
- CHANNEL MILE
- COUNTY LINE
- AUGER BORING
- MULTIPURPOSE CHANNEL
- FILL BANK
- STREET (ROAD)
- INTERSTATE HIGHWAY
- L.P. LOWER POOL
- U.P. UPPER POOL
- EXISTING BRIDGE

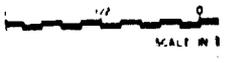
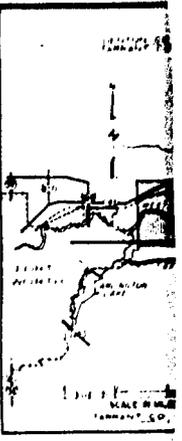
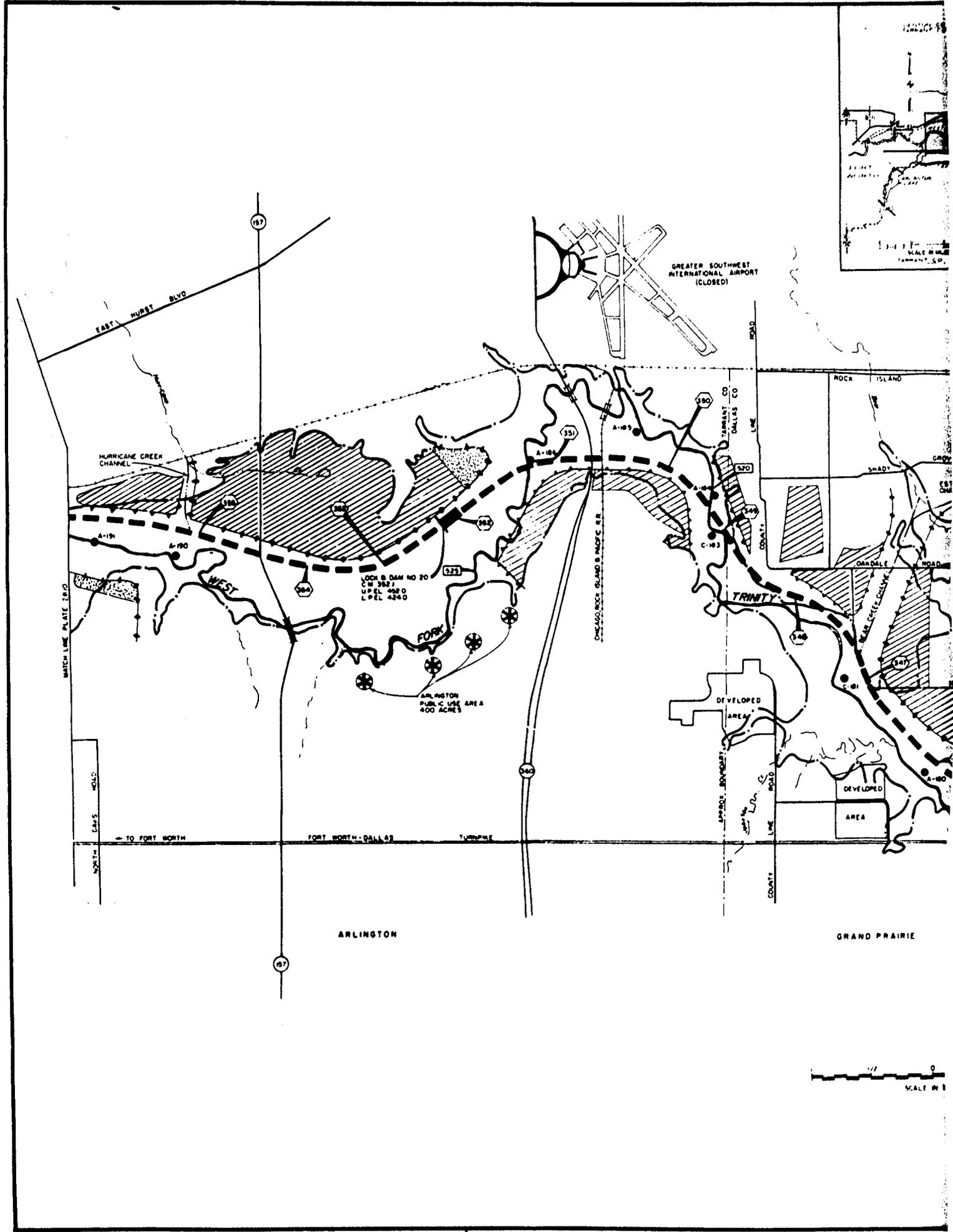


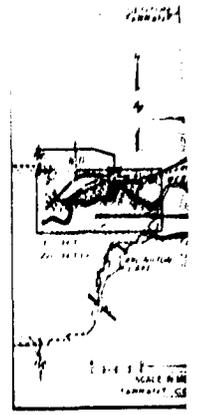
NOTE
 UTILITIES REQUIRING RELOCATION ARE SHOWN ON PROFILE
 AND LISTED IN RELOCATIONS INVENTORY

TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
 MULTIPURPOSE CHANNEL
 PLAN
 (DALLAS FLOODWAY AND FLOODWAY EXTENSION)
 U.S. ARMY ENGINEER DISTRICT, FORT WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT

PLATE 28 B

Best Available Copy





NICHLAND HILLS

NORTH RIVER WEST

HALTOM CITY

FORT WORTH TURNING BASH

DEVELOPED AREA

FORT WORTH TURNING BASH CHANNEL

MCNARY RD
BIG FOSSEL CR CHANNEL

LITTLE FOSSEL CR CHANNEL

ELLOT RD

MEADOW RD

BA-246

BA-240

A-200

C-199

C-201

BA-250

BA-249

BA-6C-249

BA-6C-248

BA-6C-247

BA-6C-246

BA-6C-245

BA-6C-244

BA-6C-243

BA-6C-242

BA-6C-241

BA-6C-240

BA-6C-239

BA-6C-238

BA-6C-237

BA-6C-236

BA-6C-235

BA-6C-234

BA-6C-233

BA-6C-232

BA-6C-231

BA-6C-230

BA-6C-229

BA-6C-228

BA-6C-227

BA-6C-226

BA-6C-225

BA-6C-224

BA-6C-223

BA-6C-222

BA-6C-221

BA-6C-220

BA-6C-219

BA-6C-218

BA-6C-217

BA-6C-216

BA-6C-215

BA-6C-214

BA-6C-213

BA-6C-212

BA-6C-211

BA-6C-210

BA-6C-209

BA-6C-208

BA-6C-207

BA-6C-206

BA-6C-205

BA-6C-204

BA-6C-203

BA-6C-202

BA-6C-201

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BA-6C-18

BA-6C-17

BA-6C-16

BA-6C-15

BA-6C-14

BA-6C-13

BA-6C-12

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BA-6C-8

BA-6C-7

BA-6C-6

BA-6C-5

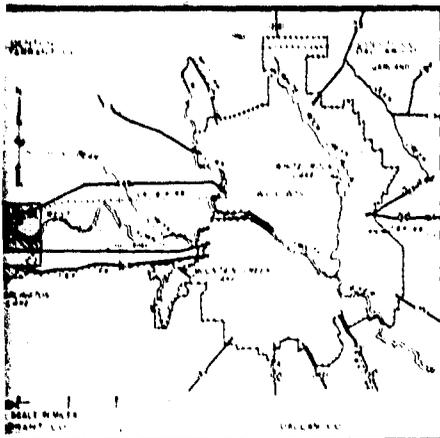
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BA-6C-3

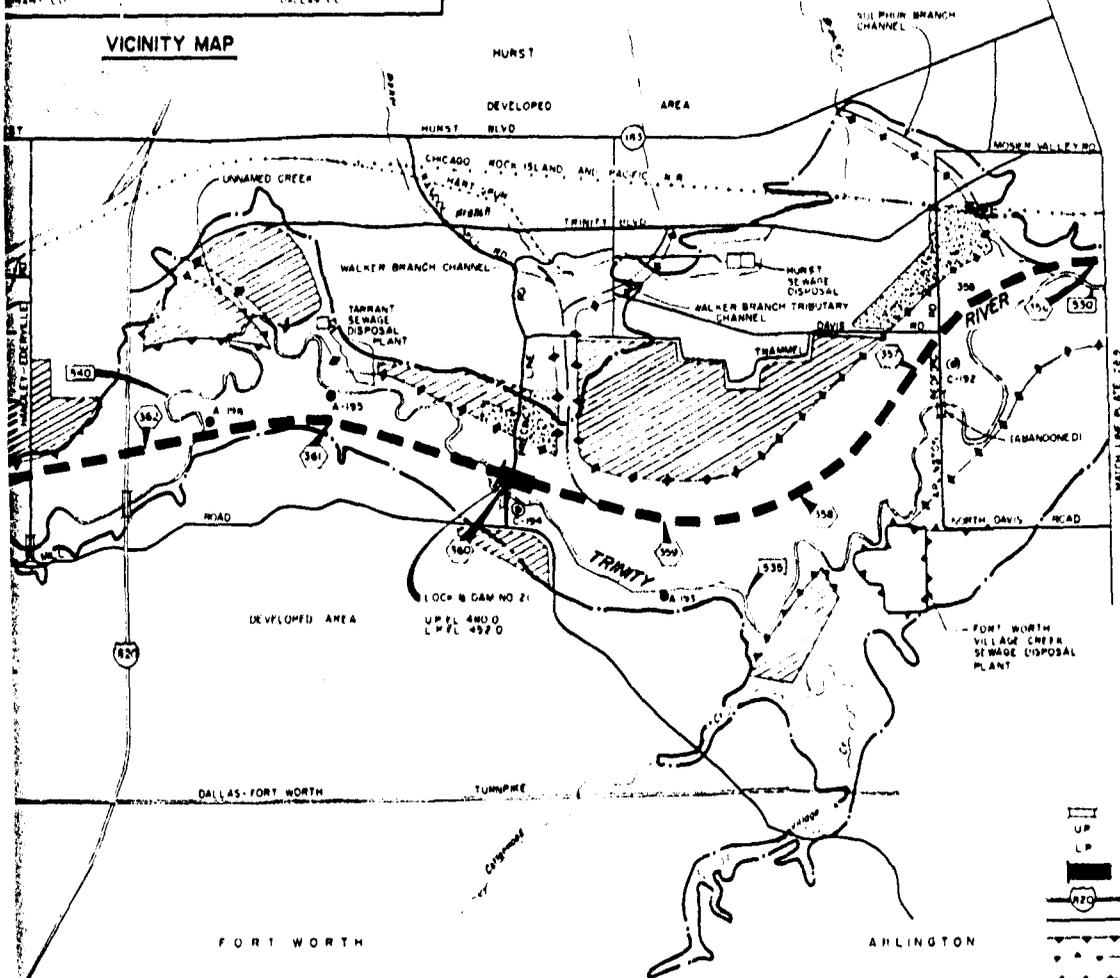
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BA-6C-1

BA-6C-0



VICINITY MAP



LEGEND

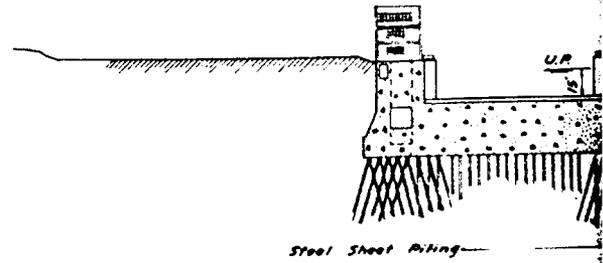
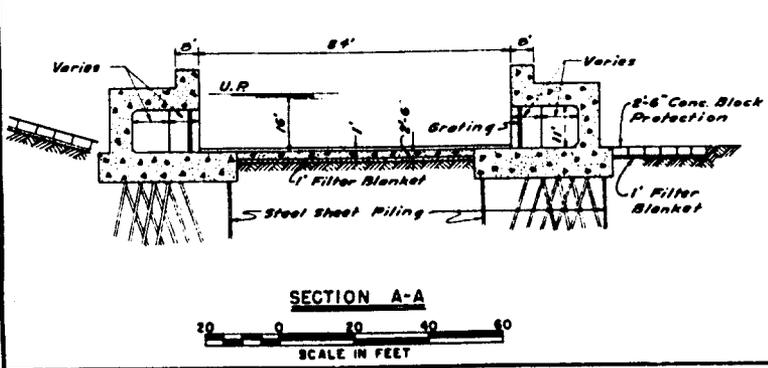
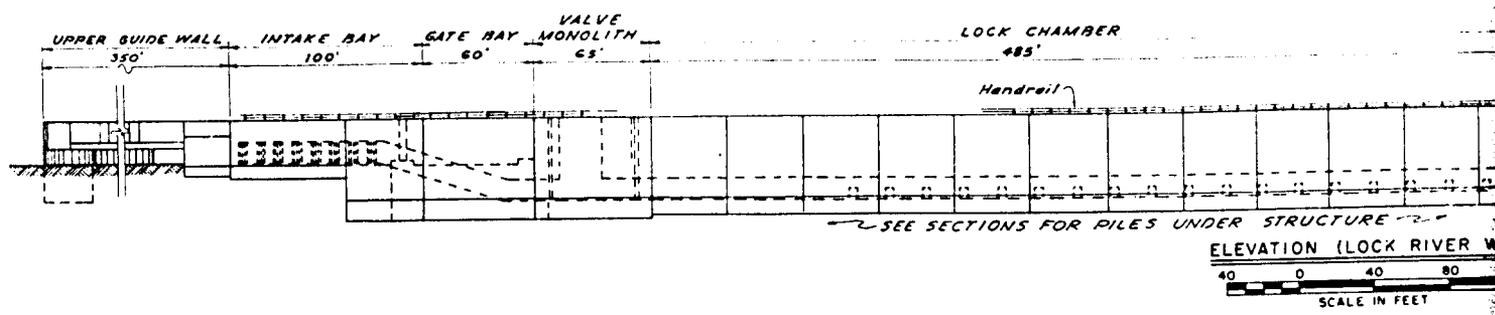
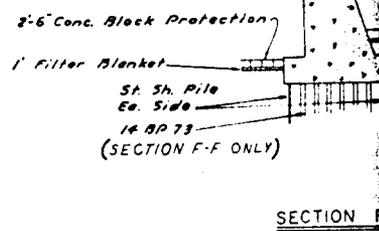
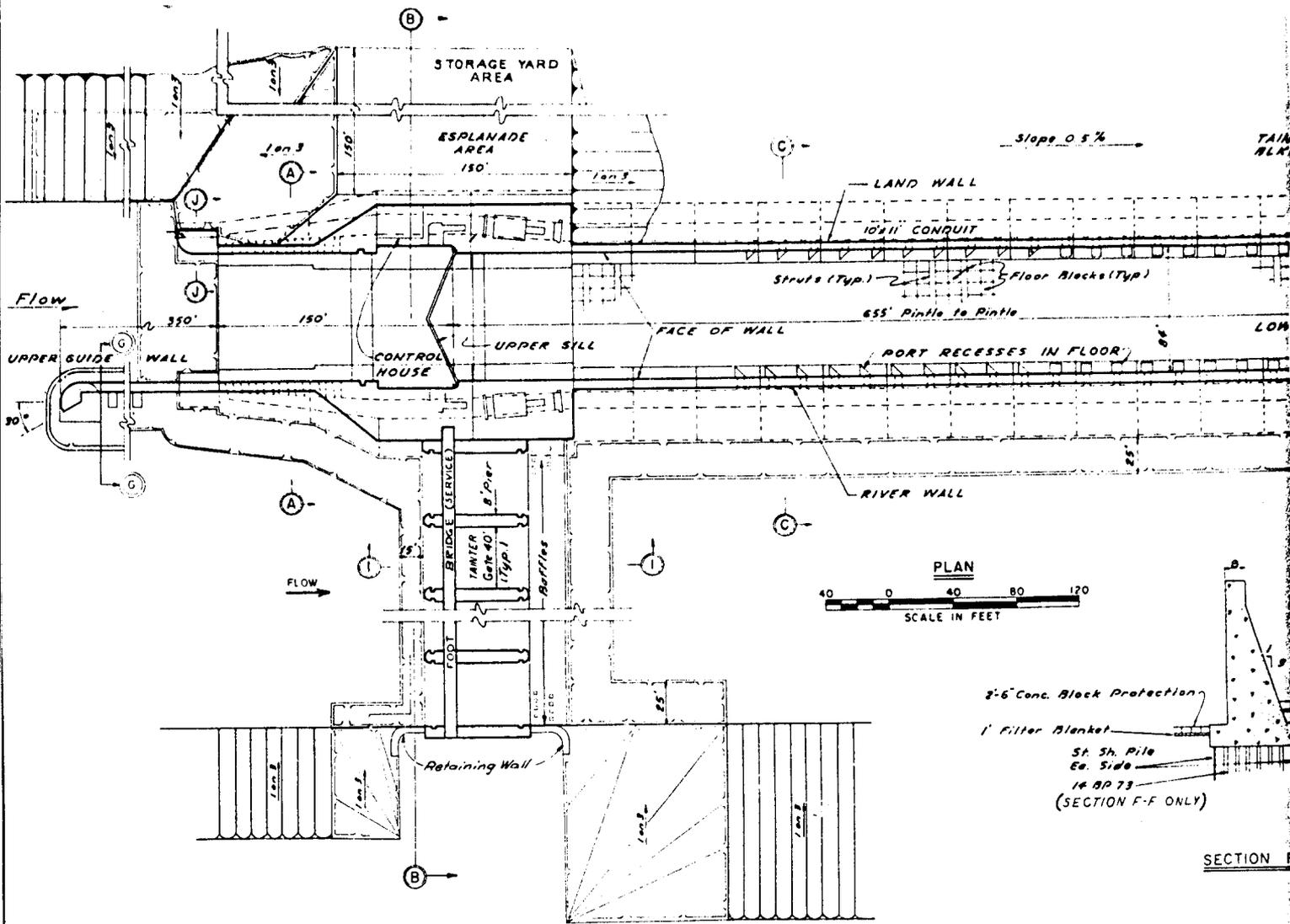
- EXISTING BRIDGE
- UPPER POOL
- LOWER POOL
- NAVIGATION LOCK & DAM
- INTERSTATE HIGHWAY
- STREET (ROAD)
- FILL BANK
- EXISTING LEVEE
- PROPOSED LEVEE
- SLUMP AREA, PROPOSED
- FILL AREA, PROPOSED
- HIGH WATER LINE (MAXIMUM OF RECORD)
- RAILROAD
- U.S. HIGHWAY
- DIVERSION CHANNEL
- RIVER MILE
- SPUR CHANNEL
- CHANNEL MILE
- AUGER BORING
- MULTIPURPOSE CHANNEL
- STATE HIGHWAY

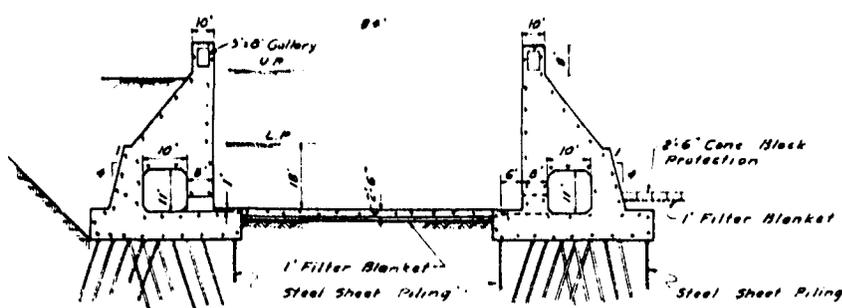
Best Available Copy

SCALE IN MILES

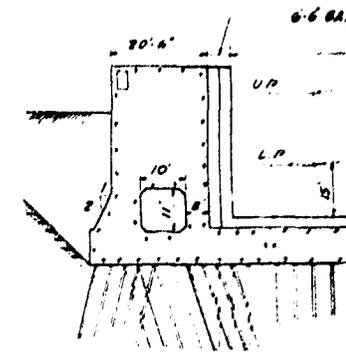
LOCATIONS ARE SHOWN ON PROFILE AND INVENTORY

TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
MULTIPURPOSE CHANNEL PLAN
 (WEST FORK FLOODWAY)
 U.S. ARMY ENGINEER DISTRICT, FORT WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT

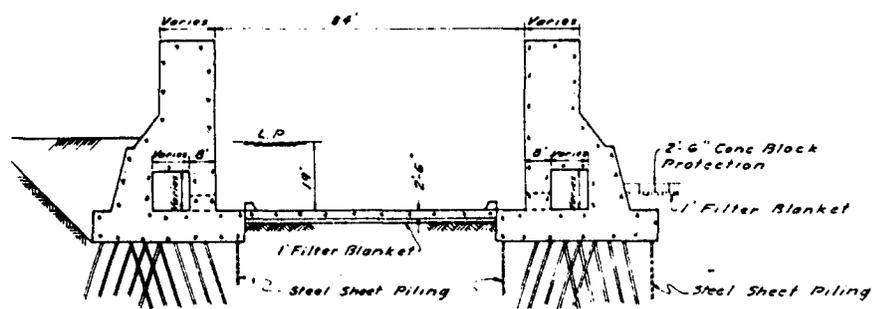




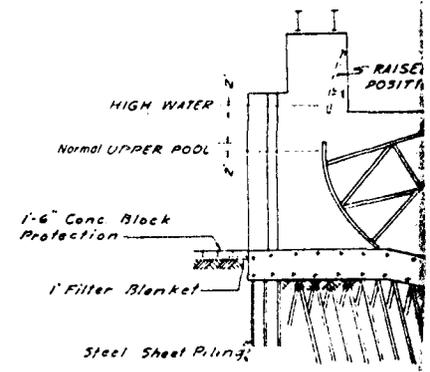
SECTION C-C
 20 0 20 40 60
 SCALE IN FEET



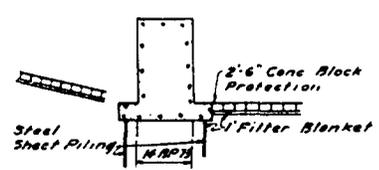
SECTION D-D
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 SCALE IN FEET



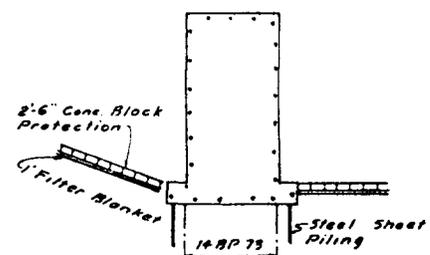
SECTION E-E
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 SCALE IN FEET



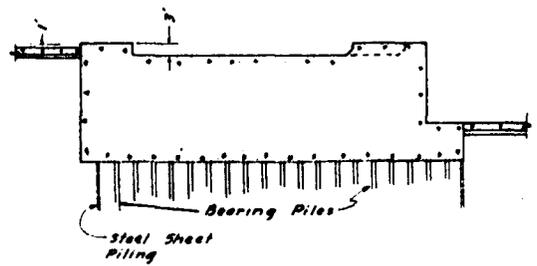
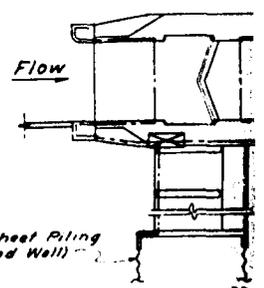
SECTION F-F
 20 0 20 40 60
 SCALE IN FEET



SECTION J-J
 20 0 20 40 60
 SCALE IN FEET



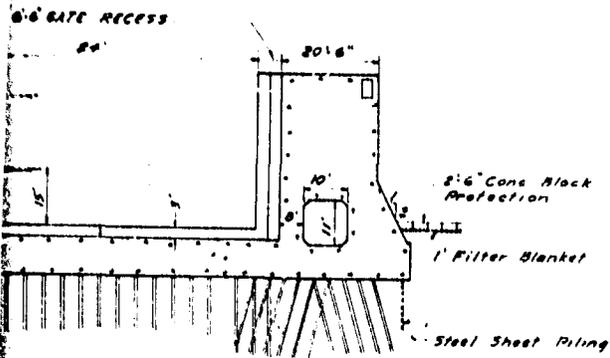
SECTION K-K
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 SCALE IN FEET



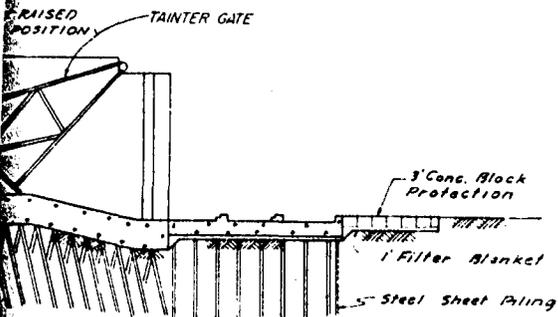
SECTION OF UPPER SILL
 20 0 20 40 60
 SCALE IN FEET



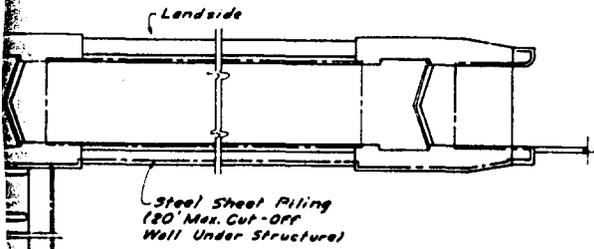
SECTION OF LOWER SILL
 20 0 20 40 60
 SCALE IN FEET



SECTION D-D



SECTION I-I

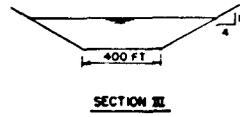
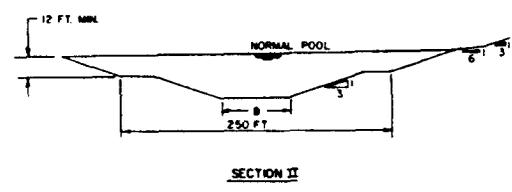
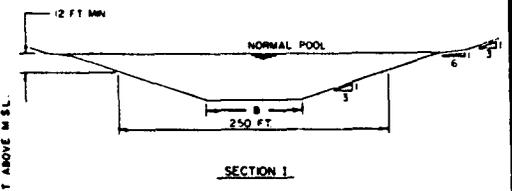
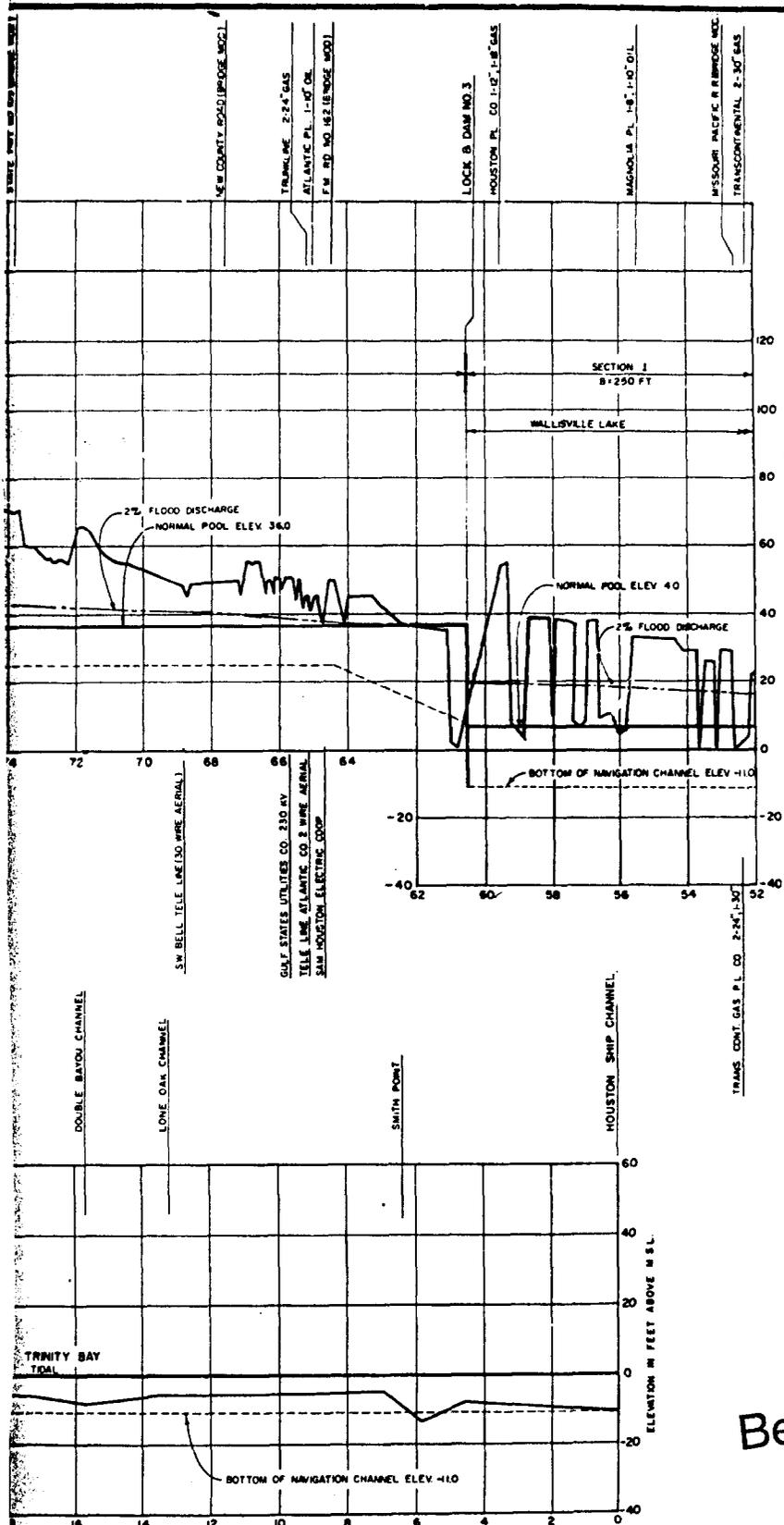


SHEET PILE LAYOUT



Best Available Copy

<p>TRINITY RIVER AND TRIBUTARIES, TEXAS TRINITY RIVER PROJECT TYPICAL LOCK (GRAVITY TYPE) AND DAM SECTIONS</p>
<p>U.S. ARMY ENGINEER DISTRICT, FORT WORTH TO ACCOMPANY ENVIRONMENTAL STATEMENT</p>



- LEGEND**
- CENTERLINE PROFILE
 - - - BOTTOM OF PROPOSED CHANNEL
 - · · · · EXISTING PRIVATE LEVEES, LEFT BANK
 - - - TWO PERCENT FLOOD DISCHARGE (REGULATED)

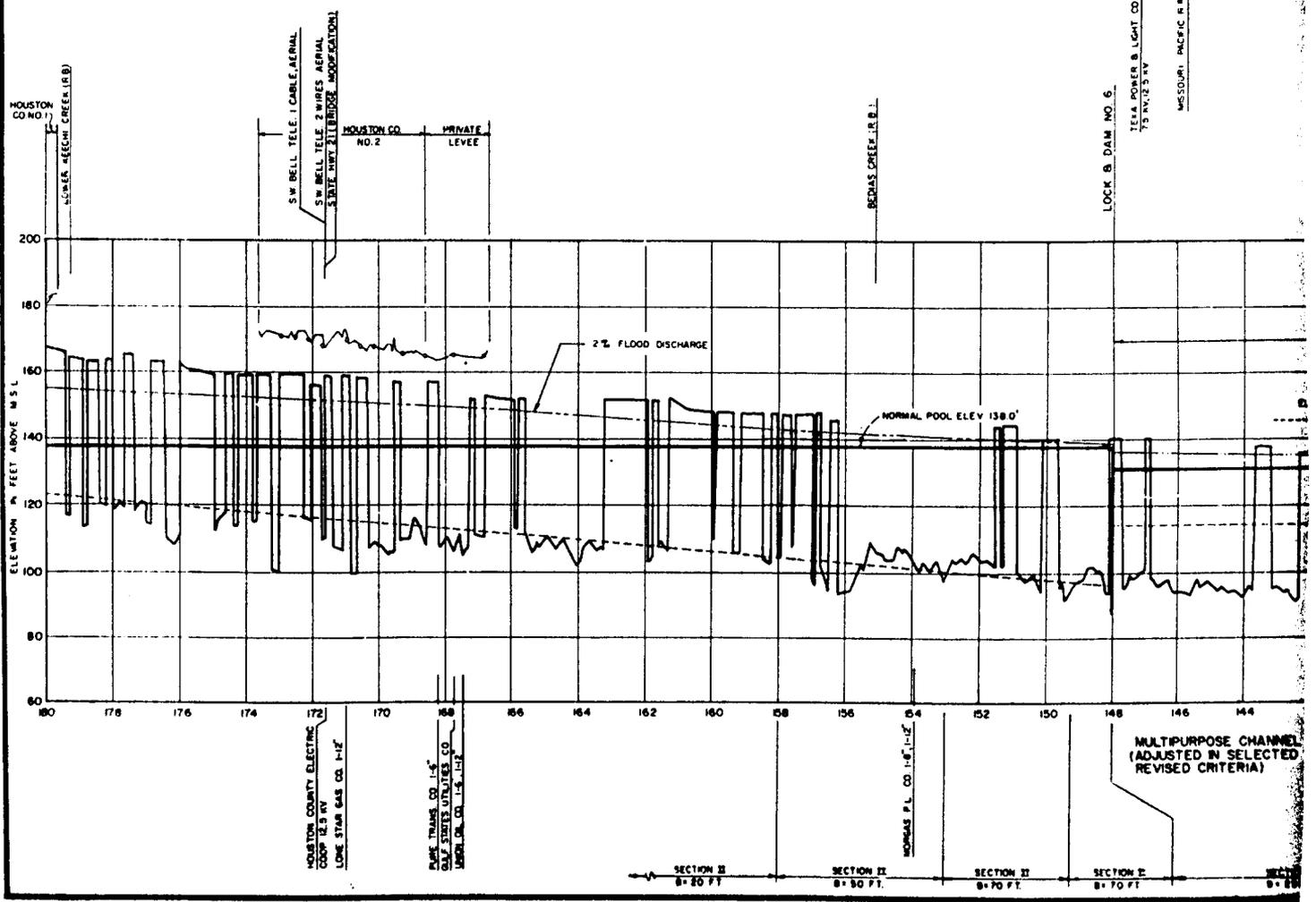
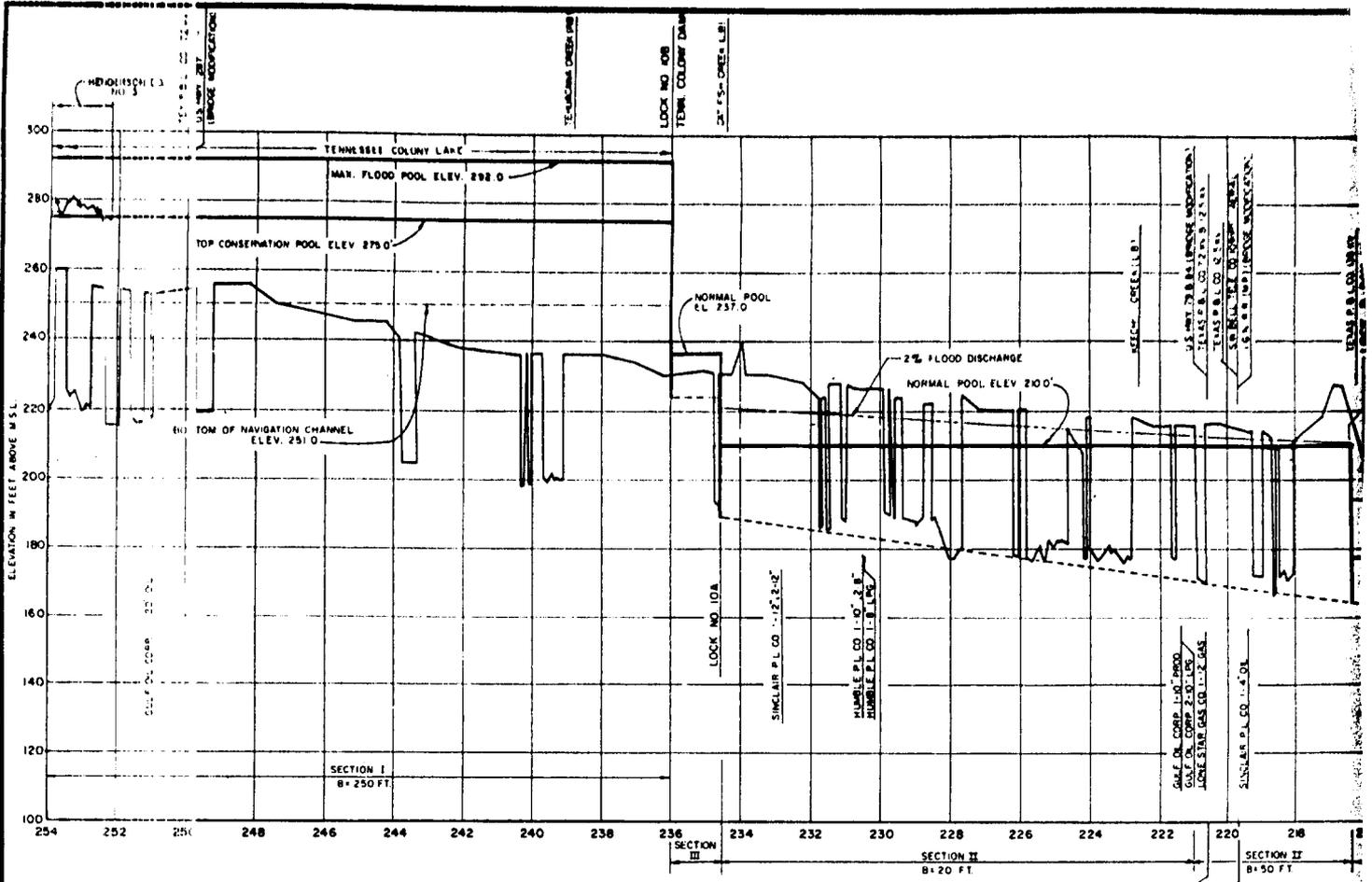
Best Available Copy

(MILES ADJUSTED IN SELECTED CRITERIA)

TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
**MULTIPURPOSE CHANNEL
 PROFILE**

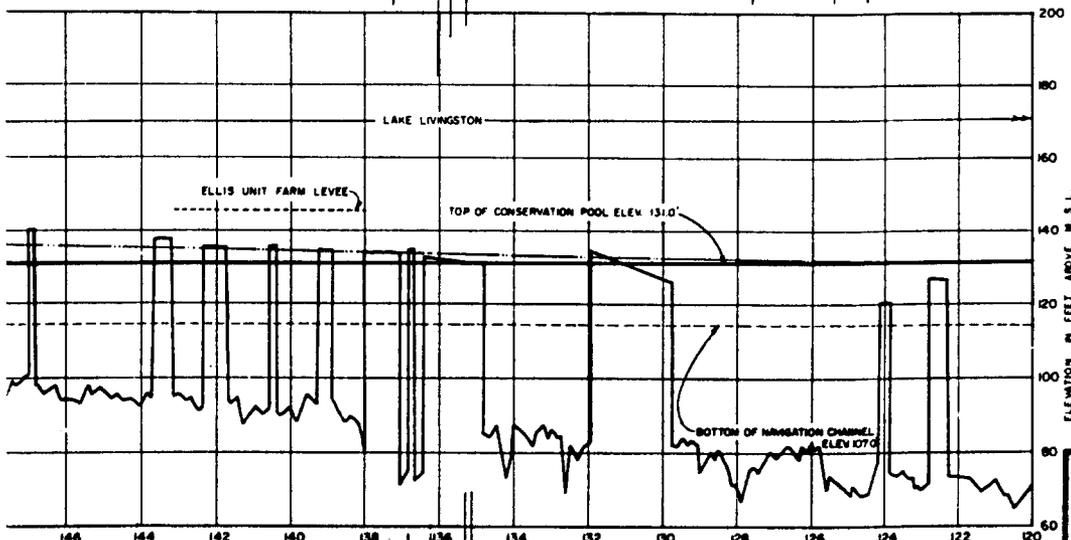
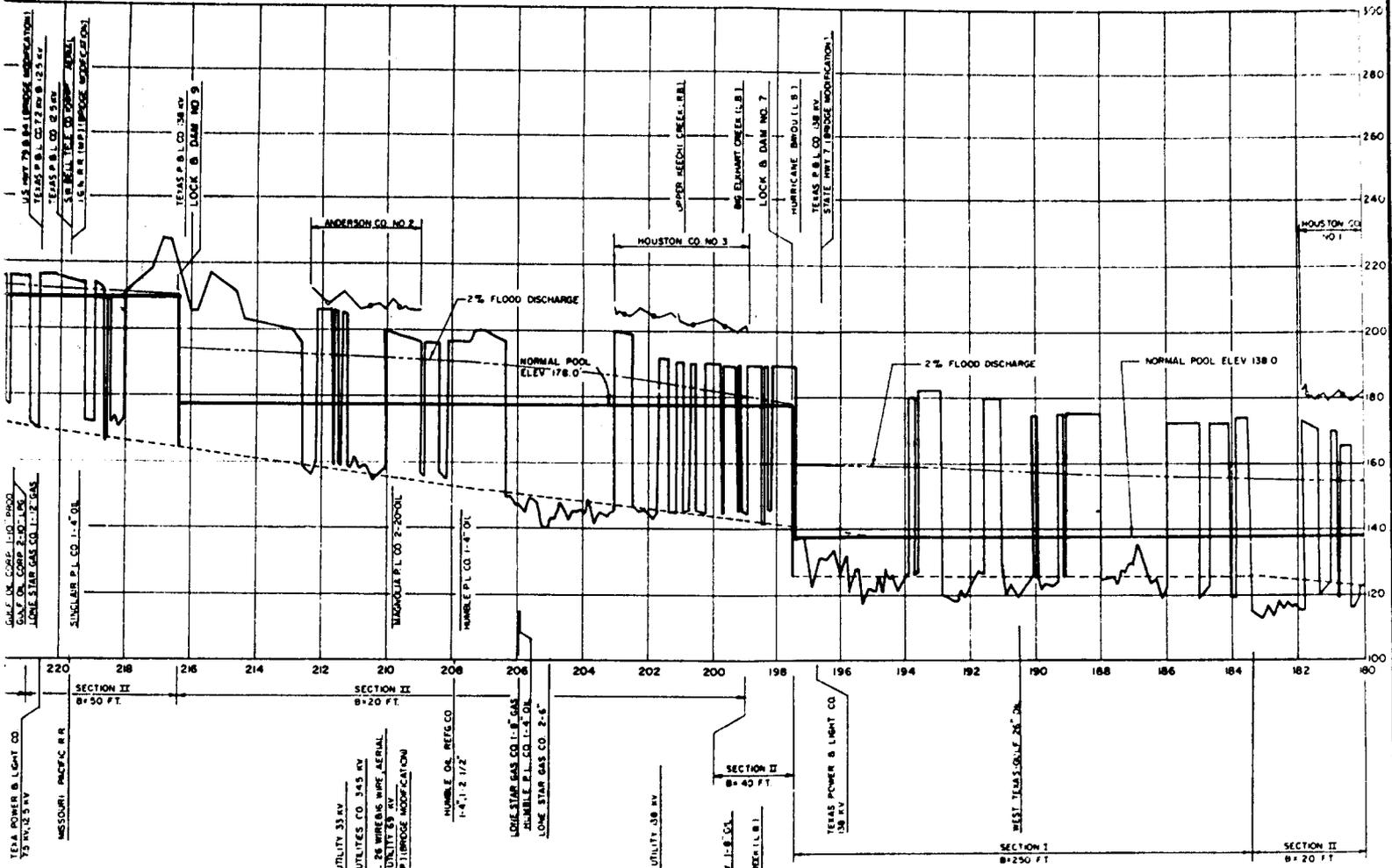
U.S. ARMY ENGINEER DISTRICT, FORT WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT

SECTION I
B = 250 FT



MULTIPURPOSE CHANNEL (ADJUSTED IN SELECTED REVISED CRITERIA)

SECTION III 8 x 80 FT SECTION II 8 x 80 FT SECTION I 8 x 70 FT SECTION II 8 x 70 FT



LEGEND

- CENTERLINE PROFILE
- - - BOTTOM OF PROPOSED CHANNEL
- · · · · EXISTING PRIVATE LEVEE, RIGHT BANK
- · · · · EXISTING PRIVATE LEVEE, LEFT BANK
- · · · · EXISTING COUNTY LEVEE, LEFT BANK
- TWO PERCENT FLOOD DISCHARGE (REGULATED)
- R.B. RIGHT BANK
- L.B. LEFT BANK

NOTE
SECTIONS SHOWN ON PLATE 31.

MULTIPURPOSE CHANNEL MILES 1962 MILES
(ADJUSTED IN SELECTED REACHES FOR
REVISED CRITERIA)

Best Available Copy

TRINITY RIVER AND TRIBUTARIES, TEXAS
TRINITY RIVER PROJECT
MULTIPURPOSE CHANNEL
PROFILE

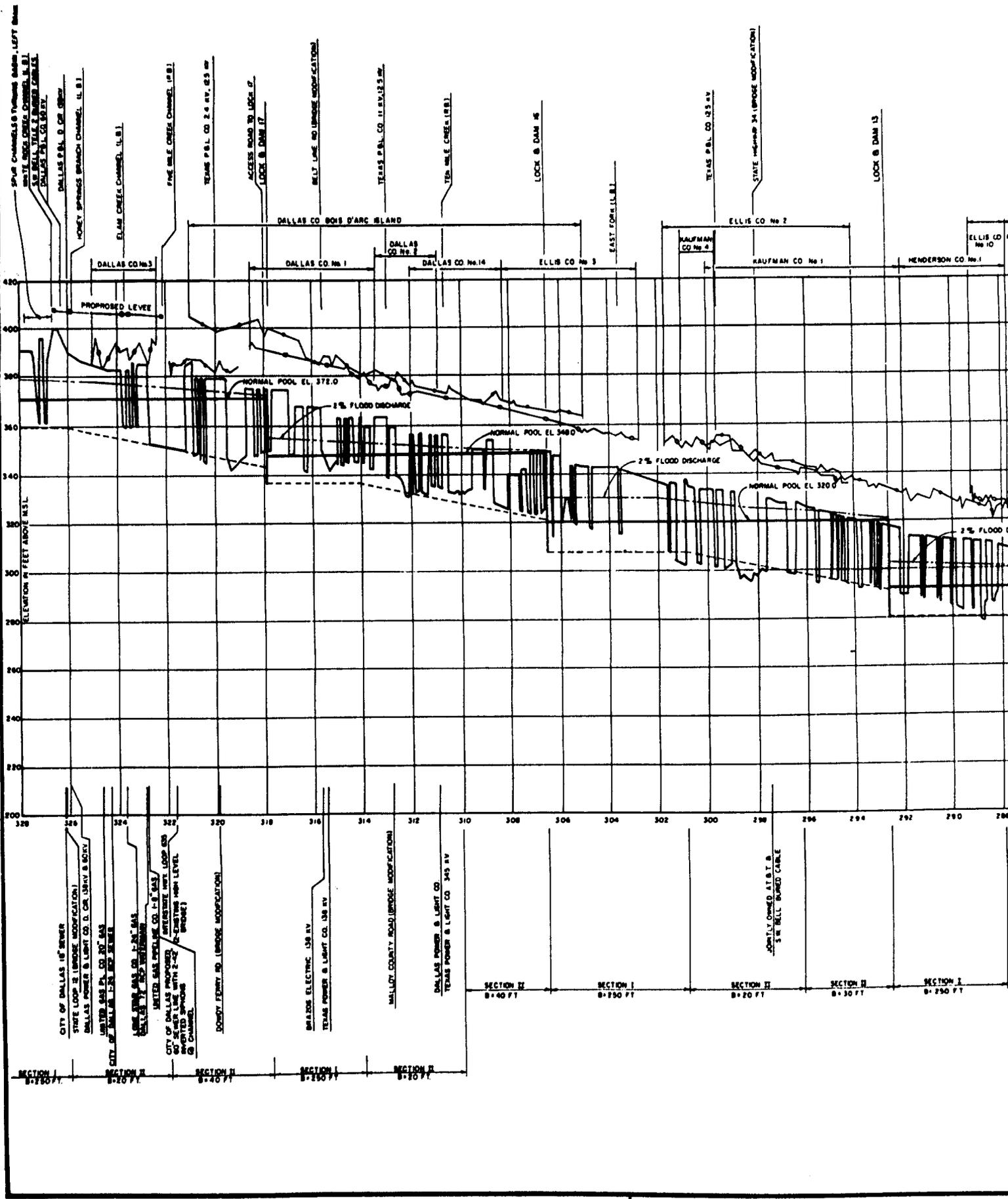
U.S. ARMY ENGINEER DISTRICT, FORT WORTH

TO ACCOMPANY ENVIRONMENTAL STATEMENT

PLATE 312

1

2



SPUR CHANNELS & FLOOD BASIN, LEFT BANK
 WEST SIDE CREEK CHANNEL, (L.B.)
 EAST SIDE CREEK CHANNEL, (L.B.)
 DALLAS P.B.L. CO. 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

DALLAS P.B.L. CO. 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

DALLAS CO. No. 3

FIVE MILE CREEK CHANNEL, (L.B.)

TEXAS P.B.L. CO. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

ACCESS ROAD TO LOCK & DAM 17

BELT LINE (NO LEVEE MODIFICATION)

TEXAS P.B.L. CO. 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

17 1/2 MILE CREEK, (L.B.)

LOCK & DAM 14

EAST FOR (L.B.)

TEXAS P.B.L. CO. 12, 13, 14

STATE HIGHWAY 34 (BRIDGE MODIFICATION)

LOCK & DAM 13

DALLAS CO. BOIS D'ARC ISLAND

DALLAS CO. No. 1

DALLAS CO. No. 2

DALLAS CO. No. 14

ELLIS CO. No. 3

KAUFMAN CO. No. 4

ELLIS CO. No. 2

KAUFMAN CO. No. 1

HENDERSON CO. No. 1

ELLIS CO. No. 10

PROPOSED LEVEL

NORMAL POOL EL. 372.0

2% FLOOD DISCHARGE

NORMAL POOL EL. 348.0

2% FLOOD DISCHARGE

NORMAL POOL EL. 320.0

2% FLOOD DISCHARGE

ELEVATION IN FEET ABOVE M.S.L.

SECTION I
8+250 FT

SECTION II
8+200 FT

SECTION III
8+150 FT

SECTION IV
8+100 FT

SECTION V
8+50 FT

SECTION VI
8+40 FT

SECTION VII
8+300 FT

SECTION VIII
8+20 FT

SECTION IX
8+30 FT

SECTION X
8+250 FT

CITY OF DALLAS 18" SEWER

STATE LOOP 12 (BRIDGE MODIFICATION)

DALLAS POWER & LIGHT CO. D. C&L URAN & B&V

UNITED GAS PL. CO. 30" GAS

CITY OF DALLAS 12" 60" SEWER

LOW VOLT GAS CO. 1" N.C. GAS

UNITED GAS PIPELINE CO. 1" GAS

CITY OF DALLAS PROPOSED INTERMEDIATE WWT LOOP (END OF SEWER LINE WITH 2-2' 2" EXISTING HIGH LEVEL BRIDGE)

DODDY FERRY RD. (BRIDGE MODIFICATION)

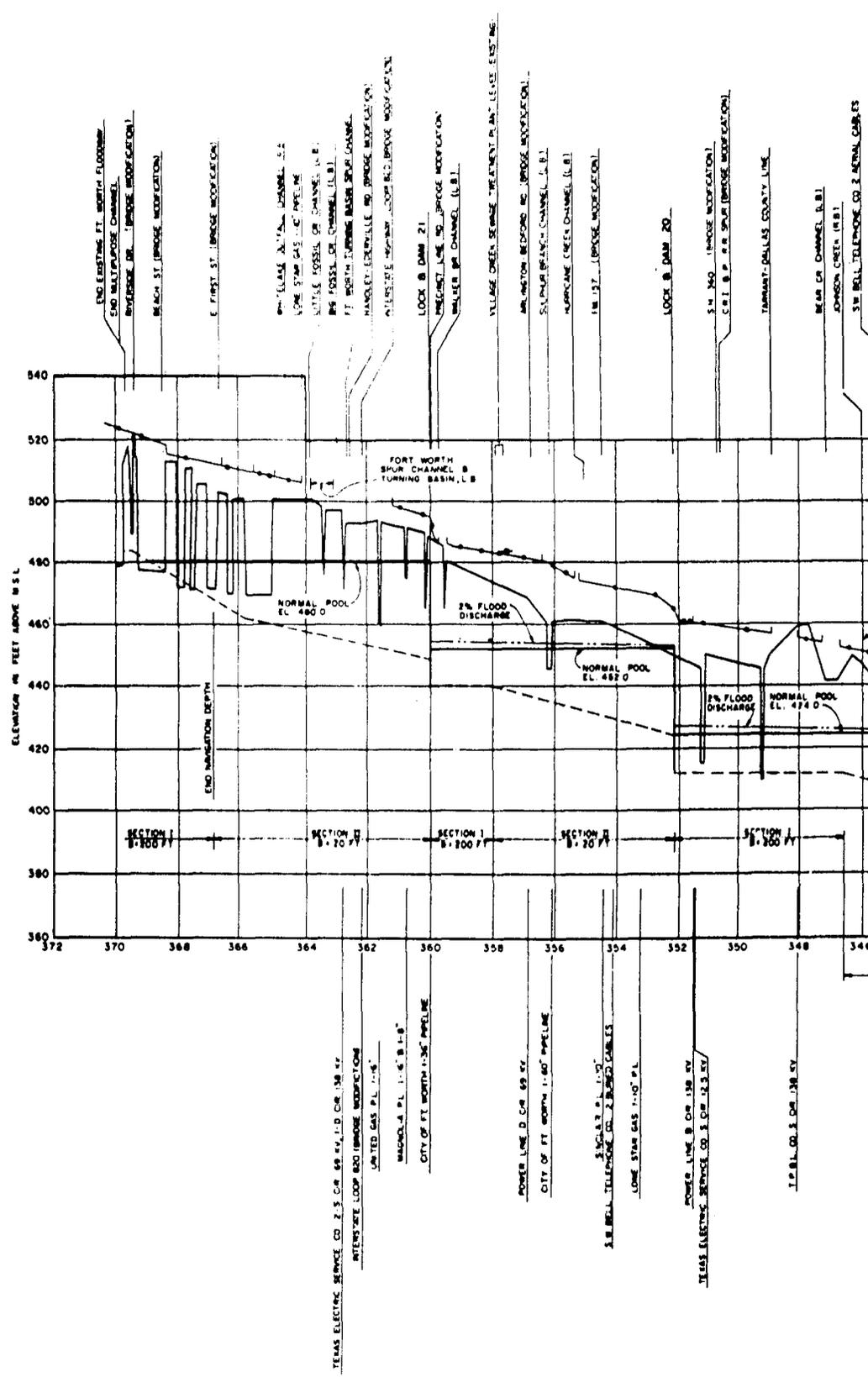
SHAZOS ELECTRIC, (L.B. IV)

TEXAS POWER & LIGHT CO. (L.B. IV)

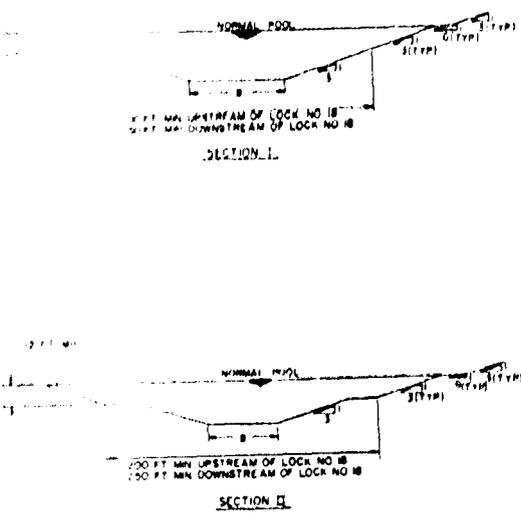
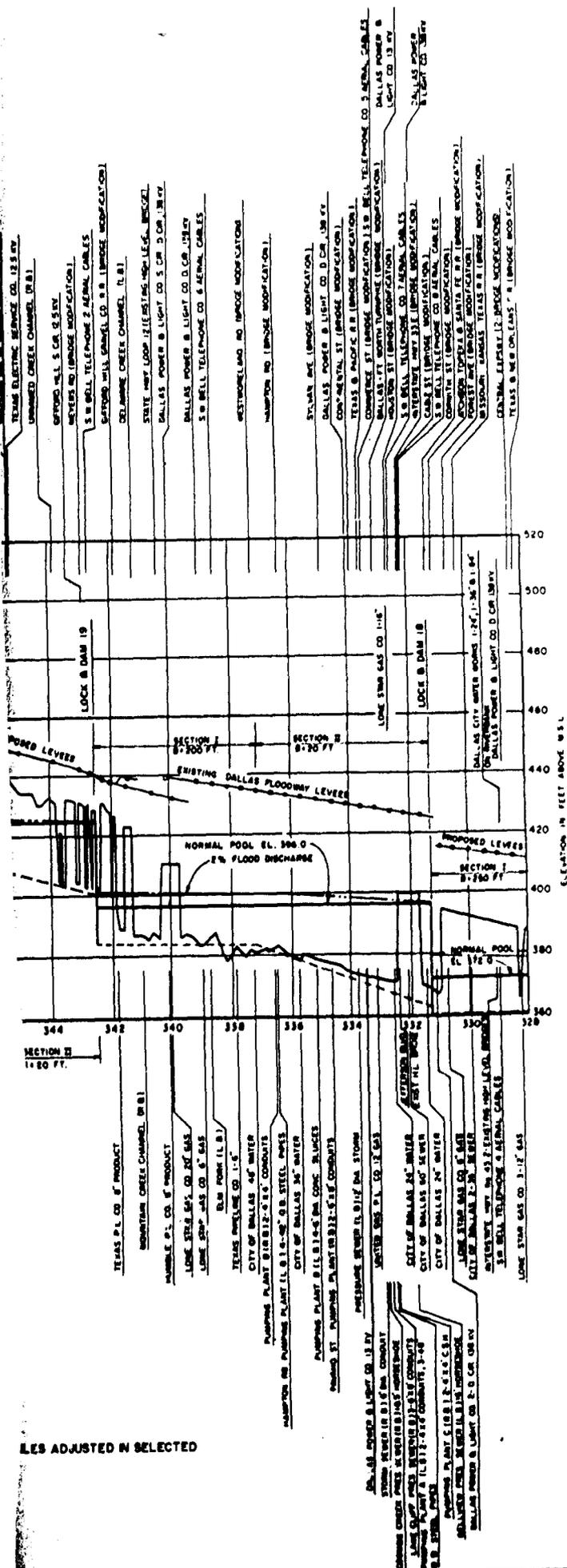
MALLOT COUNTY ROAD (BRIDGE MODIFICATION)

DALLAS POWER & LIGHT CO. TEXAS POWER & LIGHT CO. 345 IV

JOINTLY OWNED AT & T. 5" W BELL BURIED CABLE



MULTIPURPOSE CHANNEL MILES 1802 REACHES FOR REVISED CRITERIA



LEGEND

- CENTERLINE PROFILE
- - - BOTTOM OF PROPOSED CHANNEL
- L B LEFT BANK
- R B RIGHT BANK
- PROPOSED LEVEE, R.B.
- PROPOSED LEVEE, L.B.
- TWO PERCENT FLOOD DISCHARGE (REGULATED)
- EXISTING LEVEE, R.B.
- EXISTING LEVEE, L.B.

Best Available Copy

TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
MULTIPURPOSE CHANNEL PROFILE
 U.S. ARMY ENGINEER DISTRICT, FORT WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT

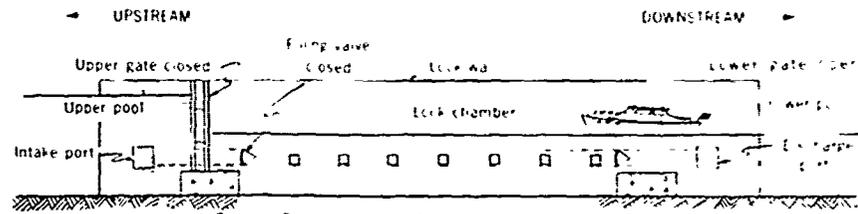


Fig. 1 Boat enters lock at lower pool elevation

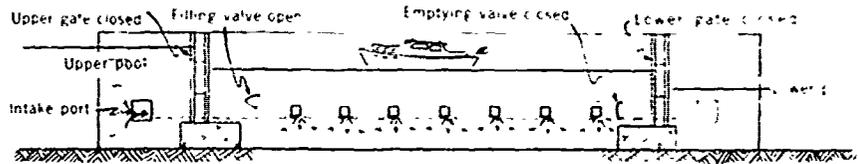


Fig 2 Boat is lifted by filling lock chamber

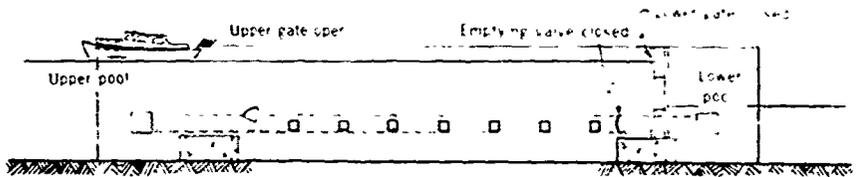
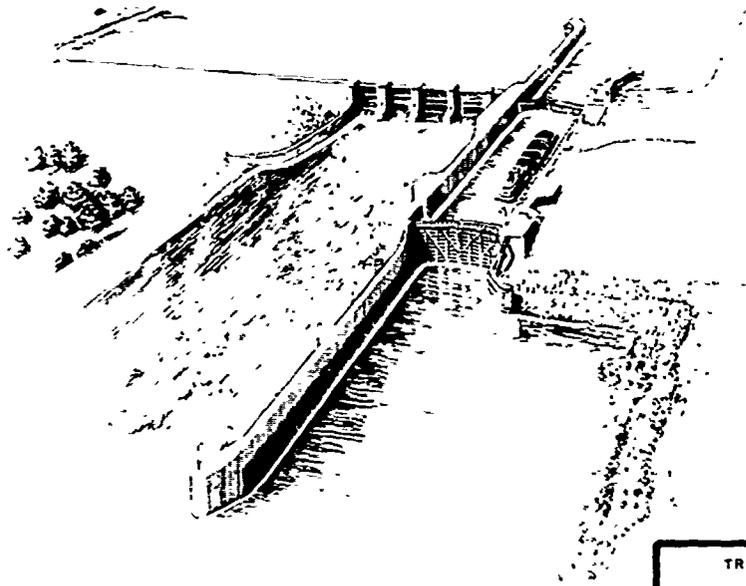


Fig. 3 Boat leaves lock at upper pool elevation

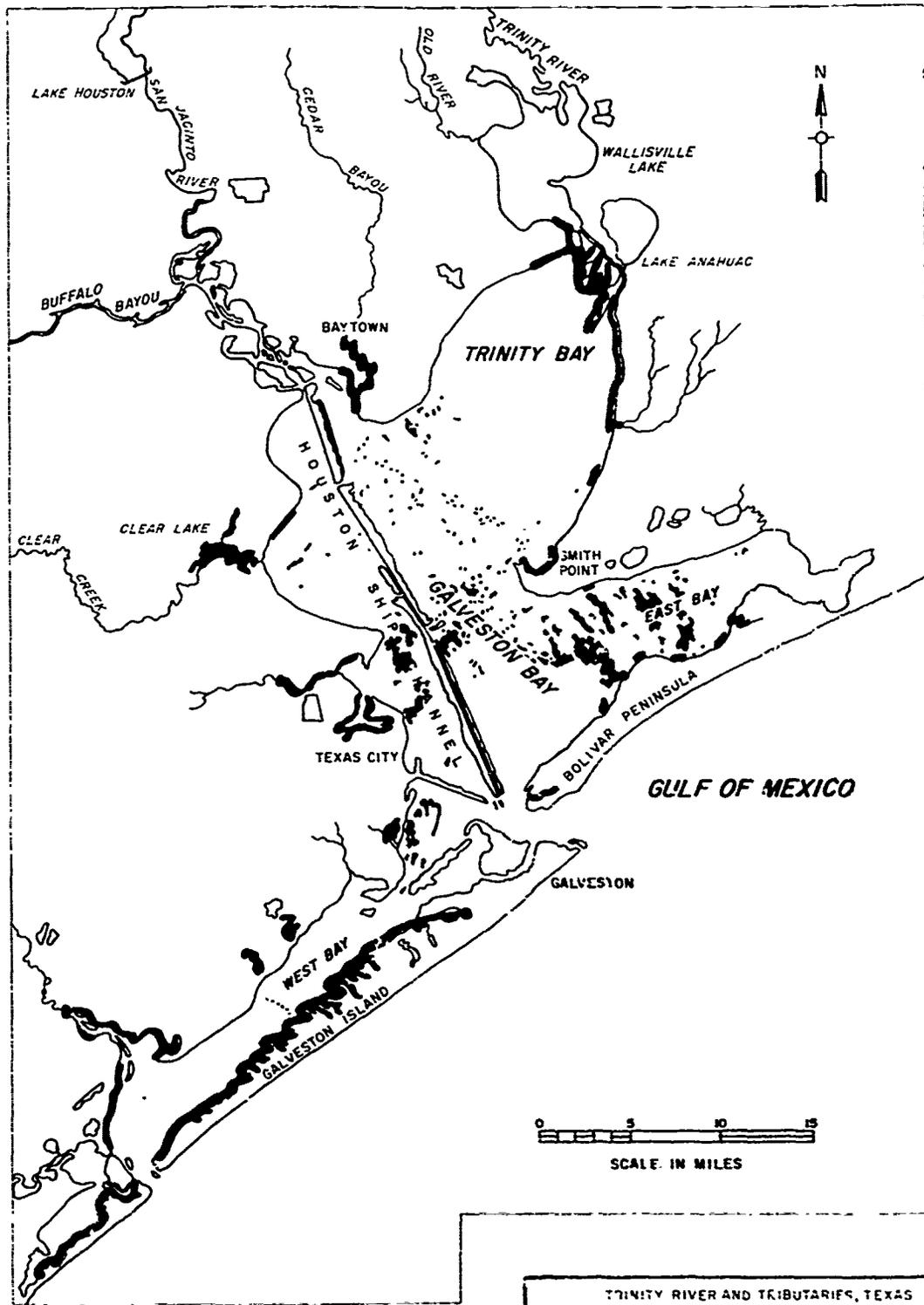
3-STEP DIAGRAM



LOCK AND DAM PERSPECTIVE

TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
 NAVIGATION LOCK OPERATION
 U S ARMY ENGR. DIST , FT. WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT
 PLATE 32

44
 Y 1



- LEGEND**
-  OYSTER REEFS
 -  NURSERY AREAS

DATA SOURCE:
 ACTIVITIES AND RESOURCES OF THE GALVESTON
 BAY DECEMBER 1971

TRINITY RIVER AND TRIBUTARIES, TEXAS
 TRINITY RIVER PROJECT
**GALVESTON BAY OYSTER REEFS
 AND
 NURSERY AREAS**
 U.S. ARMY ENGINEER DISTRICT, FT. WORTH
 TO ACCOMPANY ENVIRONMENTAL STATEMENT

PLATE 33



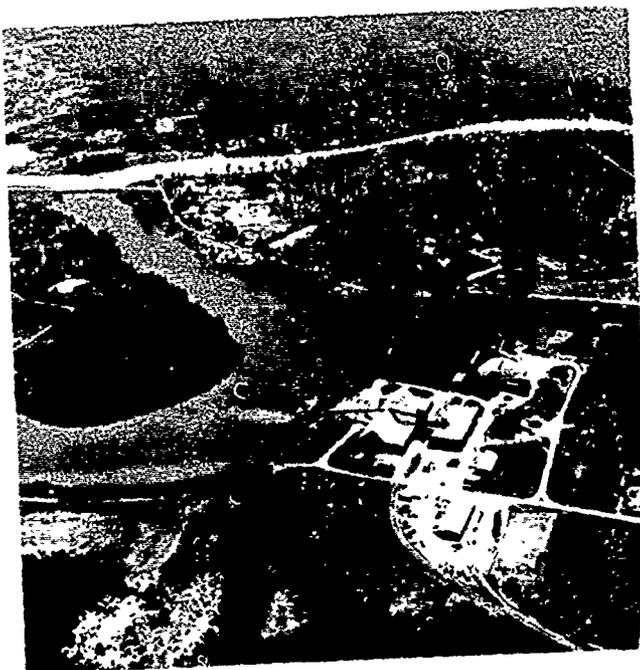
No. 1. River Mile 0: Anahuac, Texas, on left. Barge on Trinity River, Trinity Bay in right background, Lake Anahuac in foreground.



No. 2. River Mile 22: Heron-egret rookery in old river oxbow near Trinity River.



No. 3. River Mile 27: Coastal Industrial Water Authority Canal on left, Dayton Canal on right. Trinity River in foreground.



No. 4. River Mile 38: Port of Liberty, Texas, located on cutoff river meander, is current upstream terminus for navigation on the Trinity River. Trinity River is in background.



No. 5. River Mile 79: New residential development located in flood plain on both sides of Trinity River.



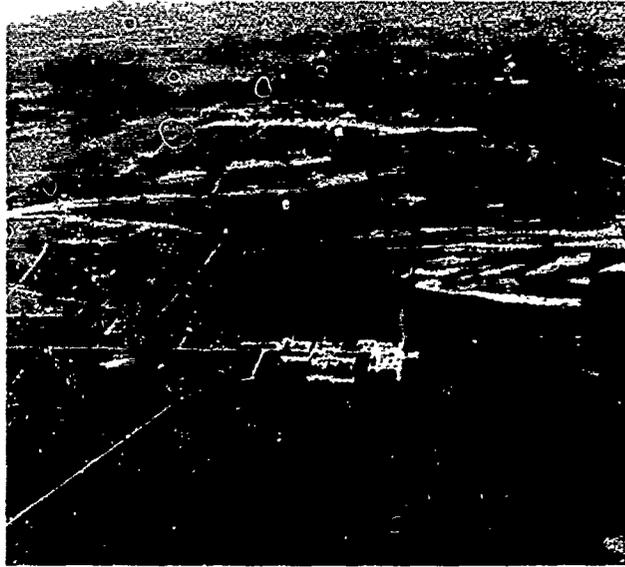
No. 6. River Mile 83: Old River Lake development located in flood plain on old oxbow lake east of Trinity River.



No. 7. River Mile 129: Flooded development below Lake Livingston Dam, June 1973. Lake Livingston in background.



No. 8. River Mile 154: Development on east lakeshore of Lake Livingston.



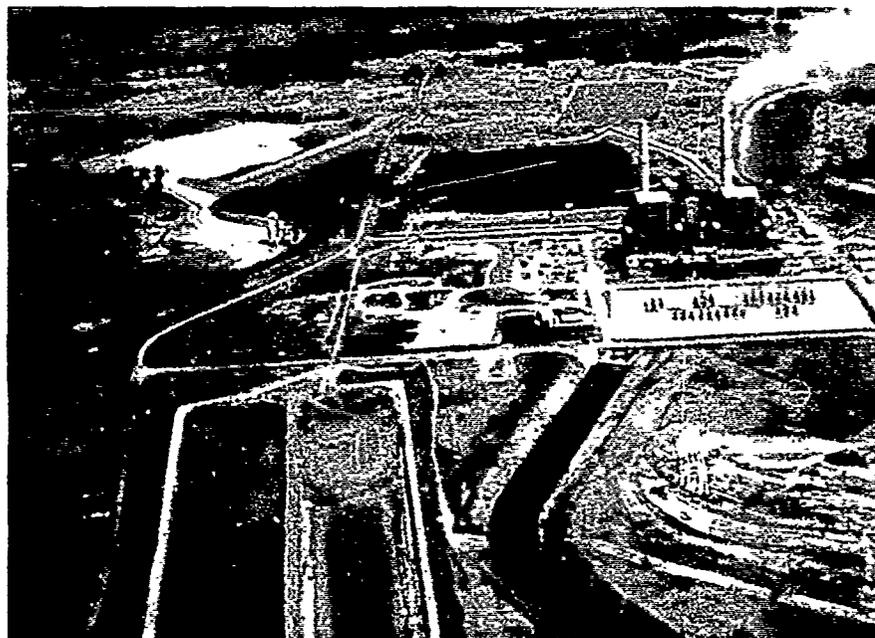
No. 9. River Mile 213: Looking west, Eastham Prison Farm in foreground, Ferguson Prison Farm in background, Texas Department of Corrections. Trinity River in upper-center.



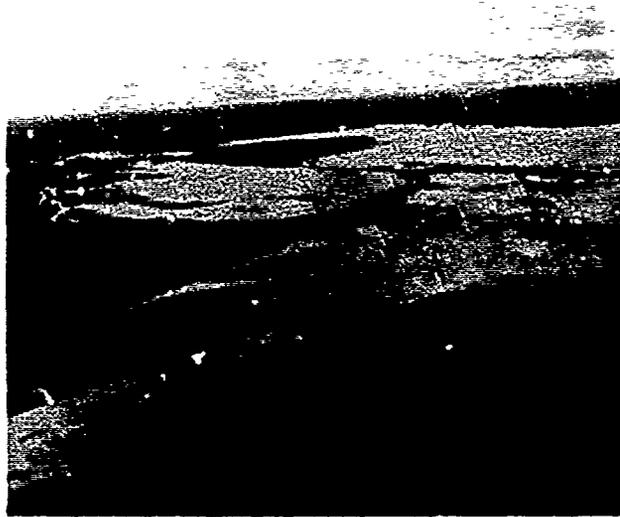
No. 10. River Mile 324: Stone quarry near Butler Dome at edge of flood plain. View is east across the flood plain with Blue Lake in the background.



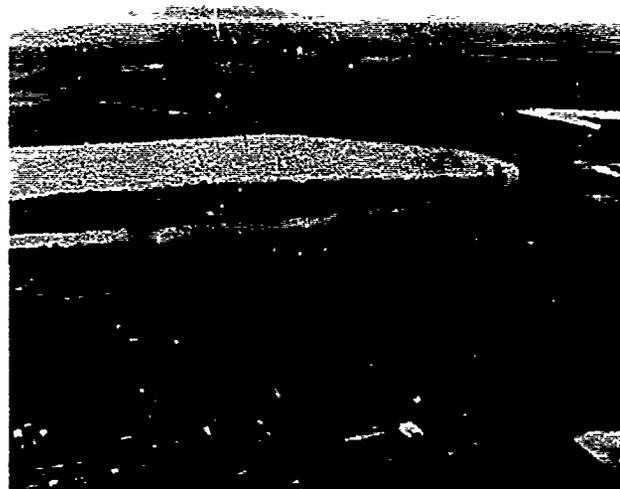
No. 11. River Mile 350: Lignite strip mining operation near Fairfield, Texas. Reclaimed land in right center of photograph.



No. 12. River Mile 350: Lignite-fired electric generating plant near Fairfield, Texas.



No. 13. River Mile 356: Flooding of cleared, non-leveed area within proposed Tennessee Colony Lake conservation pool.



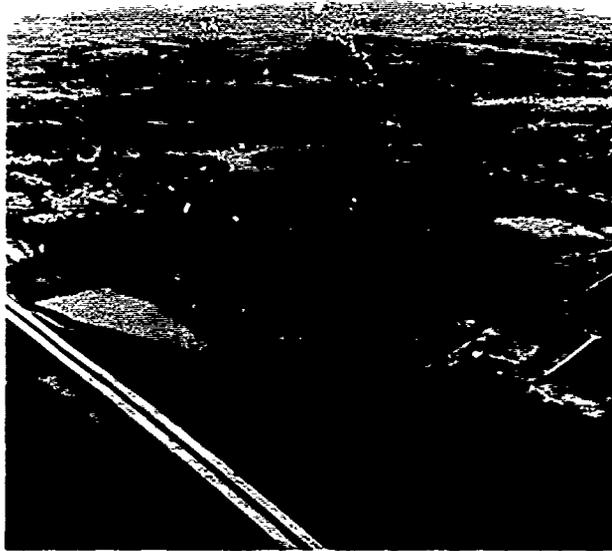
No. 14. River Mile 390: Texas Power and Light gas-fired electric generating plant, with cooling lake at Trinidad, Texas. Trinity River to right of lake.



No. 15. River Mile 454: Leveed agricultural land in upper Trinity Basin. Treeline between levees in center of photograph demarks river channel.



No. 16. River Mile 472: Sand and gravel pits at Bois D'Arc Island in southeast Dallas County. Trinity River in lower right corner of photograph.



No. 17. River Mile 496: White Rock Creek Sewage Treatment Plant in Dallas, Interstate 45 high-level bridge crossing the Trinity River in left foreground.



No. 18. River Mile 506: Leveed floodways of the Dallas Floodway. Confluence of Elm Fork and West Fork forming the Trinity River in foreground, downtown Dallas in background.



No. 19. River Mile 516: Lion Country Safari, a commercial "African Wildlife Preserve" in Grand Prairie, which utilizes an area containing abandoned flood plain sand and gravel pits.



No. 20. River Mile 546: Flood plain cropland in center of photograph, old river oxbow in foreground. Treeline designates river channel.



No. 21. River Mile 553: Fort Worth. Leveed channel of West Fork of Trinity River (looking south). Greenway Park in center of photograph is adjacent to Belknap and Riverside Freeway bridges.



No. 22. River Mile 559: Fort Worth. Confluence of Clear Fork and West Fork of Trinity River, looking east-northeast. North Main Power Plant (left-center) is a gas-fired electric generating plant.



No. 23. Verdigris River Navigation Channel, Oklahoma. Navigation Channel lower left, river channel lower right. Newt Graham Lock & Dam upper center.



No. 24. Verdigris River Navigation Channel, Oklahoma. Newt Graham Lock & Dam.