

ENVIRONMENTAL SURVEY PROGRAMS

PRESENTATION TO
U.S. NUCLEAR REGULATORY COMMISSION
MAY 23, 1979

U.S. DEPARTMENT OF ENERGY
NATIONAL WASTE TERMINAL STORAGE PROGRAM

*Encl. to memo
to Mr. J. Boyle
6/14/79.*

AGENDA

ENVIRONMENTAL SURVEY

NWTS OVERVIEW

W. HEWITT

ENVIRONMENTAL SURVEY OVERVIEW

D. WAITE

GIR-PARADOX SUMMARY

M. GLORA

SALINA-PERMIAN SUMMARY

D. WAITE

NON-SALT

D. WAITE (MCINTOSH)

NATIONAL SCREENING

D. WAITE (NEWCOMB)

BWIP

G. HUNT

WIPP

M. MERRITT

DISCUSSION

W. HEWITT

WMII:5/23/79



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ENVIRONMENTAL SURVEY PROGRAM

OBJECTIVE

TO ASSURE CONSIDERATION OF ENVIRONMENTAL CONCERNS IN REPOSITORY SITING LEADING TO ENVIRONMENTAL ACCEPTABILITY AND COMPLIANCE WITH NEPA AT SITE SELECTION STAGE.

NWTS/WIPP OVERVIEW

WIPP

SITE SPECIFIC DEIS PREPARED AND PUBLISHED

BWIP

LOW LEVEL OF EFFORT-PRESENT EMPHASIS ON HYDROGEOLOGIC SYSTEMS WILL INCREASE AS GEOLOGIC WINNOWING PROGRESSES

NTS

PRESENT EMPHASIS ON HYDROGEOLOGIC SYSTEMS

ONWI

ENVIRONMENTAL AND HYDROGEOLOGIC EXPLORATION PROCEEDING IN PARALLEL

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**THE TERM "ENVIRONMENTAL" IS USED LOOSELY AND INCLUDES
THE FOLLOWING FACTORS:**

- **LAND USAGE**
- **DEMOGRAPHY**
- **SOCIOECONOMIC**
- **NATURAL RESOURCES (INCLUDING WATER)**
- **TERRESTRIAL ECOLOGY**
- **AQUATIC ECOLOGY**
- **TRANSPORTATION**

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**THE INFORMATION/DATA DEVELOPED IN THE ENVIRONMENTAL
SURVEY PROGRAM WILL BE UTILIZED AS FOLLOWS:**

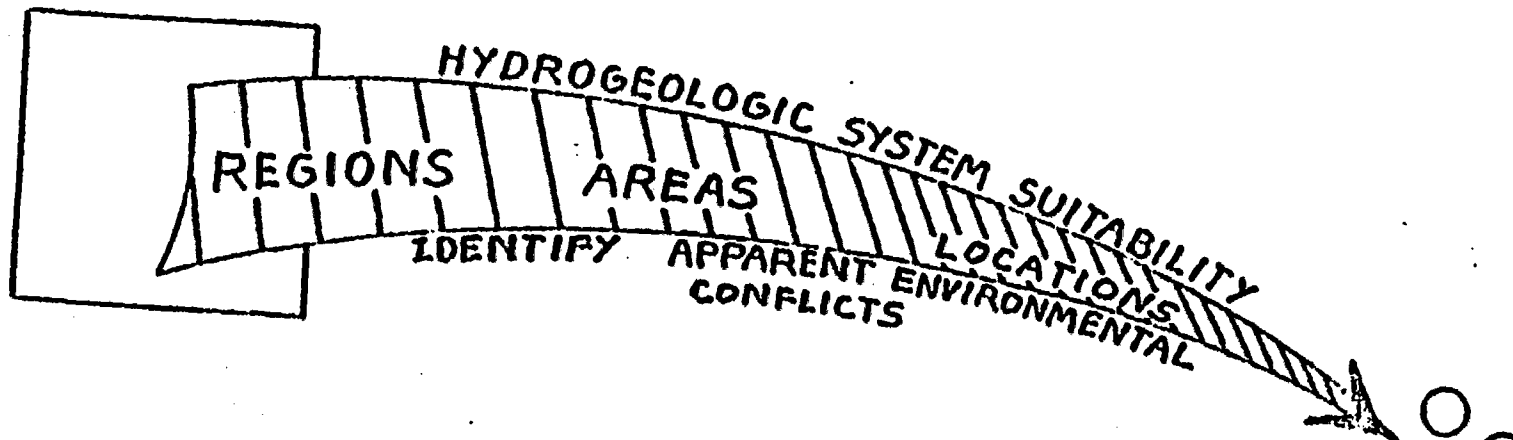
- **ENVIRONMENTAL CHARACTERIZATION REPORTS** - **WINNOWING**
 - **REGIONAL**
 - **AREAS**
 - **LOCATIONS**
- **SITE QUALIFICATION REPORTS** - **ACCEPTABILITY**
 - **SHOULD MEET PARAGRAPH 60.11**
- **ENVIRONMENTAL IMPACT STATEMENTS** - **SELECTION**
- **ENVIRONMENTAL REPORTS** - **LICENSING**

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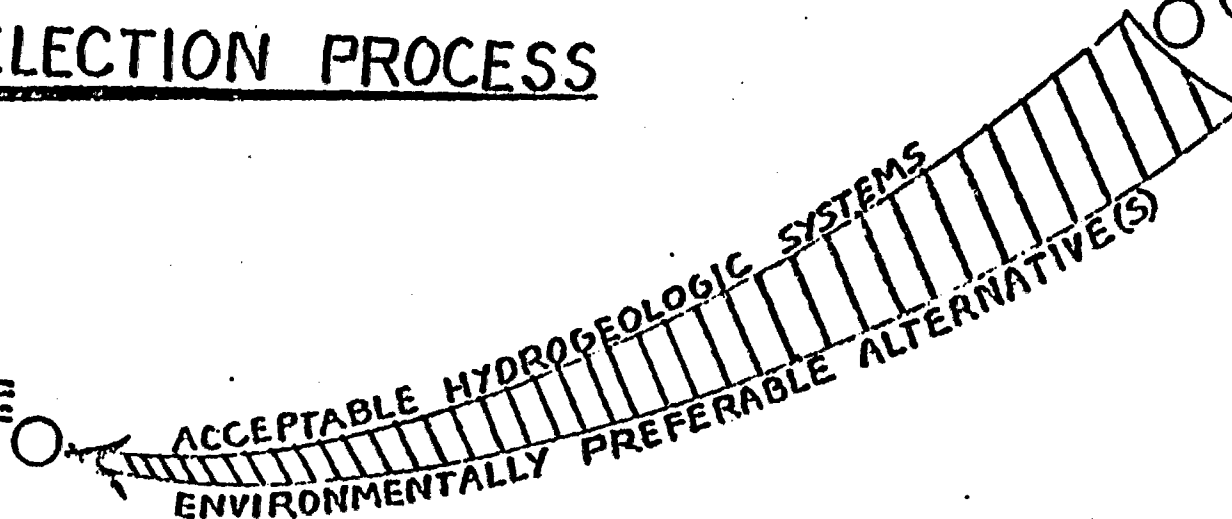
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SITE SELECTION PROCESS

RECOMMENDED SITE



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ENVIRONMENTAL SURVEY

OVERVIEW

D. A. WAITE

ONWI

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**THE INFORMATION/DATA DEVELOPED IN THE ENVIRONMENTAL
SURVEY PROGRAM WILL BE UTILIZED AS FOLLOWS:**

- **ENVIRONMENTAL SURVEY PLANS - PLANNING**
- **ENVIRONMENTAL CHARACTERIZATION REPORTS - WINNOWING**
 - **REGIONAL**
 - **AREAS**
 - **LOCATIONS**
- **SITE QUALIFICATION REPORTS - ACCEPTABILITY**
 - **SHOULD MEET PARAGRAPH 60.11**
- **ENVIRONMENTAL IMPACT STATEMENTS - SELECTION**
- **ENVIRONMENTAL REPORTS - LICENSING**

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SURVEY PLAN CONTENTS

VOLUME I

- 1.0 INTRODUCTION
- 2.0 REGIONAL ENVIRONMENT
- 3.0 STUDY AREA ENVIRONMENT
- 4.0 REGULATORY REQUIREMENTS AND COMPLIANCE

VOLUME II

- 5.0 LOCAL ENVIRONMENT

VOLUME III

COMMENTS ON VOLUME I

VOLUME IV

COMMENTS ON VOLUME II

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2.1 ENVIRONMENTAL MEDIA SYSTEMS

2.1.1 GEOSPHERE

2.1.1.1 PHYSIOGRAPHY AND TOPOGRAPHY

2.1.1.2 STRUCTURAL GEOLOGY

2.1.1.3 STRATIGRAPHY

2.1.1.4 TECTONIC HISTORY

2.1.1.5 SEISMOLOGY

2.1.1.6 ENERGY AND MINERAL RESOURCES

2.1.2 HYDROSPHERE

2.1.2.1 SURFACE WATERS

2.1.2.2 GROUNDWATER

2.1.3 ATMOSPHERE

2.1.3.1 CLIMATE

2.1.3.2 PALEOCLIMATOLOGY

2.1.3.3 SEVERE WEATHER

2.1.3.4 RESTRICTIVE DISPERSION
CONDITIONS

2.1.3.5 TOPOGRAPHY

2.1.3.6 DISPERSION CONDITIONS

2.1.3.7 AIR QUALITY

REFERENCES

2.1.4 BACKGROUND RADIATION

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2.2 DEMOGRAPHIC, SOCIOECONOMIC, AND LAND-USE SYSTEMS

2.2.1 DEMOGRAPHY

2.2.1.1 URBAN PLACES

2.2.2 SOCIOECONOMICS

2.2.2.1 ECONOMIC BASE

2.2.3 LAND USE

2.2.3.1 LAND-USE PATTERNS

2.2.3.2 INDIAN RESERVATIONS

2.2.3.3 RECREATIONAL AND NATURAL AREAS

2.2.3.4 POTENTIALLY INTERACTIVE USES

2.2.3.5 TRANSPORTATION SYSTEMS

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2.3 ECOSYSTEMS

2.3.1 TERRESTRIAL

2.3.1.1 NATURAL SYSTEMS

2.3.1.2 AGRICULTURAL SYSTEMS

2.3.2 AQUATIC

2.3.2.1 IMPORTANT SPECIES AND HABITATS

2.3.2.2 ENDANGERED AND THREATENED SPECIES AND HABITATS

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CONTENTS

VOLUME II

5.0	LOCAL ENVIRONMENT.....	
5.1	ENVIRONMENTAL MEDIA SYSTEMS.....	
5.1.1	Geosphere and Hydrosphere.....	
5.1.2	Atmosphere.....	
5.1.2.1	Climate.....	
5.1.2.2	Paleoclimatology.....	
5.1.2.3	Severe Weather.....	
5.1.2.4	Restrictive Dispersion Conditions.....	
5.1.2.5	Topography.....	
5.1.2.6	Meteorological Monitoring Program.....	
5.1.2.7	Dispersion Conditions.....	
5.1.2.8	Relative Dispersion (X/Q) Estimates...	
5.1.2.9	Air Quality.....	
5.1.2.9.1	Statutory Requirements.....	
5.1.2.9.2	Present Air Quality.....	
5.1.3	Background Radiation and Noise.....	
5.1.3.1	Background Radiation.....	
5.1.3.2	Noise.....	
5.2	DEMOGRAPHIC, SOCIOECONOMIC, AND LAND-USE SYSTEMS.....	
5.2.1	Demography.....	
5.2.1.1	Centers of Population.....	
5.2.1.2	Population Density.....	
5.2.2	Socioeconomics.....	
5.2.2.1	Social Environment.....	
5.2.2.2	Economic Environment.....	
5.2.2.2.1	Fiscal Capacity.....	
5.2.2.2.2	Economic Base.....	
5.2.2.3	Cultural Resources.....	
5.2.2.4	Government and Community Organizations.....	
5.2.3	Land Use.....	
5.2.3.1	Land-Use Development.....	
5.2.3.1.1	Land-Use Patterns.....	
5.2.3.1.2	Land-Use Controls.....	
5.2.3.2	Community Facilities.....	
5.2.3.2.1	Education.....	
5.2.3.2.2	Recreation.....	
5.2.3.2.3	Fire Protection.....	
5.2.3.2.4	Police Protection.....	
5.2.3.2.5	Health.....	
5.2.3.2.6	Sanitary Sewerage.....	
5.2.3.2.7	Water Supply.....	
5.2.3.2.8	Solid Waste Management.....	
5.2.3.3	Housing.....	
5.2.3.4	Transportation Facilities.....	
5.2.3.4.1	Roads.....	

CONTENTS (Continued)

	5.2.3.4.2	Railroads.....	
	5.2.3.4.3	Air Transportation.....	
	5.2.3.4.4	Utility Corridors.....	
	5.2.3.4.5	Water Transportation.....	
	5.2.3.5	Visual Aesthetics.....	
5.2.4		Use of Natural Resources.....	
	5.2.4.1	Energy and Mineral Resources and Reserves.....	
	5.2.4.2	Surface-Water Use.....	
	5.2.4.3	Groundwater Use.....	
5.3		ECOSYSTEMS.....	
	5.3.1	Terrestrial Ecology.....	
	5.3.1.1	Natural Systems.....	
		5.3.1.1.1 Vegetation.....	
		5.3.1.1.2 Wildlife.....	
		5.3.1.1.3 Soils.....	
		5.3.1.1.4 Other Terrestrial Ecological Considerations..	
	5.3.1.2	Agricultural Systems.....	
		5.3.1.2.1 Cropland and Pasture.....	
		5.3.1.2.2 Soils.....	
		5.3.1.2.3 Domestic Fauna (Livestock).	
5.3.2		Aquatic Ecology.....	
	5.3.2.1	Aquatic Organisms and Abundance.....	
	5.3.2.2	Representative Important Species.....	
	5.3.2.3	Migration, Life Histories, and Habitat Use.....	
	5.3.2.4	Food Chains and Interspecies Relationships.....	
	5.3.2.5	Preexisting Environmental Stresses....	

SUBSECTION CONTENTS

- RATIONALE
- DATA SOURCES
- DATA PRESENTATION

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PLAN FOR THE PREPARATION OF ENVIRONMENTAL REPORTS

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CONTENTS OF ER

FOREWORD

- 1.0 PURPOSE OF THE PROPOSED FACILITY**
- 2.0 THE SITE AND TRANSPORT ROUTES**
- 3.0 THE PROPOSED FACILITY**
- 4.0 SHORT-TERM ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES**
- 5.0 LONG-TERM ENVIRONMENTAL IMPACTS AND MITIGATING MEASURES**
- 6.0 ENVIRONMENTAL MEASUREMENTS AND MONITORING**
- 7.0 ALTERNATIVES**
- 8.0 SUMMARY COST/BENEFIT ANALYSIS**
- 9.0 ENVIRONMENTAL APPROVALS AND CONSULTATION**
- 10.0 REFERENCES**
- 11.0 GLOSSARY, ABBREVIATIONS, AND ACRONYMS**

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CONTENTS OF ER

FOREWORD

1.0 PURPOSE OF THE PROPOSED FACILITY

- 1.1 SUMMARY OF NEED AND BENEFITS**
- 1.2 NUCLEAR POWER AND THE FUEL CYCLE IN THE UNITED STATES**
- 1.3 INTERNATIONAL NUCLEAR WASTES**
- 1.4 TECHNOLOGY OF NUCLEAR WASTE STORAGE IN GEOLOGIC MEDIA**

2.0 THE SITE AND TRANSPORT ROUTES

- 2.1 LOCATION**
- 2.2 GEOSPHERE**
- 2.3 HYDROSPHERE**
- 2.4 ATMOSPHERE**
- 2.5 HUMAN ENVIRONMENT**
- 2.6 ECOLOGICAL ENVIRONMENT**
- 2.7 BACKGROUND RADIATION**
- 2.8 NOISE**

3.0 THE PROPOSED FACILITY

- 3.1 ON-SITE FACILITY SYSTEMS AND THEIR OPERATION**
- 3.2 TRANSPORTATION AND WASTE ROCK STORAGE AND DISPOSAL FACILITIES**
- 3.3 CONSTRUCTION**
- 3.4 DECOMMISSIONING AND SURVEILLANCE**
- 3.5 SCHEDULE AND COSTS**

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CONTENTS OF ER (Continued)

4.0 SHORT-TERM ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

- 4.1 FACILITY CONSTRUCTION**
- 4.2 FACILITY OPERATION**
- 4.3 DECOMMISSIONING**
- 4.4 TRANSPORTATION**
- 4.5 ABNORMAL EVENTS**

5.0 LONG-TERM ENVIRONMENTAL IMPACTS AND MITIGATING MEASURES

- 5.1 THE HUNDRED TO THOUSAND YEAR PERIOD**
- 5.2 THE VERY LONG TIME PERIOD**

6.0 ENVIRONMENTAL MEASUREMENTS AND MONITORING

- 6.1 GEOLOGICAL MONITORING**
- 6.2 HYDROLOGICAL MONITORING**
- 6.3 METEOROLOGICAL MONITORING**
- 6.4 AIR QUALITY MONITORING**
- 6.5 RADIOLOGICAL MONITORING**
- 6.6 NOISE MONITORING**
- 6.7 SOCIOECONOMIC MONITORING**
- 6.8 ECOLOGICAL MONITORING**

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CONTENTS OF ER (Continued)

7.0 ALTERNATIVES

- 7.1 NO-ACTION ALTERNATIVES**
- 7.2 OTHER TECHNOLOGY ALTERNATIVES**
- 7.3 OTHER DESIGN ALTERNATIVES**
- 7.4 OTHER SITE ALTERNATIVES**
- 7.5 DELAY IN SCHEDULE**

8.0 SUMMARY COST/BENEFIT ANALYSIS

- 8.1 UNAVOIDABLE ADVERSE EFFECTS**
- 8.2 COMMITMENT OF RESOURCES**
- 8.3 SHORT-TERM USES AND LONG-TERM PRODUCTIVITY**
- 8.4 ENVIRONMENTAL TRADE-OFF ANALYSIS**

9.0 ENVIRONMENTAL APPROVALS AND CONSULTATION

10.0 REFERENCES

11.0 GLOSSARY, ABBREVIATIONS, AND ACRONYMS

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2.1.2 TRANSPORT ROUTES

The location of roads and railways, proposed to be built as part of this facility should be shown on the layout maps described under Section 2.1.1 along with the location of existing systems in the same area. Also major highways and railroads which will serve the repository should be presented on appropriate maps and described.

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2.3.1.3 Water Quality

This section should describe the temporal and spatial variation of surface water quality in the vicinity of the repository. It should include:

- **Monthly mean and extreme value of the physical, chemical, biological, and radiological characteristics of streams, lakes, and impoundments.**
- **Location of point and nonpoint sources of surface water pollutants; monthly variations in the quantity and characteristics of pollutants.**
- **Local, state, and Federal laws, regulations, and standards.**

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GULF INTERIOR REGION

AND

PARADOX SUMMARY

M. A. GLORA

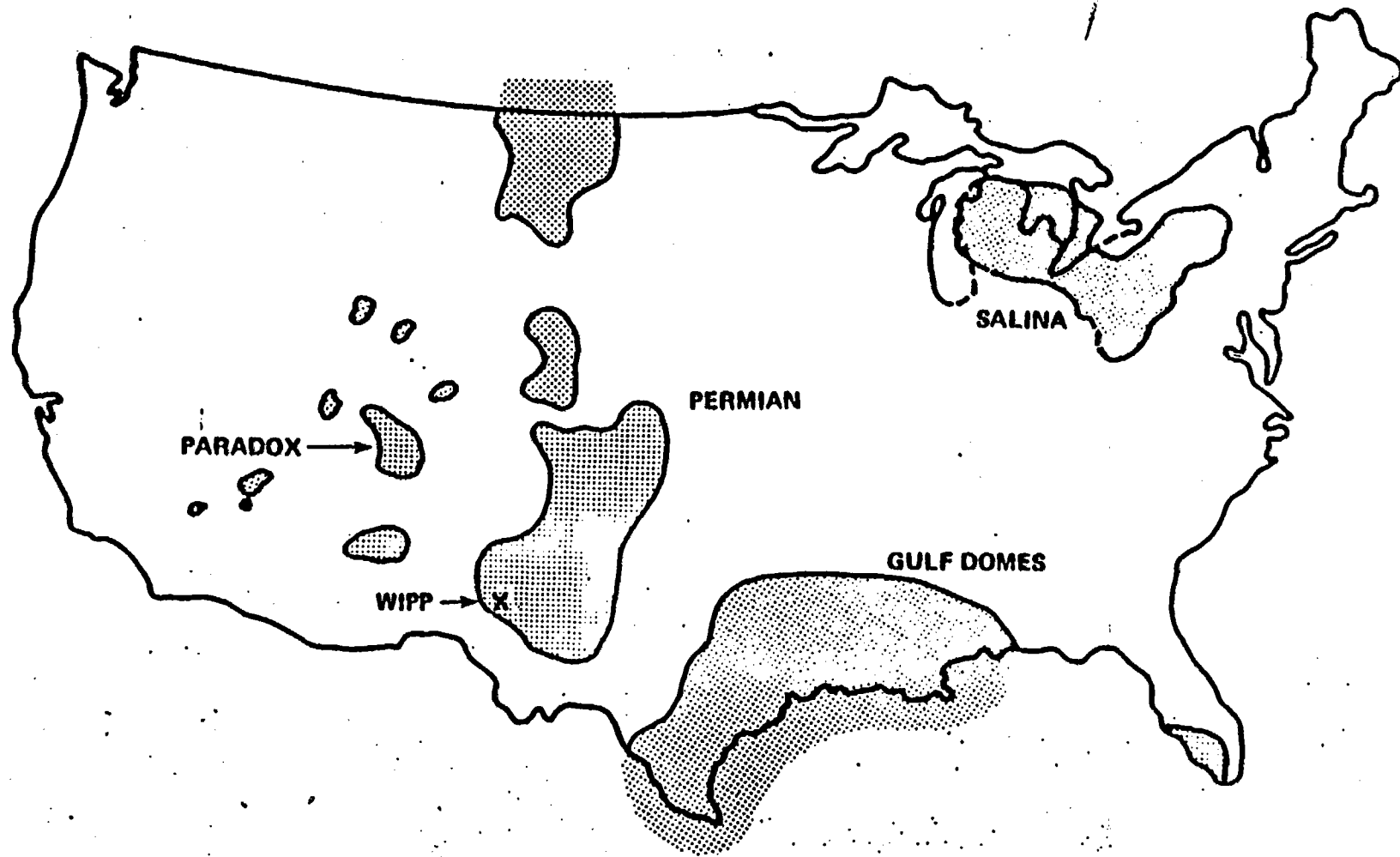
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SALT FORMATIONS OF THE UNITED STATES



GULF INTERIOR REGION
ENVIRONMENTAL CHARACTERIZATION

- ~ 263 ON-SHORE DOMES
- ~ 125 INTERIOR DOMES
- ALTITUDE: AVERAGES SEVERAL
HUNDRED FEET ABOVE SEA LEVEL
- CLIMATE: HUMID/TEMPERATE
- DEMOGRAPHY - GIR BY STATE
 - LOUISIANA - GIR
 - 29 PARISHES AND POPULATION OF 1,062,000
(1970)
 - CITIES OF SHREVEPORT, MONROE, ALEXANDRIA
 - MISSISSIPPI - GIR
 - 35 COUNTIES AND POPULATION OF 1,064,000
(1975 ESTIMATE)
 - CITIES OF JACKSON, MERIDIAN, HATTIESBURG,
VICKSBURG
 - TEXAS - GIR
 - 32 COUNTIES AND POPULATION OF 766,154 (1970)

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**GULF INTERIOR REGION
ENVIRONMENTAL CHARACTERIZATION**

- SOCIOECONOMIC

● **LOUISIANA**

- FARMING, GRAZING
- NATURAL GAS/PETROLEUM
- LUMBER/WOOD PRODUCTS, TEXTILES,
CHEMICALS

● **MISSISSIPPI**

- MANUFACTURING
- NATURAL GAS/PETROLEUM
- AGRICULTURE

● **TEXAS**

- LOW POPULATION DENSITY (~0.02 PEOPLE/ACRE)
- WOODLANDS AND AGRICULTURE
- EXTENSIVE RECREATIONAL AREAS
- EXTENSIVE TRANSPORTATION SERVICES

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GULF INTERIOR REGION
ENVIRONMENTAL CHARACTERIZATION

- ECOSYSTEMS

• LOUISIANA

- PRAIRIE
- THREE MIXED HARDWOOD/SOFTWOOD FOREST TYPES
- DIVERSE WILDLIFE HABITATS
- CONTAINS NATIONAL FOREST, NATURAL AREA,
STATE/NATIONAL AND PRIVATE WILDLIFE AREAS

• MISSISSIPPI

- FIVE VEGETATION TYPES (HARDWOOD/SOFTWOOD)
- SIX NATURAL AREAS, FIVE NATIONAL FORESTS
- DIVERSE HABITATS

• TEXAS

- NINE VEGETATION TYPES (SAVANNA → HARDWOOD/
SOFTWOOD FOREST)
- FOUR NATIONAL FORESTS
- LOCALLY ADMINISTERED NATURAL AREAS

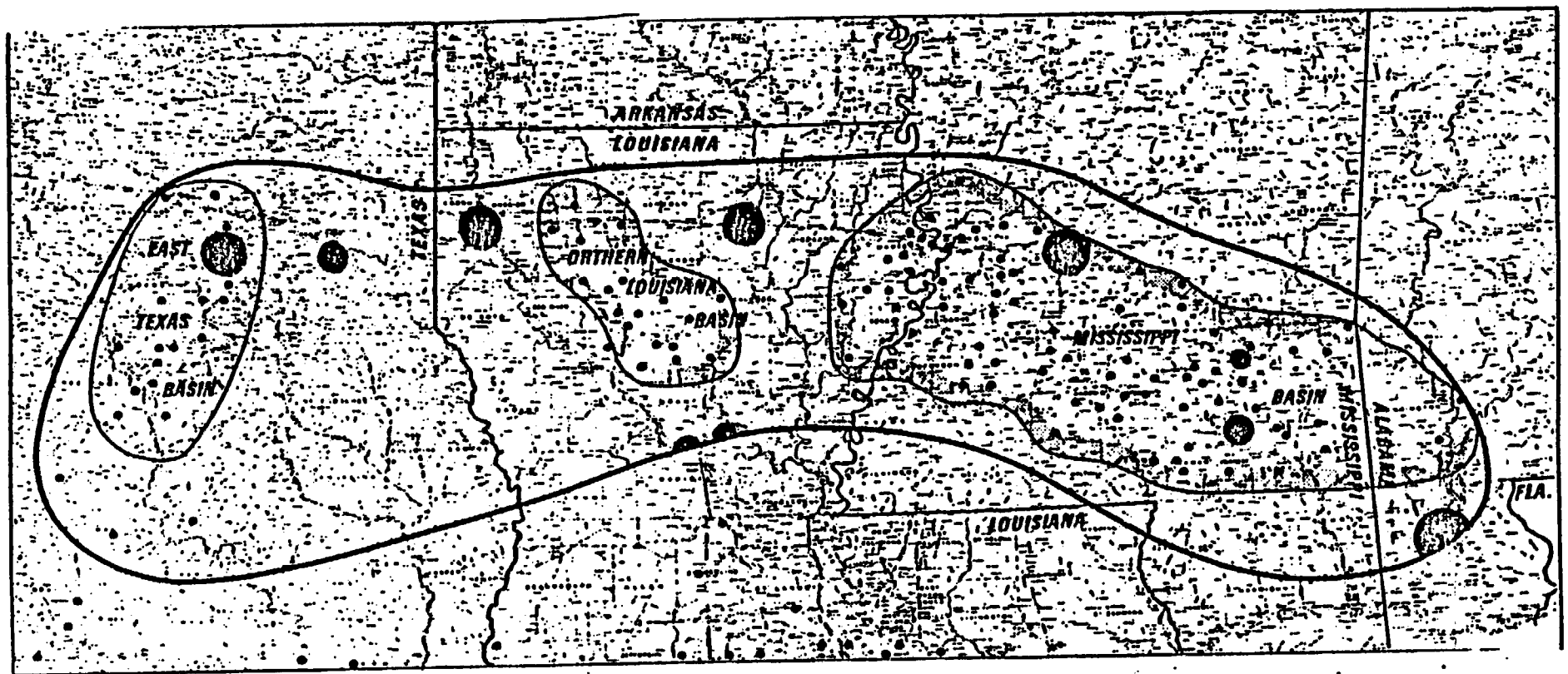
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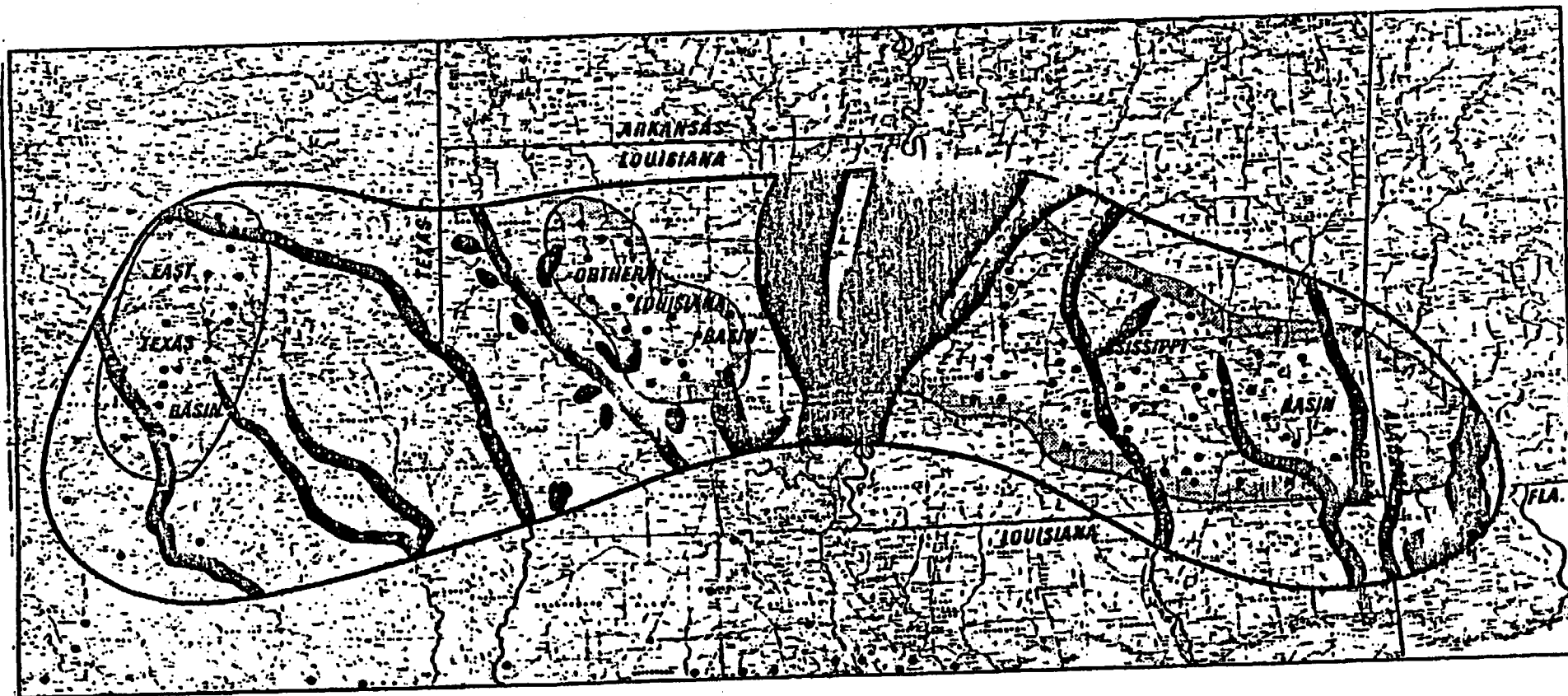
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AIRPORTS AND URBAN AREAS



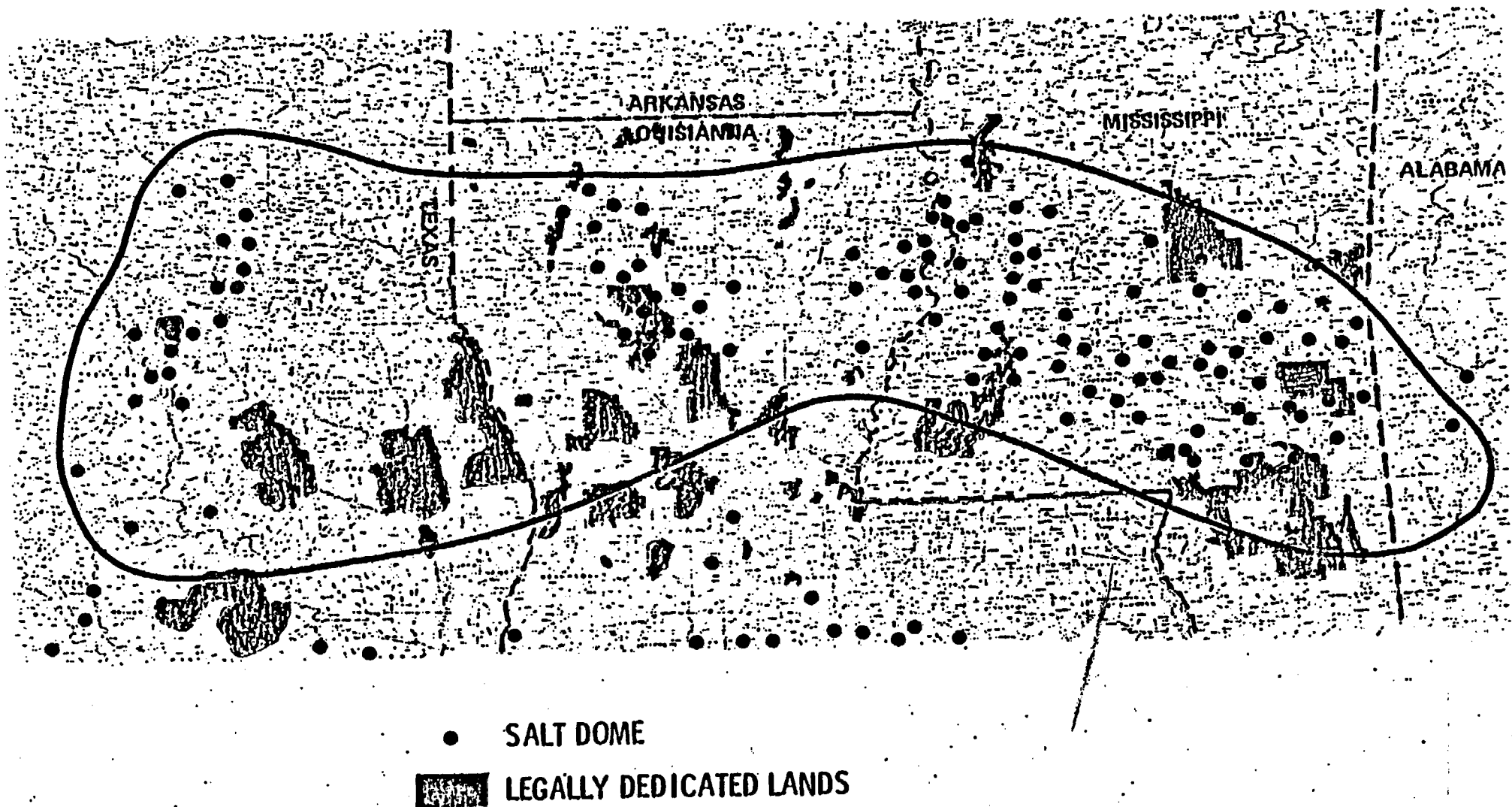
GULF INTERIOR REGION

MAJOR RIVERS, LAKES AND AREAS SUBJECT TO FLOODING



GULF INTERIOR REGION

LEGALLY DEDICATED LANDS OF THE GULF INTERIOR REGION



PARADOX REGION
ENVIRONMENTAL CHARACTERIZATION

- AREA 12,000 SQUARE MILES
- IN COLORADO PLATEAU PHYSIOGRAPHIC PROVINCE
- ALTITUDE: 5,000 FEET
- BEDDED/ANTICLINAL SALT
- COOL-SEMIARID STEPPE WITH ISOLATED DESERT AND HUMID CONTINENTAL REGIMES
- DEMOGRAPHY
 - TOTAL POPULATION 240,000 (1970)
 - NUMEROUS SMALL TOWNS
 - NO LARGE CITIES
 - NEAREST ADJACENT FARMINGTON, N.M.;
GRAND JUNCTION, CO.

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PARADOX REGION
ENVIRONMENTAL CHARACTERIZATION

- ECOSYSTEMS
 - LARGE, RELATIVELY UNDISTURBED AREAS
 - PINE/FIR FOREST
 - SCRUBLANDS
 - STEPPES
 - BARRENLANDS

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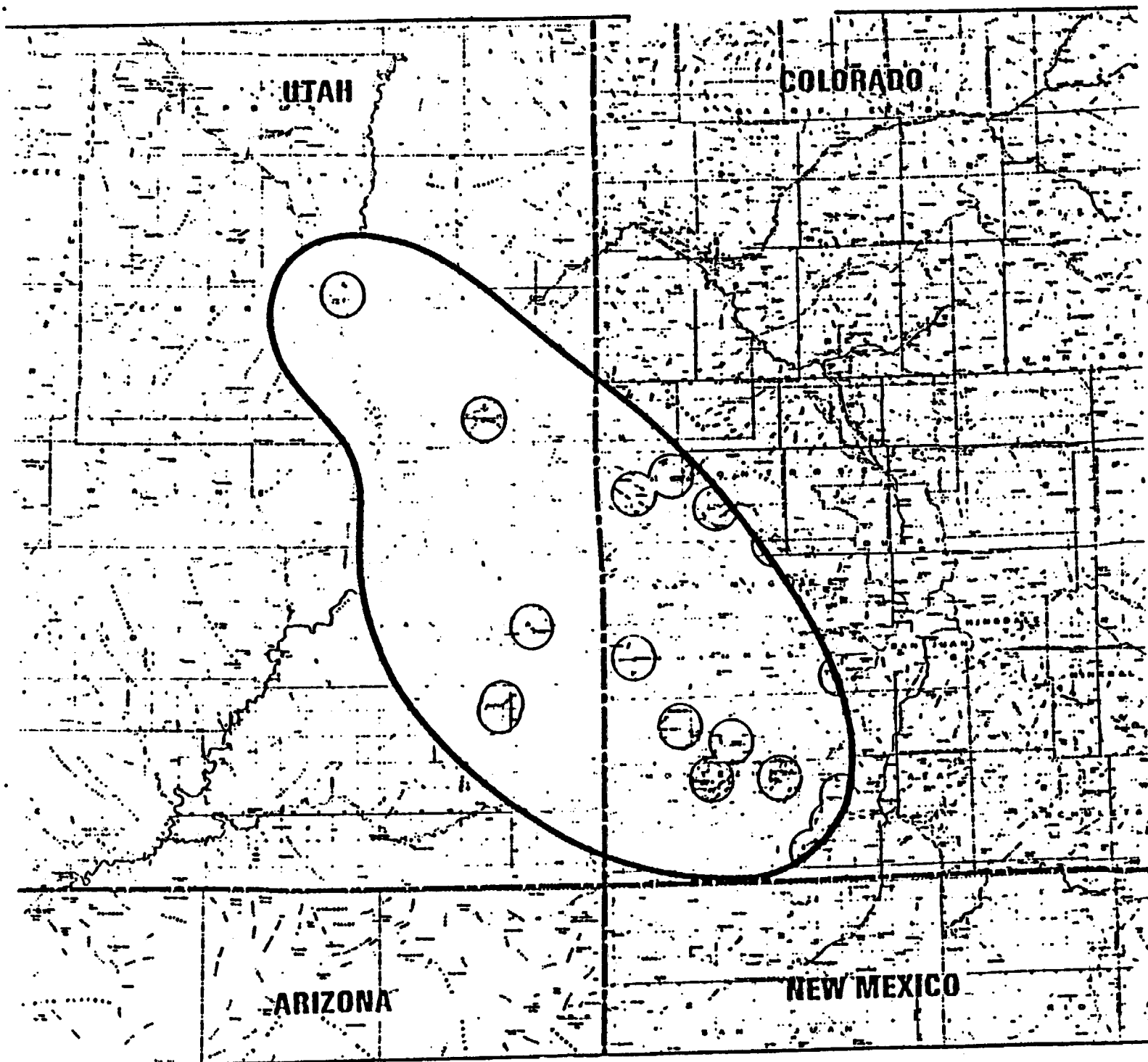
PARADOX REGION
ENVIRONMENTAL CHARACTERIZATION

- SOCIOECONOMIC
 - EXTRACTIVE INDUSTRY (PETROLEUM, COAL, POTASH, URANIUM)
 - AGRICULTURE (HAY, GRAIN, LIVESTOCK)

- LAND USE
 - 29% FEDERAL AND STATE RECREATION AND NATURAL AREAS
 - BULK OF REMAINDER - OPEN LAND

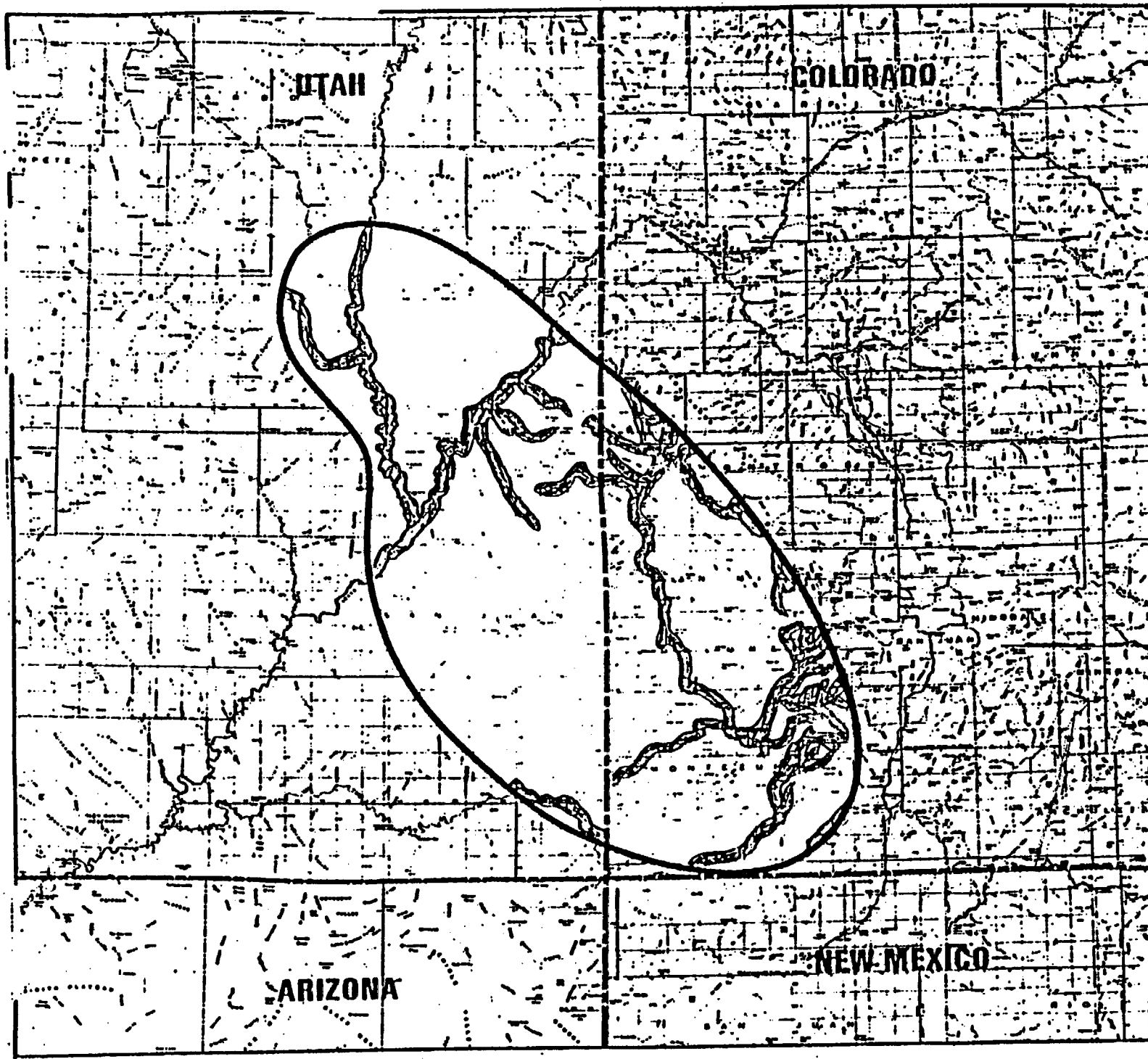
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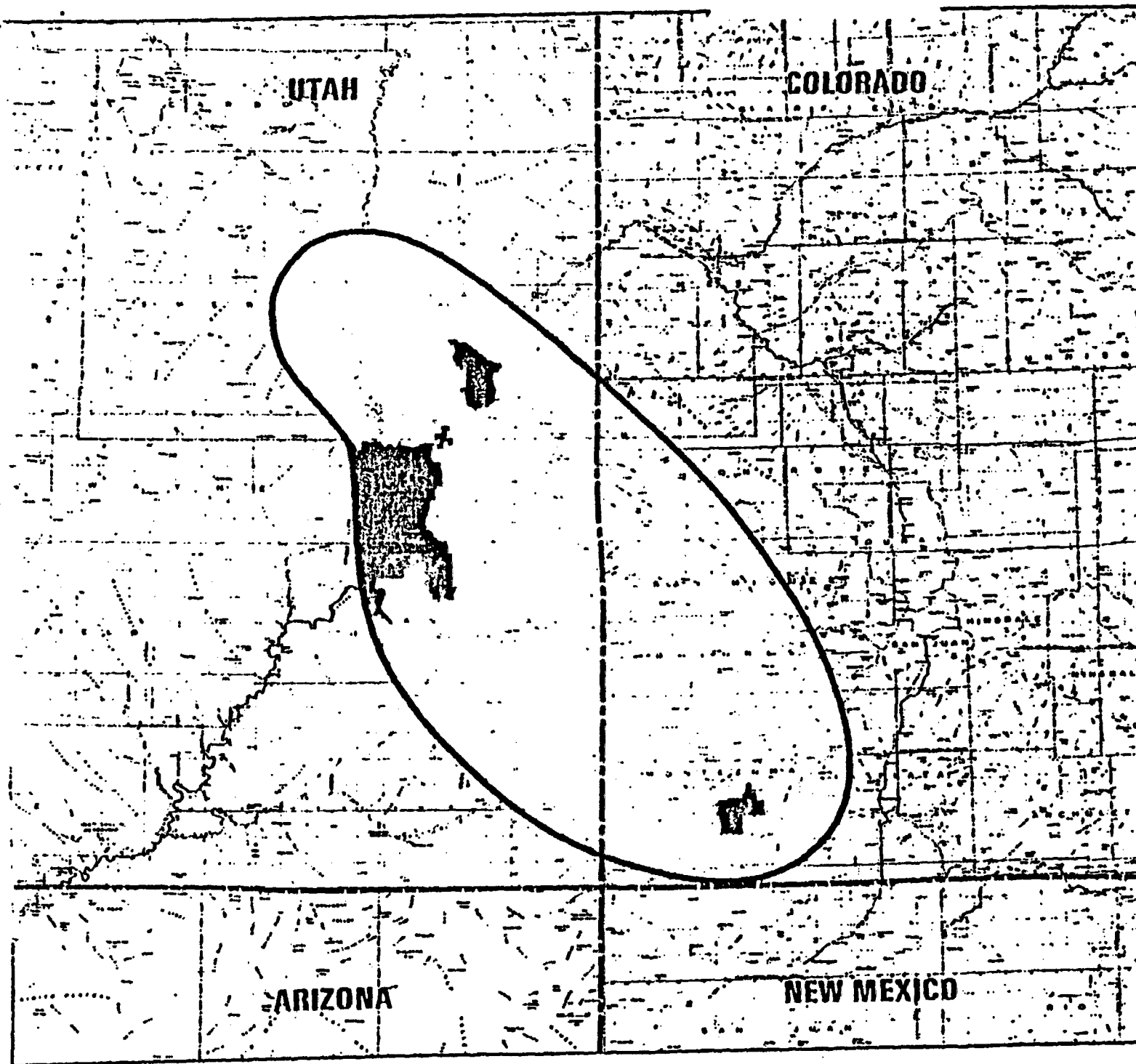
AIRPORTS & URBAN AREAS

PARADOX
REGION



RIVERS & RESERVOIRS

PARADOX
REGION



NATIONAL PARKS
WILDERNESS AREAS
STATE PARK

PARADOX
REGION

UTAH

COLORADO

ARIZONA

NEW MEXICO

UTAH

COLORADO

SLOPE > 500'/MI

PARADOX
REGION

ARIZONA

NEW MEXICO



ENVIRONMENTAL DOCUMENTATION STATUS

- PARADOX

REGIONAL CHARACTERIZATION REPORT FOR THE PARADOX
BEDDED SALT REGION AND SURROUNDING TERRITORY
(Y/OWI/SUB-78/42507/1)

- PUBLIC COMMENT COMPLETED 4/1/79
- FINAL REPORT IN PREPARATION

- GULF INTERIOR REGION

REGIONAL ENVIRONMENTAL CHARACTERIZATION REPORT FOR
THE GULF INTERIOR REGION AND SURROUNDING TERRITORY
(ONWI/SUB/78/512-01600-1)

- PUBLIC COMMENT COMPLETE 6/15/79

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PERMIAN
AND
SALINA SUMMARY

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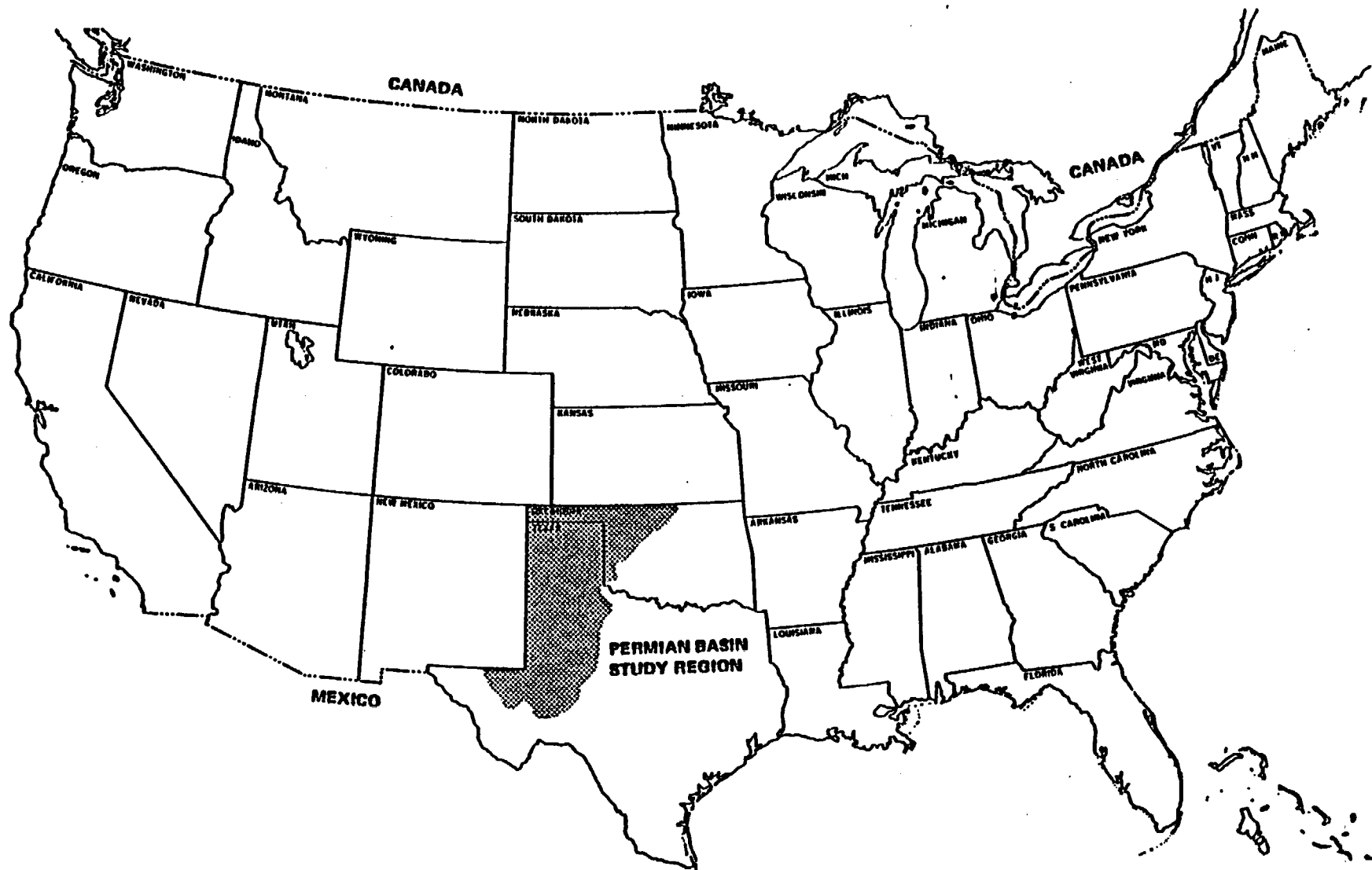
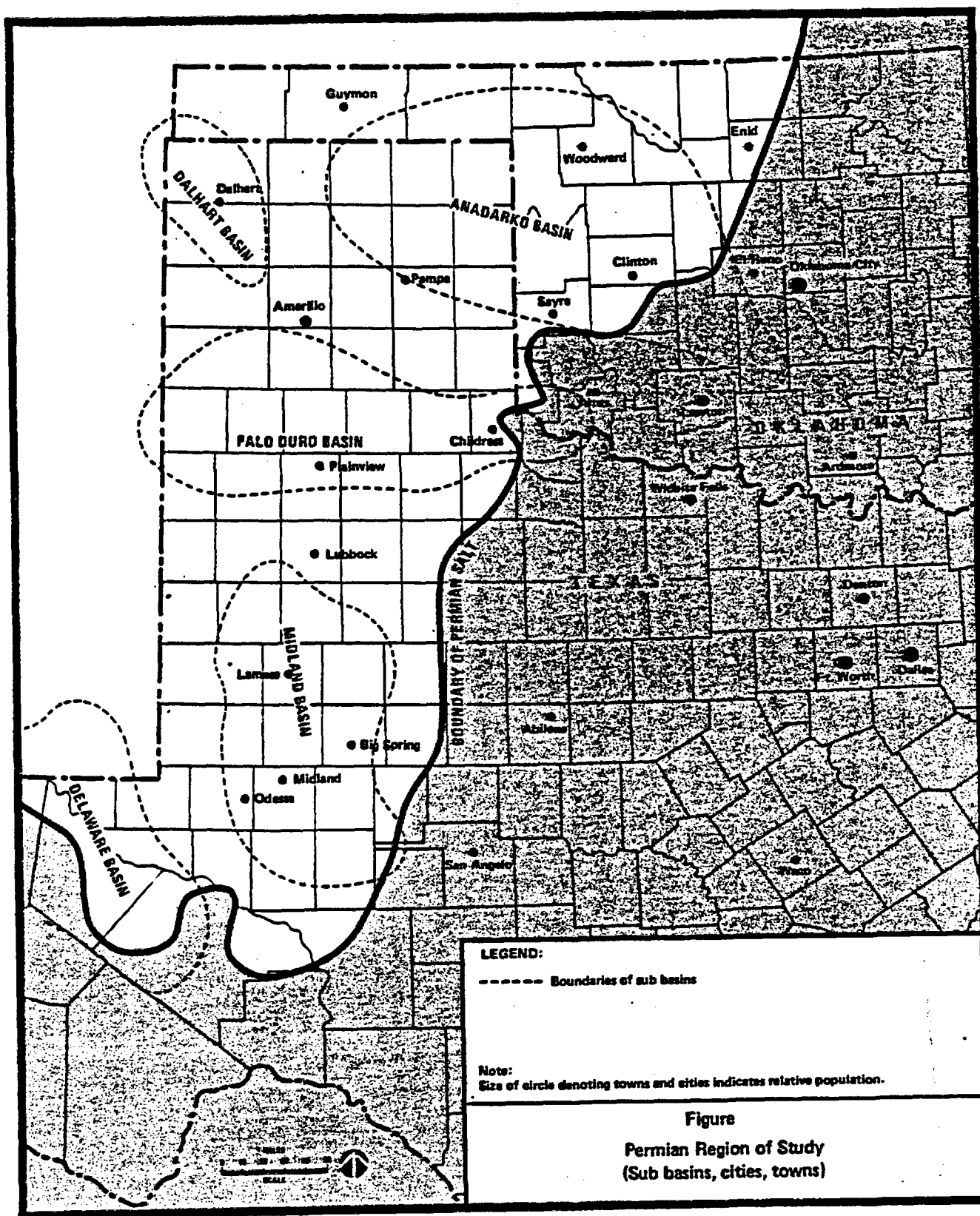
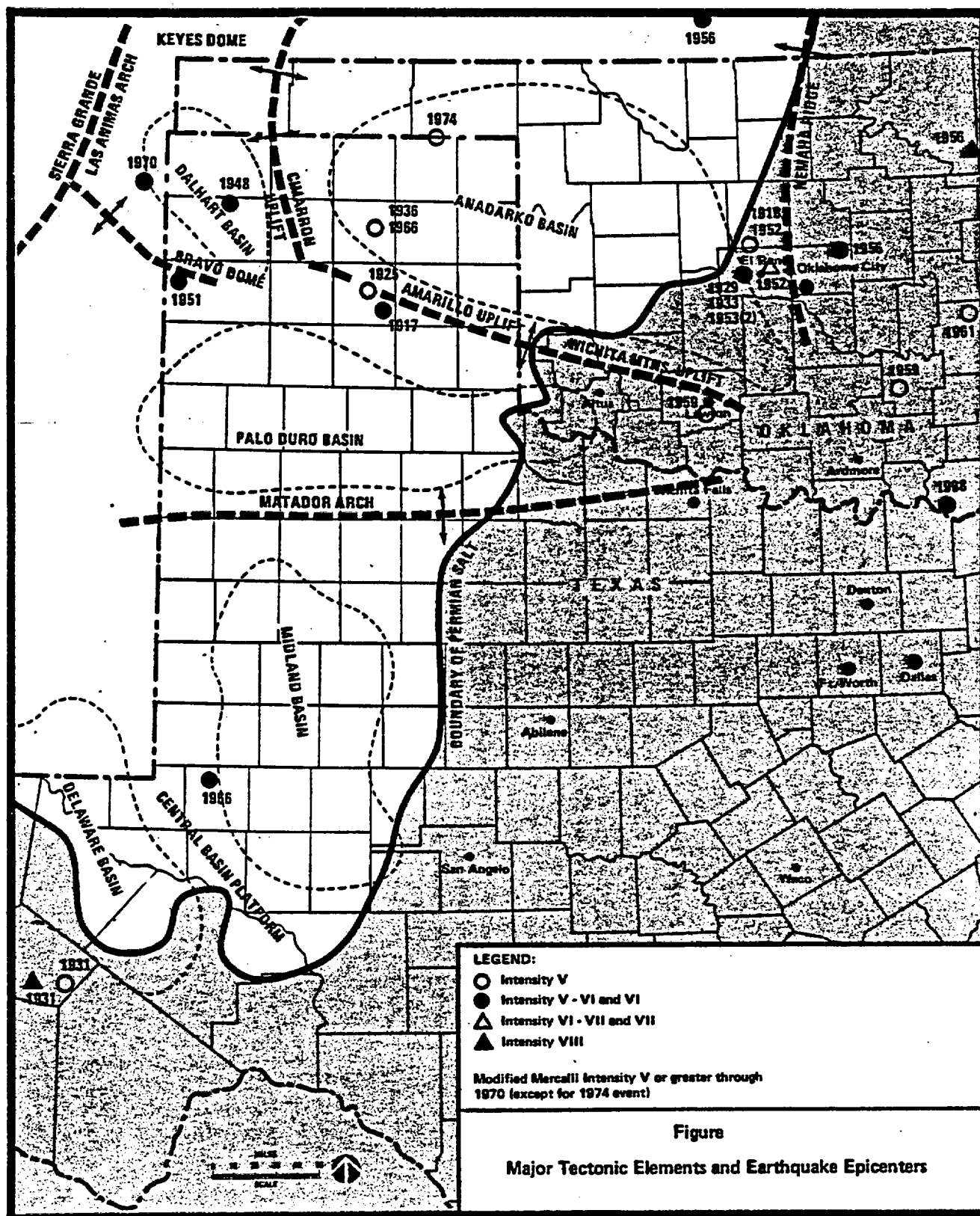
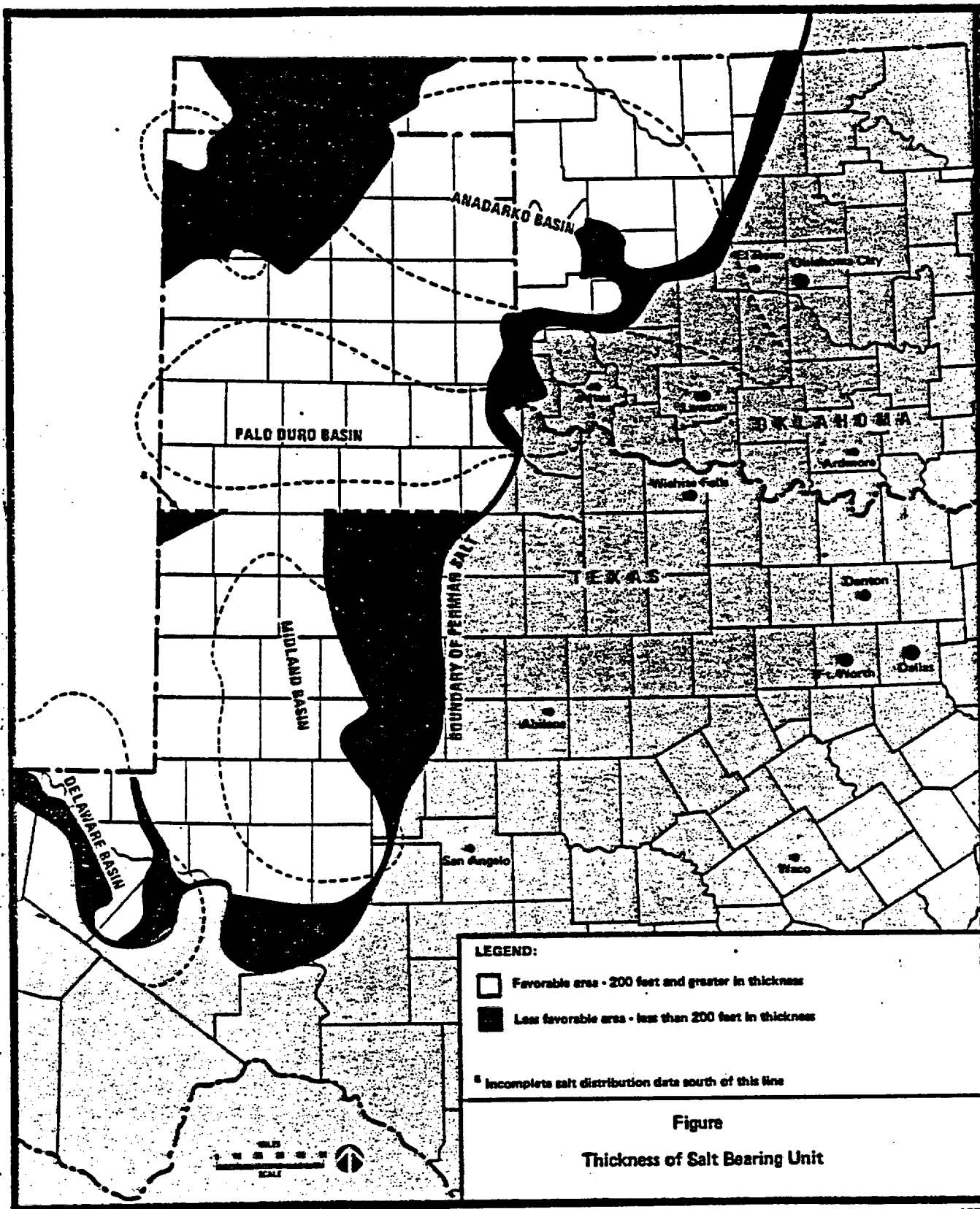


Figure
Regional Location

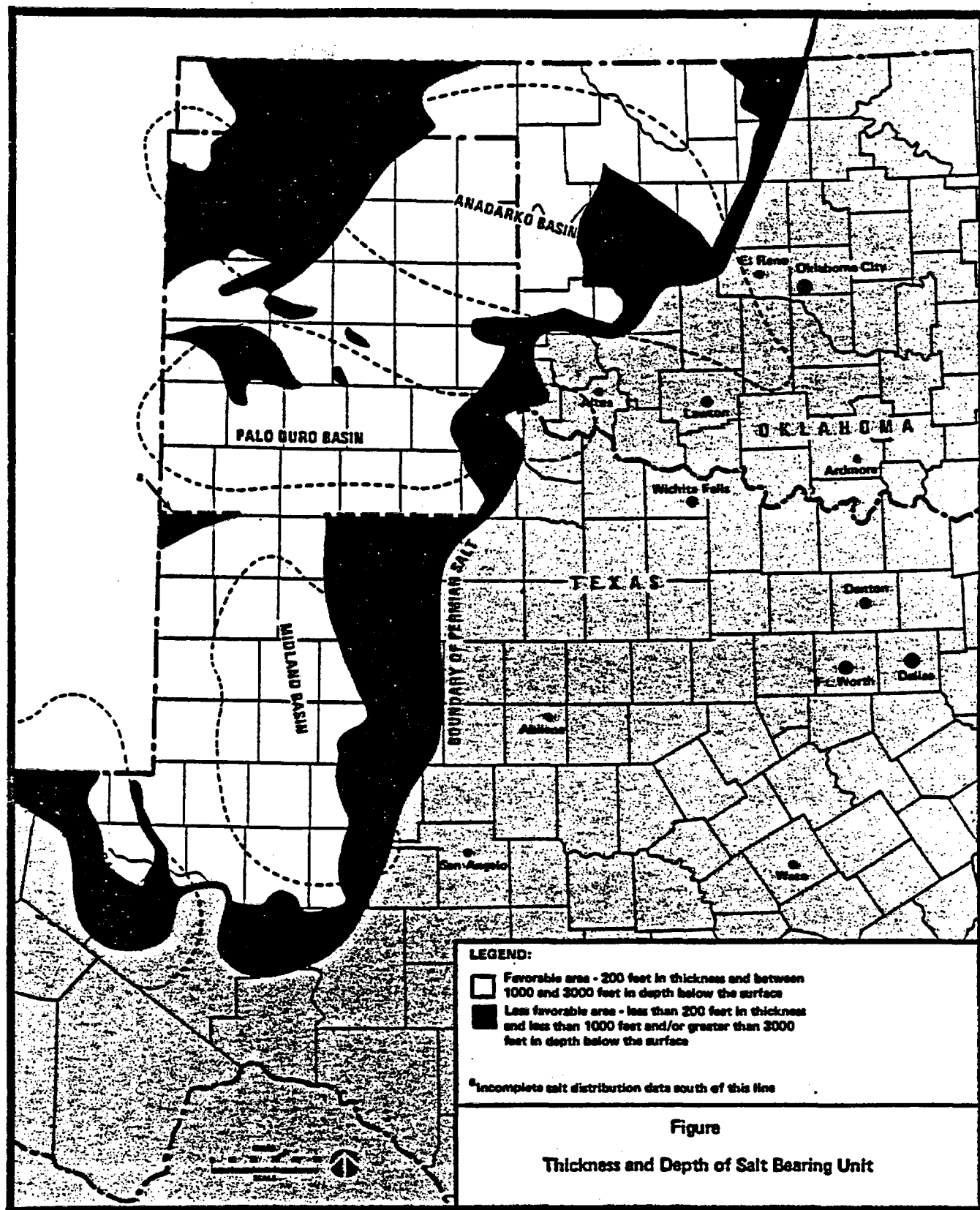




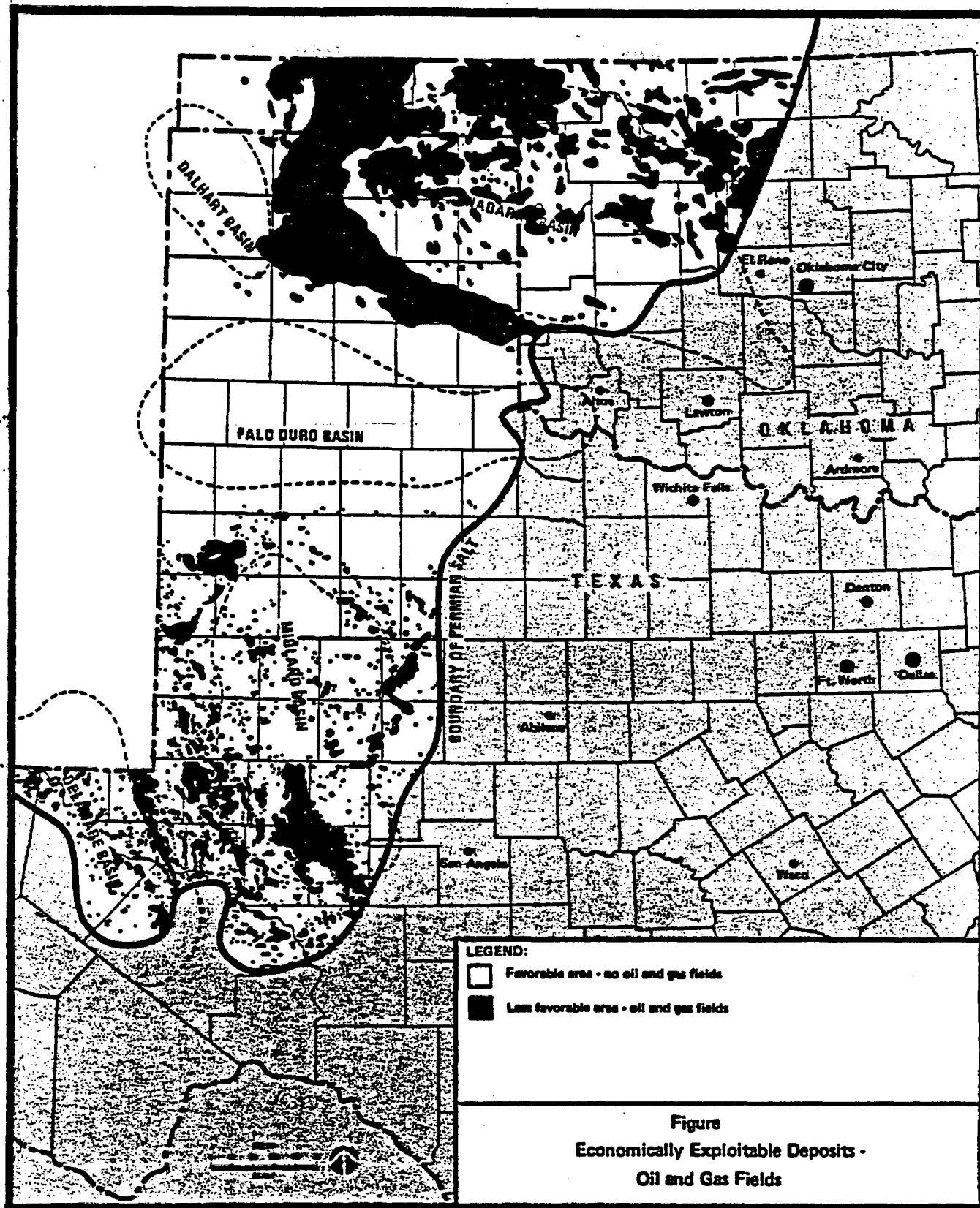
Source: Johnson, 1976



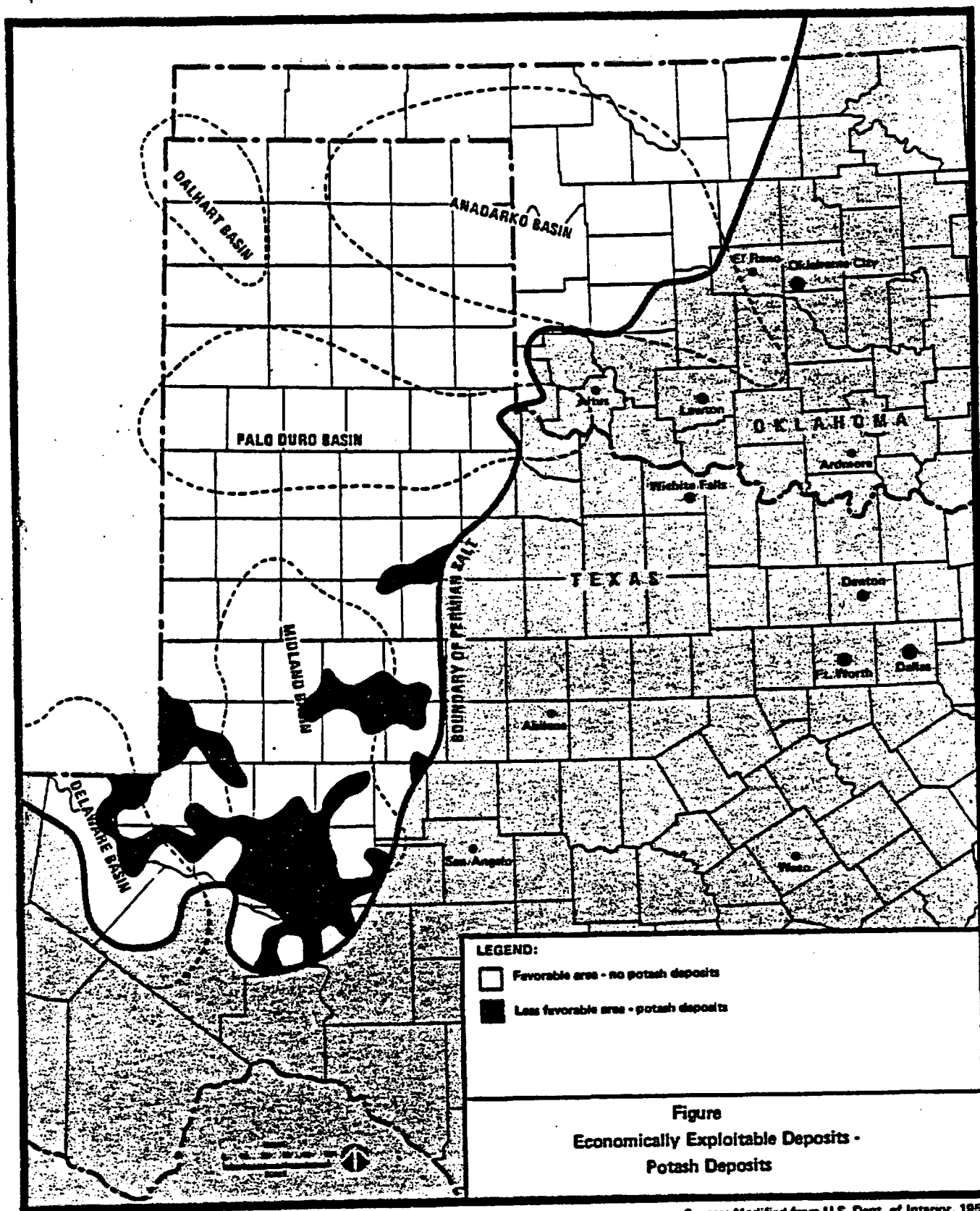
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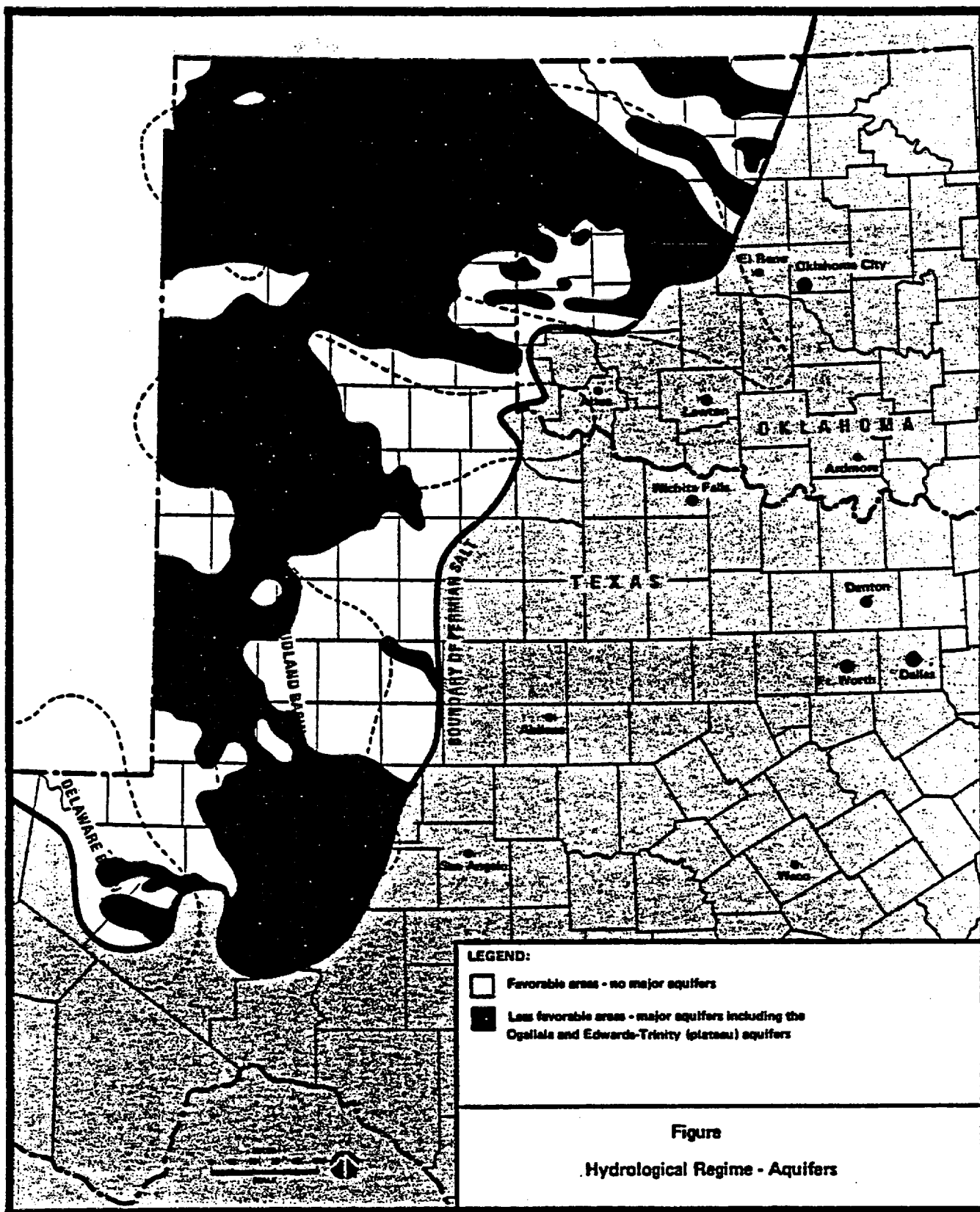


Source: Modified from Johnson, 1976 and Bachman and Johnson, 1973

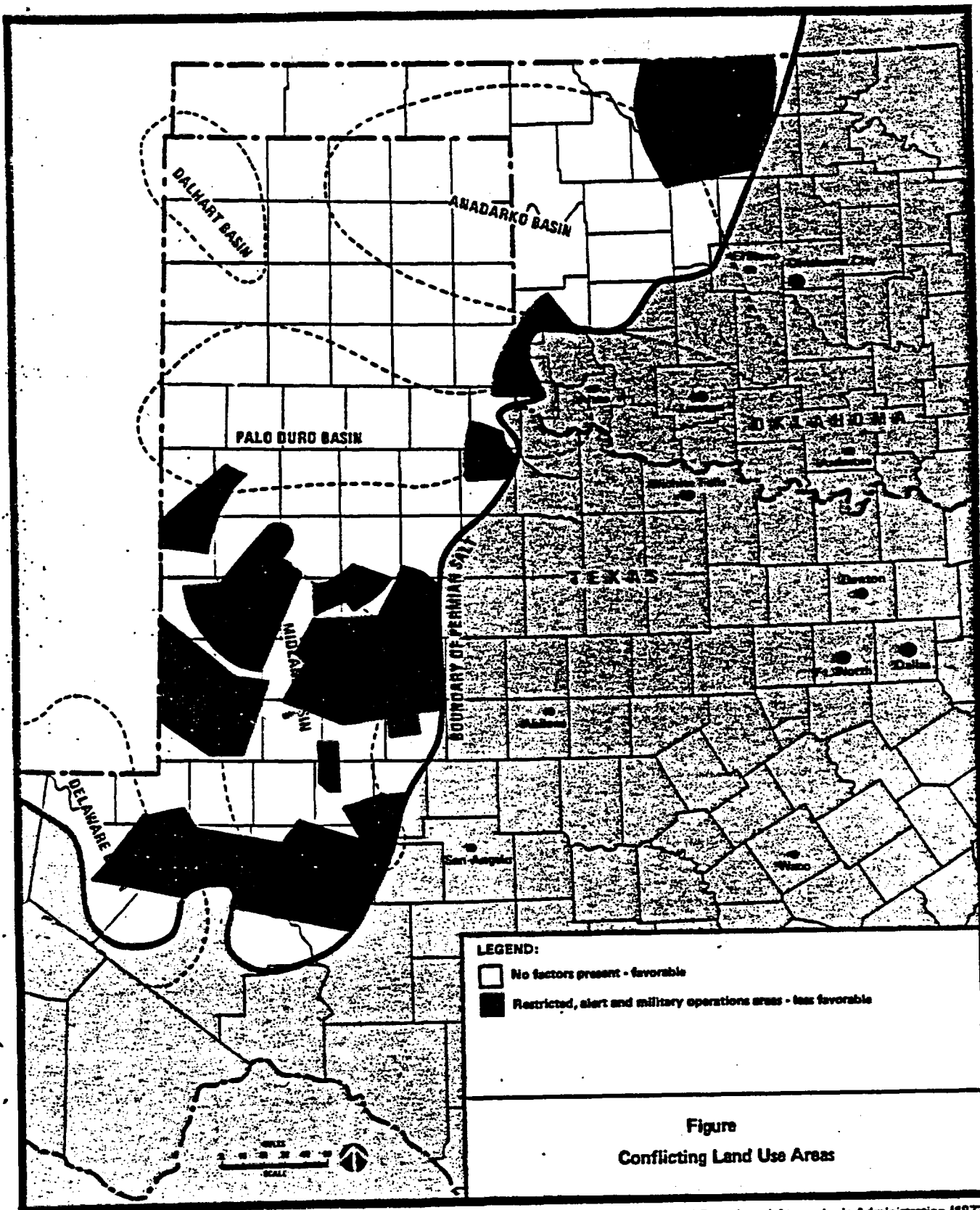


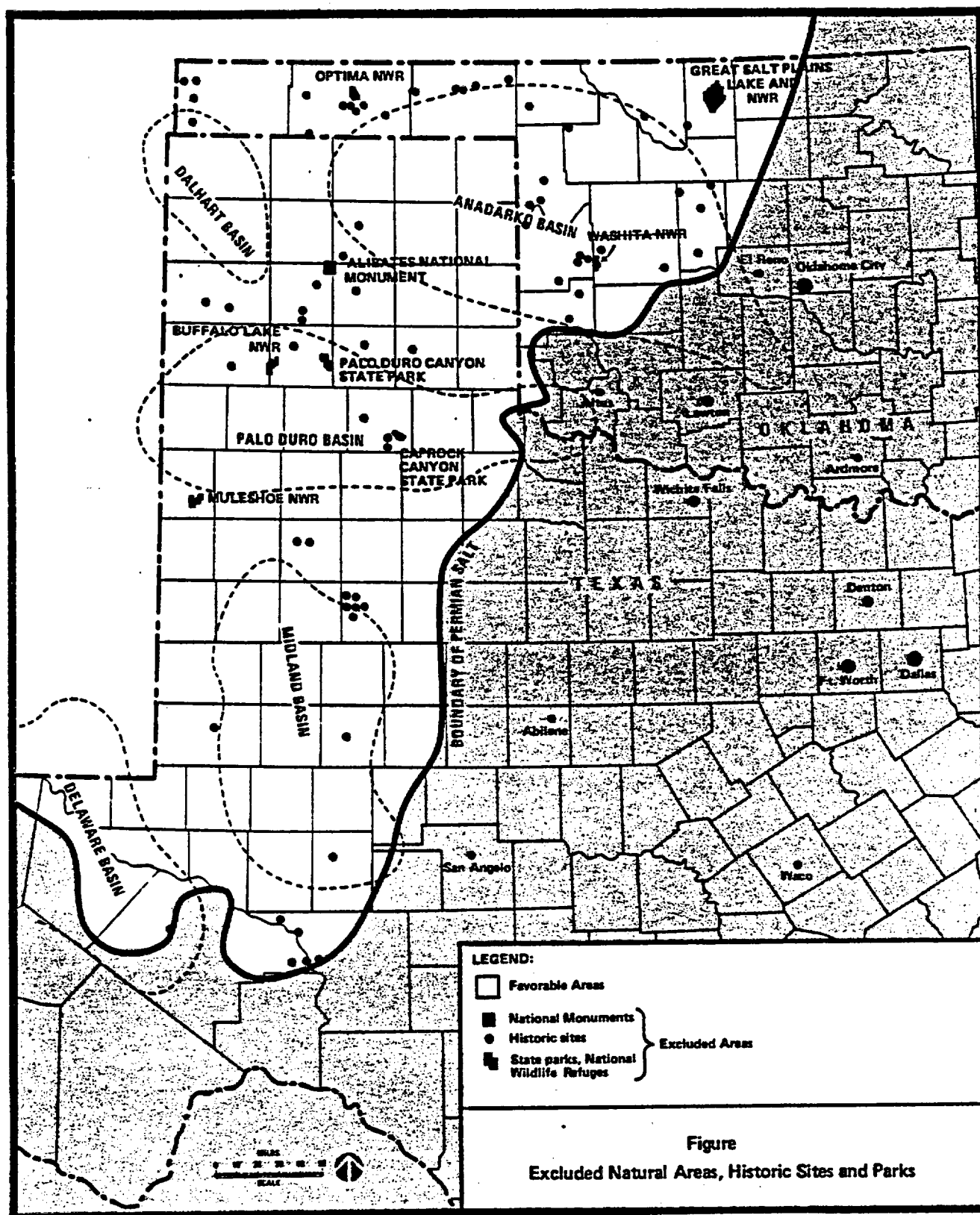
Source: Modified from Johnson, 1976 and
Texas Bureau of Economic Geology, 1976

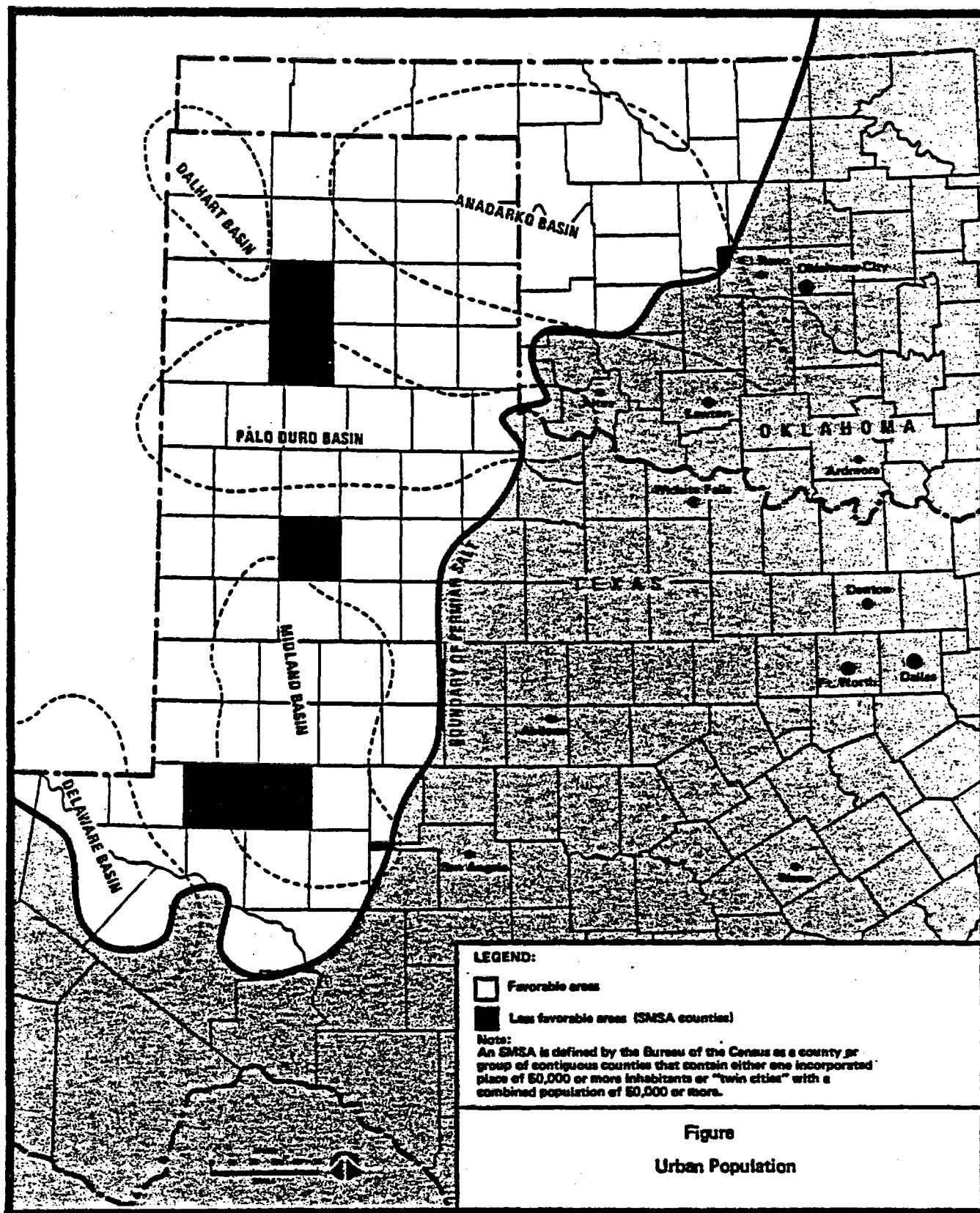




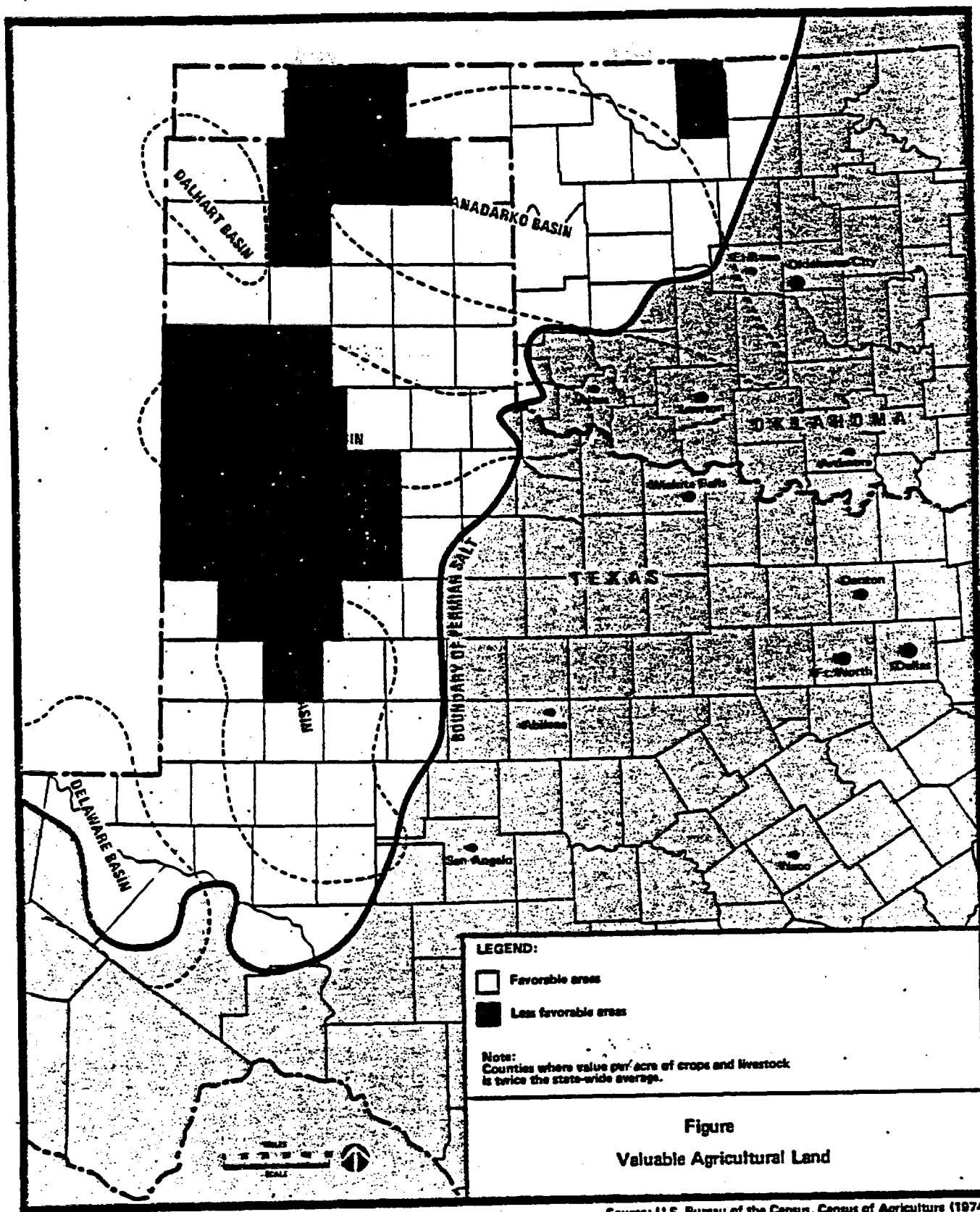
Source: NUS, 1978

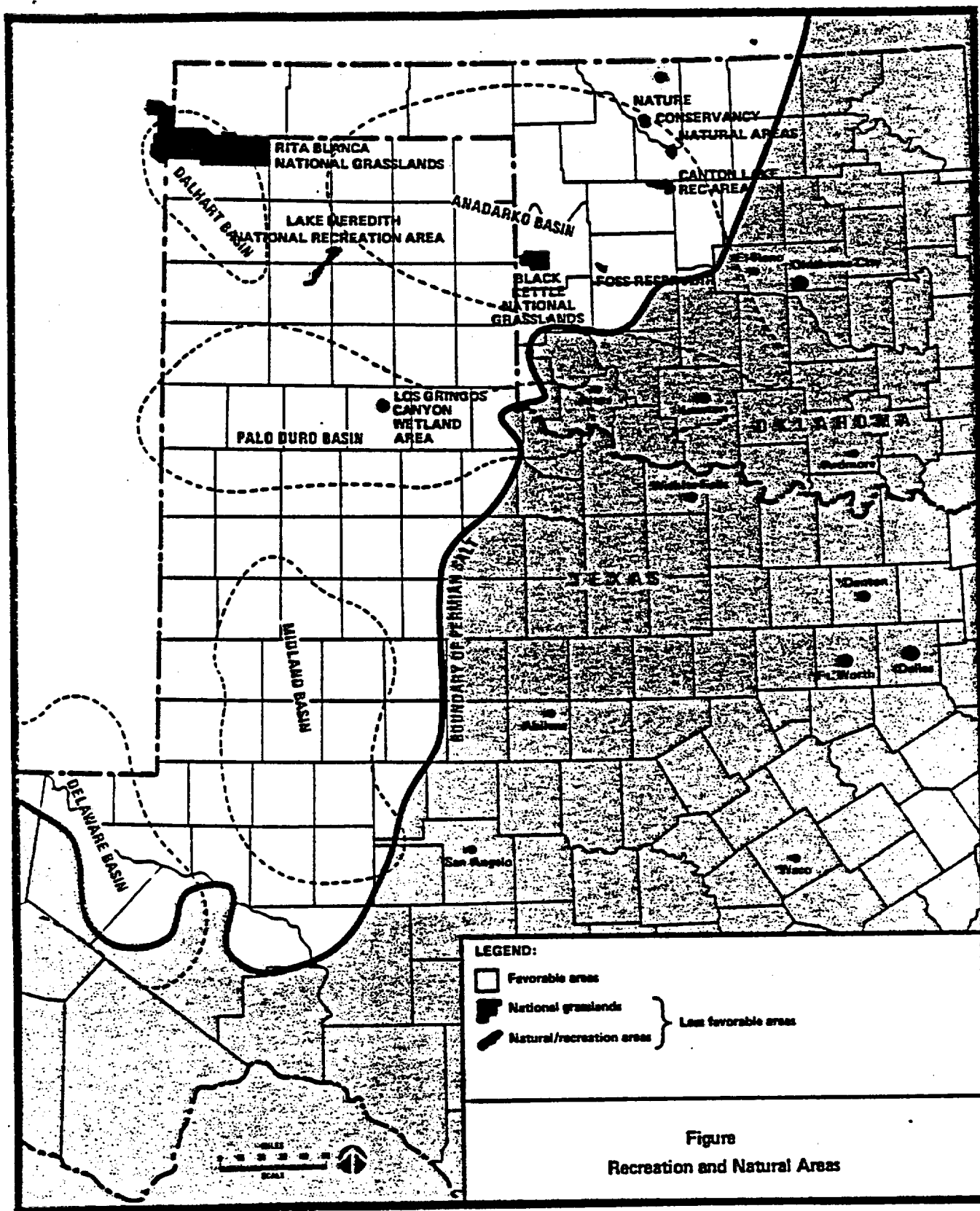




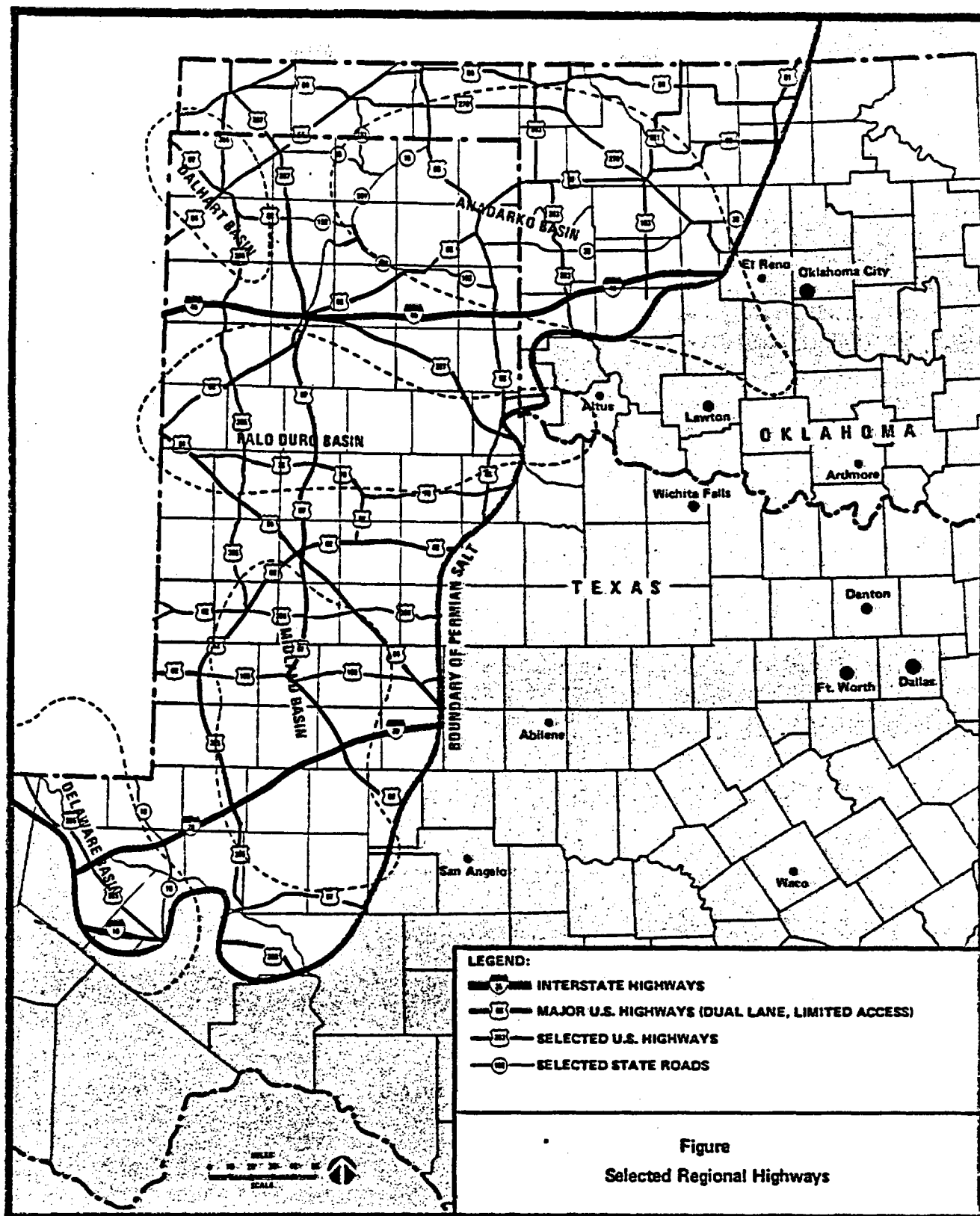


Source: U.S. Bureau of the Census (1971)

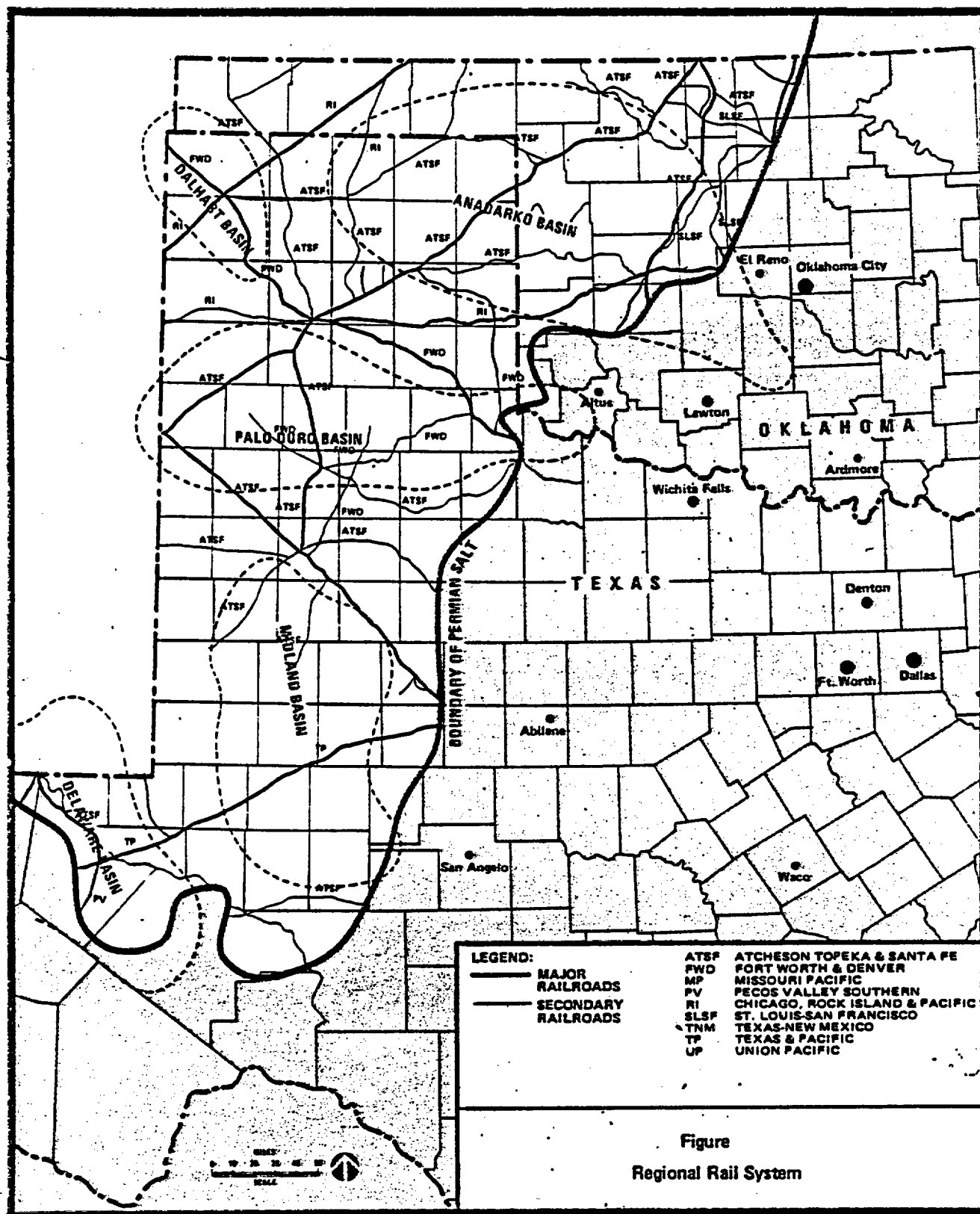




Source: Adapted from U.S. Forest Service (1976)
U.S. Bureau of Reclamation (1976)
Godwin and Niering (1975)



Source: Adapted from Rand McNally Road Atlas (1978)



Source: Adapted from U.S. Geological Survey (1978)

STATUS OF SALINA BASIN ENVIRONMENTAL SURVEY WORK — MAY, 1979

STATUS — MAY, 1979

- **DRAFT REGIONAL ENVIRONMENTAL CHARACTERIZATION
REPORT ISSUED APRIL, 1978 — OUTSIDE REVIEW AND COMMENT
— DRAFT FINAL REPORT (ONWI-16) - SUBMITTED TO DOE FOR
APPROVAL TO PUBLISH**
- **DRAFT SUPPLEMENTAL INFORMATION REPORT (ONWI-23)
— CONTAINS LIMITED LAND USE AND SOCIOECONOMIC DATA
NOT IN REGIONAL REPORT — ENVIRONMENTAL DATA RELATED
TO STONE & WEBSTER (S&W), GEOLOGIC DATA — UNDERGOING
ONWI AND DOE REVIEW**

**REGULATORY PROGRAM MANAGEMENT
FOR
MINED GEOLOGIC REPOSITORIES
IN
NONSALT MEDIA**

MAY 23, 1979

**W. H. McINTOSH
ONWI
SITE QUALIFICATION AND
LICENSING DEPARTMENT**

WHM: 5/23/79

ONWI
Office of Nuclear Waste Isolation
Battelle

NONSALT MEDIA—PROGRAM MANAGEMENT

PURPOSE:

**IDENTIFY AND CHARACTERIZE NONSALT
GEOLOGICAL SITES FOR USE AS
REPOSITORIES FOR NUCLEAR WASTE**

SCOPE:

- 1. MANAGE EFFORTS TO QUALIFY NONSALT SITES
TO COMPLY WITH SAFETY AND ENVIRONMENTAL
LICENSING CRITERIA (NRC, DOE)**
- 2. PROVIDE (LICENSING) DIRECTION FOR AND
SUPPORT THE ACTIVITIES OF**
 - WASTE ISOLATION SYSTEM ANALYSIS**
 - TECHNOLOGY AND ENGINEERING RESEARCH
AND DEVELOPMENT**
 - GEOLOGIC EXPLORATION**
 - FACILITIES ENGINEERING**

WHM: 5/23/79

ON/WI
Office of Nuclear Waste Isolation
Battelle

CONTAINMENT SYSTEMS

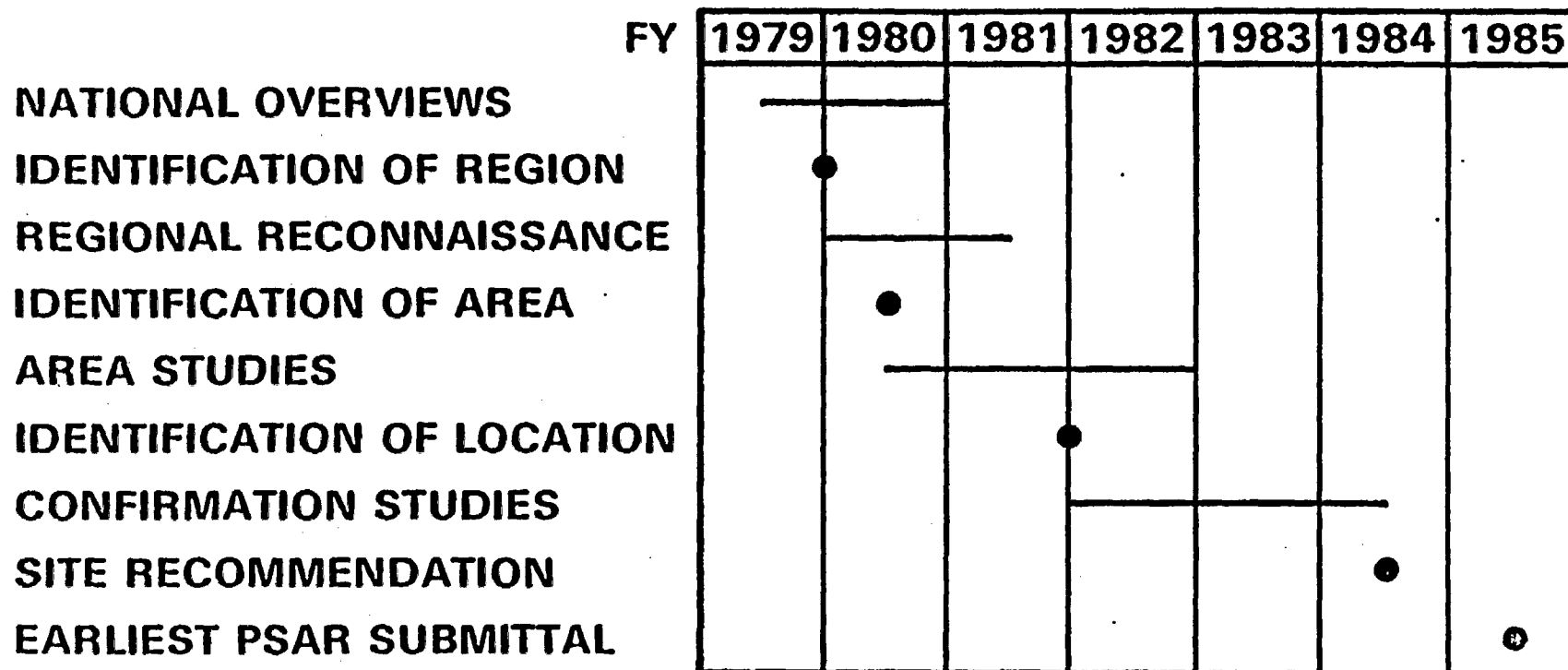
**STUDIES MAY INCLUDE, BUT NOT BE LIMITED
TO THE FOLLOWING MEDIA**

- **CRYSTALLINE**
- **ARGILLACEOUS**
- **CARBONATE**

WHM: 5/23/79

ONWI
Office of Nuclear Waste Isolation
Battelle

ONWI NONSALT SCHEDULE



WHM: 5/23/79

NONSALT MEDIA—PROGRAM MANAGEMENT

SITE QUALIFICATION TASKS

- 1. SURVEY PLANS**
- 2. ENVIRONMENTAL STUDIES**
LITERATURE SEARCHES
FIELD SURVEYS
- 3. PREPARE OR PROVIDE INFORMATION
FOR SITE QUALIFICATION
REPORT (10 CFR 60.11)**
- 4. PREPARE OR PROVIDE INPUT TO
LICENSING DOCUMENTS**
 - SAFETY ANALYSIS REPORT**
 - ENVIRONMENTAL IMPACT STATEMENT**
 - ENVIRONMENTAL REPORT**

WHM: 5/23/79

ONWI
Office of Nuclear Waste Isolation
Battelle

NONSALT PROGRAM IMPLEMENTATION

- **REGULATORY PROJECT MANAGERS (RPM)**
 - **LICENSING TASKS**
 - **SAFETY ANALYSIS REPORTS**
- **ENVIRONMENTAL PROJECT MANAGERS (EPM)**
 - **ENVIRONMENTAL SURVEY PLANS**
 - **ENVIRONMENTAL REPORTS**
 - **ENVIRONMENTAL FIELD SURVEYS**

WHM: 5/23/79

NONSALT ENVIRONMENTAL PROGRAM ELEMENTS TO BE CONSISTENT WITH SALT PROGRAM ELEMENTS

- 1. LICENSING PLANS**
- 2. SURVEY PLANS**
- 3. METHODOLOGY FOR COMPARATIVE
EVALUATIONS OF SITES**
- 4. NATIONAL SCREENING CRITERIA**

WHM: 5/23/79

NATIONAL SCREENING PROJECT

W. E. NEWCOMB

ONWI



Battelle

Project Management Division
Office of Nuclear Waste Isolation

PROJECT OBJECTIVES

- DO NATIONAL SCREENING ON BASIS OF SYSTEMS APPROACH
- INTEGRATE ALL NPTS PROGRAMS INTO NATIONWIDE SEARCH FOR SUITABLE SITES
- SUPPLEMENT INFORMATION AVAILABLE FOR ALTERNATIVE DISCUSSIONS IN NEPA DOCUMENTS

WEN:5/23/79



Battelle

Project Management Division
Office of Nuclear Waste Isolation

PROJECT TASKS

- REVIEW LITERATURE
- ESTABLISH SCREENING CRITERIA
- COMPILE NATIONAL DATA BASE
- APPLY CRITERIA TO DATA BASE
- IDENTIFY SUITABLE AREAS BASED ON SCREENING
- REPORT RESULTS

WEN:5/23/79



Project Management Division
Office of Nuclear Waste Isolation

SCREENING FACTORS

GEOLOGICAL

LENGTH OF GROUND WATER FLOW PATHS

PRESENCE OF MULTIPLE MIGRATION BARRIERS

ROCKTYPE AND THICKNESS

AQUIFER DISTRIBUTION AND FLOW RATE

SEISMICITY

FAULTING

PETROLEUM AND MINERAL RESOURCES

BORE HOLES

SUBSURFACE MINING ACTIVITY

UPLIFT AND SUBSIDANCE RATES

EROSION AND DENUDATION RATES

QUATERNARY VOLCANIC AND GEOTHERMAL AREAS

SURFACE-WATER BODIES

SUBSURFACE DISSOLUTION

WEN:5/23/79



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Project Management Division
Office of Nuclear Waste Isolation

SCREENING FACTORS

ENVIRONMENTAL

POPULATION DENSITY

DEDICATED LANDS

TRANSPORTATION ROUTES

WASTE SOURCES

WEN:5/23/79



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Project Management Division
Office of Nuclear Waste Isolation

PROJECT STATUS

- STATEMENT OF WORK PREPARED
- RFP BEING PREPARED
- SOURCE EVALUATION PANEL BEING ORGANIZED
- CONTRACT IN PLACE BY NOVEMBER 1, 1979

WEN:5/23/79



Battelle

Project Management Division
Office of Nuclear Waste Isolation

**WASTE ISOLATION PILOT PLANT
(WIPP)
ENVIRONMENTAL SURVEYS**

5/23/79

M. L. MERRITT



Sandia Laboratories

WIPP

STATUS OF NEPA AND LICENSING DOCUMENTS

DRAFT ENVIRONMENTAL IMPACT STATEMENT

**RELEASED 4/18/79
DOE/EIS-0026-D**

PRELIMINARY SAFETY ANALYSIS REPORT

**DRAFT. BEING
REVIEWED IN-HOUSE**

ENVIRONMENTAL REPORT

NOT STARTED

WIPP ENVIRONMENTAL SURVEYS

DEIS REFERENCES

	<u>SECTION</u>	<u>NUMBER OF PAGES</u>	<u>SUBJECT</u>
ARCHAEOLOGY	7.4	3	Methods, results
	I	11	Correspondence
BIOLOGY	J.1.3	2	Methods
	H.5	28	Resultant description
	H, Annex 2	42	Supporting data
METEOROLOGY	J.1.5	2	Methods
	H.4	20	Resultant description
	H, Annex 1	30	Supporting data
SOCIOECONOMICS	L	63	Input-output model
	H.2	8	Population
	H.3	34	Economic setting
	M	20	Supporting data
SURFACE WATERS	7.3.1	2	Description
AIR QUALITY	J.1.4	2	Methods
	H.4.5	3	Results
RADIATION BACKGROUND	J.1.6	8	Methods
	H.6	5	Results

WELLS-WEAVER



HILL "A"



HILL "C"



WND4

WND3

WNS8

CARLSBAD



NASH DRAW

PECOS RIVER

W11

AEC 8

WIPP
30 SO. MILES

WND1

H8

H6

P14

H2

H1

H3

P18

WND2

P15

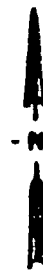
H4

P17

WNS

SALT
LAKE

MALAGA
SEEPS



OBJECTIVES

ARCHAEOLOGICAL STUDIES

- LOCATE AND DESCRIBE ARCHAEOLOGICAL SITES
- PROVIDE ARCHAEOLOGICAL CLEARANCE FOR ROADS,
DRILL PADS, AND OTHER SURFACE-DISTURBING ACTIVITIES
- RECOMMEND MITIGATING MEASURES IN CASES OF CONFLICT
BETWEEN CONSTRUCTION ACTIVITIES AND ARCHAEOLOGICAL
VALUES

OBJECTIVES

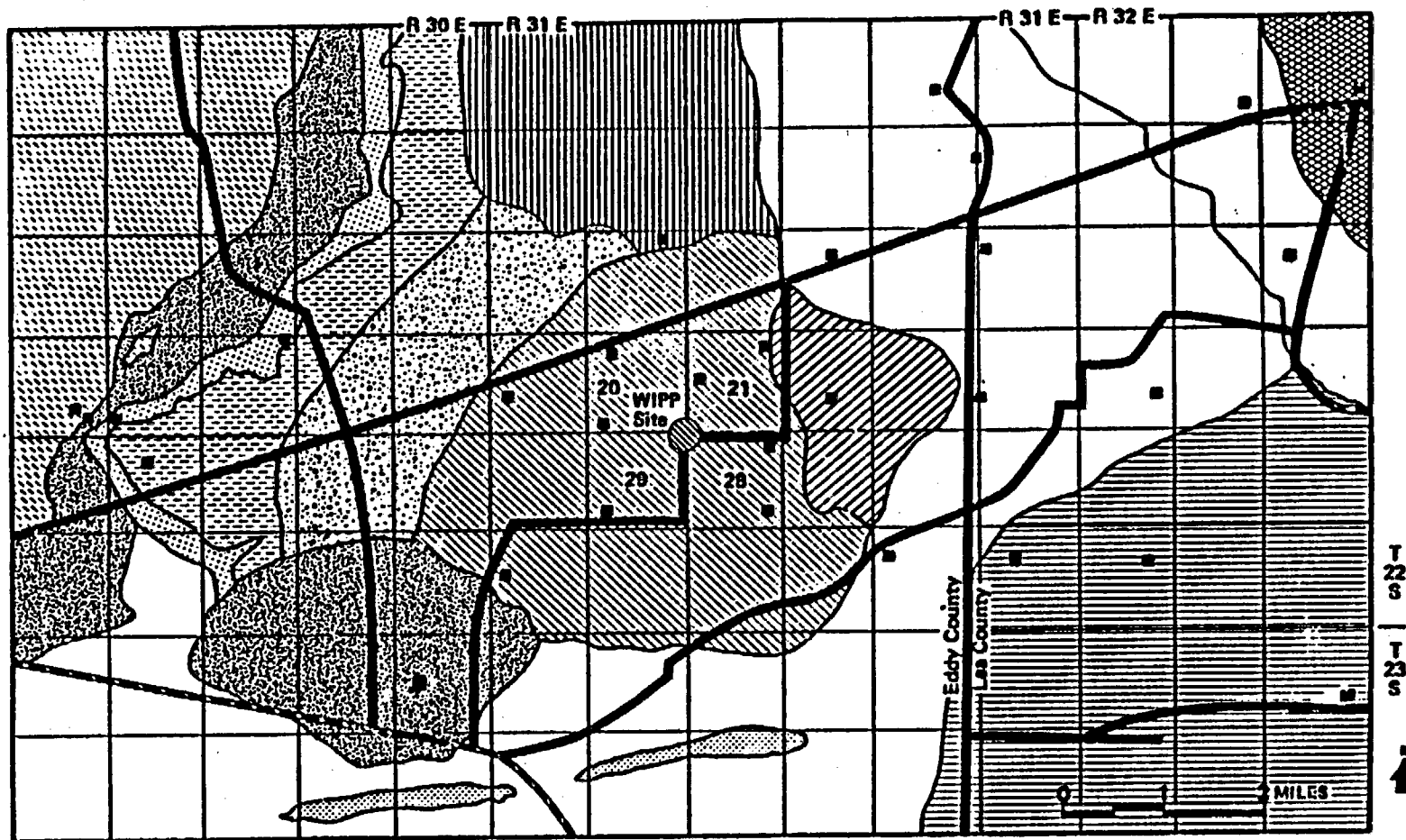
BIOLOGICAL PROGRAM

- DETERMINE BASELINE LEVELS AND TYPICAL ANNUAL VARIATIONS OF BIOMASS IN MAJOR COMPARTMENTS OF THE ECOLOGICAL SYSTEM PLANT PRODUCTIVITY IN ORDER TO
 - GUIDE OPERATIONAL MONITORING PROGRAMS
 - CREATE STANDARDS FOR EVALUATION OF OPERATIONAL IMPACTS
- DETERMINE PATTERNS OF PLANT SUCCESSION AND DO EXPERIMENTS ON THE IMPACTS OF
 - SALT PILED ON THE SURFACE
 - FENCED LAND FROM GRAZING
 - DISTURBANCE BY EARTH-MOVING MACHINERY
- ESTABLISH A BASIS FOR RADIOLOGICAL MONITORING BY
 - CREATING A SAMPLING PROTOCOL
 - NOMINATING INDICATOR ORGANISMS
- DETERMINE PRESENCE, IF ANY, OF ENDANGERED OR THREATENED ANIMALS AND PLANTS

WIPP BIOLOGY PROGRAM

PROJECTS

	PRINCIPAL INVESTIGATOR	INSTITUTION
1. FLORISTICS	W. C. MARTIN	UNM
2. SOIL-PLANT RELATIONSHIPS	G. J. JOHNSON	UNM
3. PRIMARY PRODUCTION PATTERNS	J. A. LUDWIG	NMSU
4. PLANT SUCCESSION PATTERNS	R. K. PETTIT B. E. DAHL D. K. NORTHINGTON	TEXAS TECH
5. BIOGEOCHEMISTRY	D. E. CALDWELL	UNM
6. SOIL MICROBIOLOGY	K. SUBERKROPP	NMSU
7. TERRESTRIAL INVERTEBRATES	W. G. WHITFORD	NMSU
8. ENTOMOLOGY	H. BURKE J. SHAFNER	TEXAS A&M
9. TERRESTRIAL FAUNA	A. L. GENNARO	ENMU
10. AVIFAUNA AND BATS	J. D. LIGON	UNM
11. AQUATIC ECOSYSTEMS	J. E. SUBLETTE	ENMU
12. SOIL MOISTURE AND MICROMETEOROLOGY	L. FOUNTAIN	SWRI



- A** Dominants: *Prosopis*, *Muhlenbergia*, and *Gutierrezia*. High frequency of *Trifolium*, *Yucca*, and *Sphaeralcea*. Occasional *Yucca* (rare).
- B** Dominants: *Quercus*, *Aristida*, and *Prosopis*. High frequency of *Muhlenbergia* and *Panicum*.
- C** Dominants: *Quercus*, *Artemisia*, and *Aristida*. High frequency of *Yucca*, *Sphaeralcea*, and *Gutierrezia*.
- D** Dominants: *Aristida*, *Gutierrezia*, *Prosopis*, and *Yucca*. High frequency of *Artemisia* and *Croton*.
- E** Dominants: *Prosopis*, *Gutierrezia*, *Bouteloua*, and *Opuntia*. High frequency of *Artemisia* and *Aristida*.
- F** Dominants: *Quercus*, *Sphaeralcea*, *Artemisia*, and *Muhlenbergia*. High frequency of *Festuca* and *Hesperis*.
- G** Dominants: *Artemisia*, *Prosopis*, *Muhlenbergia*, *Sphaeralcea*, *Yucca*, and *Aristida*. High frequency of *Cynhorus*, *Hesperis*, and *Panicum*.
- H** Dominants: *Larrea*, *Gutierrezia*, and *Muhlenbergia*. High frequency of *Bouteloua* and *Aristida*.
- I** Dominants: *Prosopis*, *Aristida*, and *Quercus*. Occasional *Sphaeralcea*.
- J** Dominants: *Acacia*, *Quercus*, *Prosopis*, and *Krameria*. High frequency of *Koeberlinia*, *Rhus*, *Hesperis*, and *Festuca*.
- K** Dominants: *Larrea*, *Acacia*, *Prosopis*, and *Gutierrezia*. High frequency of *Trifolium* and *Muhlenbergia*.
- L** Arid soil, Tobacco flat. Dominated by *Nitraria*, *Lepidium*, and *Grewia*.
- M** Dominants: *Prosopis*, *Sesuvium*, *Artemisia*, and *Cynhorus*.
- Paved highway
— Improved dirt road
■ Completed study plots

Figure H-13. Preliminary vegetation-type map of the WIPP reference site.

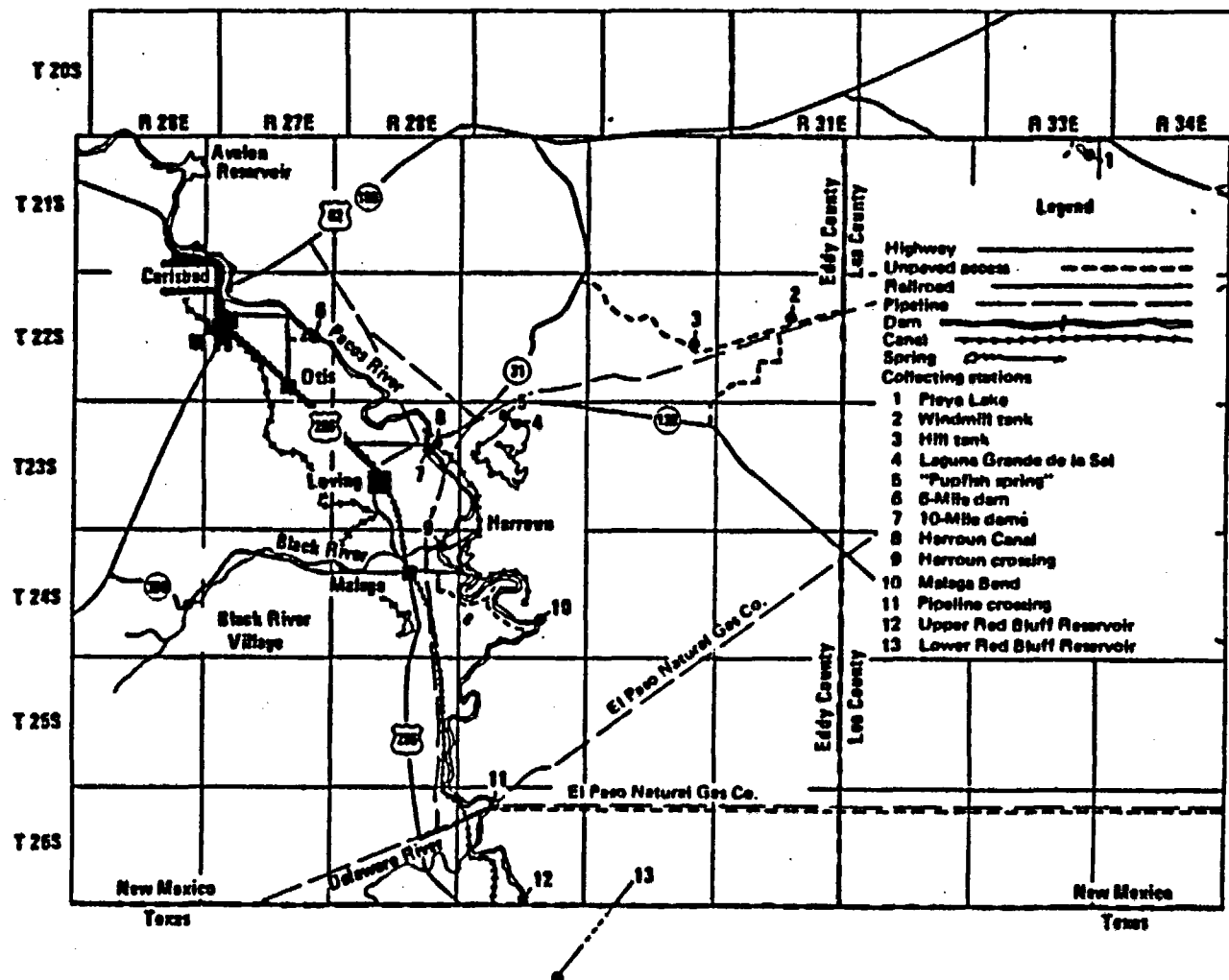


Figure H-14. Map of aquatic collecting stations.

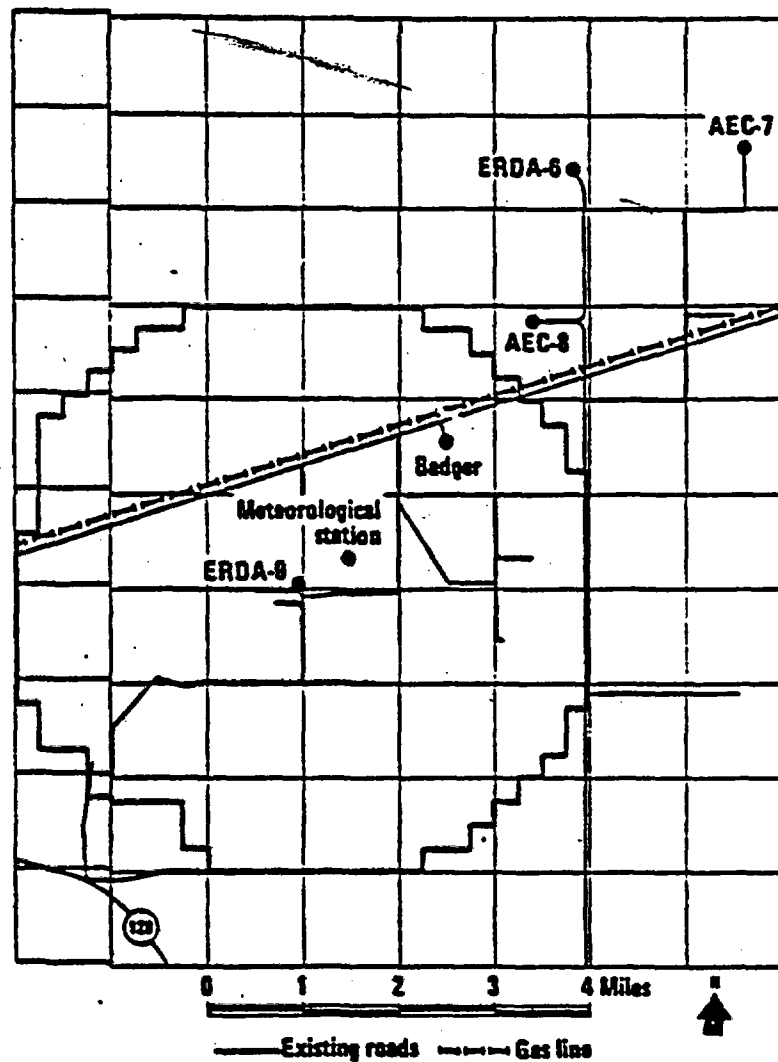


Figure H-15. Locations of thermoluminescent dosimeters in the site area. An additional thermoluminescent dosimeter will be located in Carlsbad.

WIPP METEOROLOGICAL INSTRUMENTATION

	<u>HEIGHT</u>		<u>RECORDING INTERVAL</u>
	<u>1/76-5/77</u>	<u>11/77</u>	<u>11/77</u>
WIND DIRECTION	1 m	3 m	1 hour
PRECIPITATION	1 m	1 m	1 hour
HUMIDITY	10 m	---	---
DEW POINT	---	3 m	1 hour
TEMPERATURE	---	3,10,30 m	15 sec
WIND SPEED	10 m	3,10,30 m	15 sec
WIND DIRECTION	10 m	3,10,30 m	15 sec
ΔT	---	10-3 m	15 sec
ΔT	---	30-3 m	15 sec
ΔT	---	30-10 m	15 sec

OBJECTIVES

RADIOLOGICAL STUDIES

- DETERMINE BASELINE LEVELS AND NATURE OF VARIATIONS THEREFROM OF RADIOLOGICAL BACKGROUND AT THE WIPP SITE

AIR QUALITY STUDIES

- DETERMINE BASELINE LEVELS AND TYPICAL VARIATIONS THEREFROM OF AIR POLLUTANTS AT THE WIPP SITE

OBJECTIVES

SOCIOECONOMIC AND DEMOGRAPHIC STUDIES

- DETERMINE BASELINE LEVELS AND TRENDS OF:
 - POPULATION DISTRIBUTION
 - LOCAL ECONOMIC INTERRELATIONSHIPS
 - COMMUNITY SERVICES
- PREDICT FUTURE POPULATIONS AND ECONOMIC FACTORS:
 - WITHOUT THE WIPP
 - WITH THE WIPP

WIPP
SOCIOECONOMIC ANALYSIS

INPUT-OUTPUT TABLE IS A 51 X 51 MATRIX, CONSISTING OF:

37 PRIVATE BUSINESS SUBSECTORS

6 AGRICULTURAL PRODUCTION

5 MINERAL PRODUCTS

4 CONSTRUCTION

12 SMALL INDUSTRIES

4 UTILITIES

6 TRADE AND SERVICES

12 WIPP-RELATED SUBSECTORS

4 CONSTRUCTION ABOVE-GROUND

1 NON-CONSTRUCTION EMPLOYMENT

4 CONSTRUCTION, BELOW-GROUND

1 OPERATION ABOVE-GROUND

1 OPERATION STORAGE

1 OPERATION BELOW-GROUND

**2 SUBSECTORS FOR LABOR COMPENSATION AND
PERSONAL CONSUMPTION**

Table L-2 (Continued)

INPUT-OUTPUT TABLES, LEA AND EDDY COUNTIES, NOVEMBER 1978
DIRECT, INDIRECT, AND COEFFICIENTS

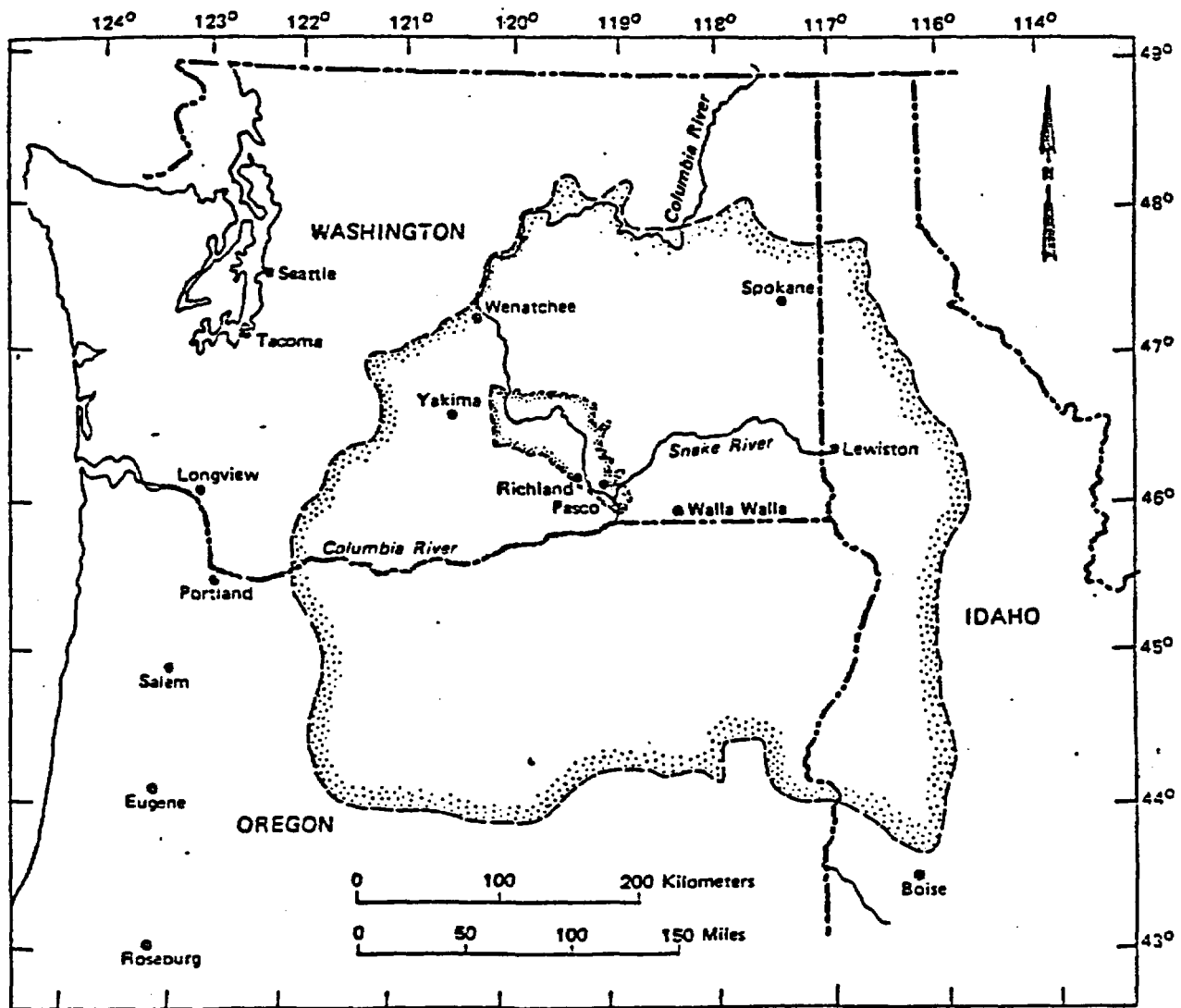
		33	34	INDUSTRY PURCHASING 35	36	37	38	39	40		
	LIVESTK & LIVESTK PROD	1	0.00266	0.00128	0.00454	0.00207	0.00339	0.00112	0.00228	0.00222	1
	COTTON	2	0.00125	0.00110	0.00114	0.00095	0.00157	0.00053	0.00108	0.00105	2
	GRAINS AND SEEDS	3	0.00154	0.00243	0.00555	0.00125	0.00199	0.00071	0.00116	0.00111	3
	FRUITS AND VEGETABLES	4	0.00053	0.00055	0.00047	0.00041	0.00068	0.00022	0.00046	0.00045	4
	FORESTRY/FISHERY PRODS	5	0.00059	0.00060	0.00054	0.00046	0.00074	0.00024	0.00051	0.00050	5
	AGRICULTURAL SERVICES	6	0.00045	0.00077	0.00070	0.00037	0.00059	0.00058	0.00077	0.00076	6
	MISC NET & NON-NET MIN	7	0.00000	0.00001	0.00001	0.00000	0.00001	0.00000	0.00000	0.00000	7
	CRUDE PETROLEUM	8	0.01057	0.01000	0.01144	0.00863	0.01445	0.00380	0.00712	0.00696	8
	NATURAL GAS & LIQ. PET	9	0.00374	0.00388	0.00348	0.00299	0.00473	0.00113	0.00220	0.00215	9
	STONE, GRAVEL AND SAND	10	0.00007	0.00023	0.00013	0.00008	0.00014	0.00053	0.00054	0.00054	10
	POTASH MINING	11	0.00001	0.00002	0.00002	0.00002	0.00002	0.00001	0.00001	0.00001	11
	RESIDENTIAL CONST.	12	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	12
	NONRESIDENTIAL CONST	13	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	13
	ALL OTHER CONST.	14	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	14
	CONST. MAINTENANCE	15	0.00786	0.02422	0.01288	0.00960	0.01648	0.00200	0.00340	0.00331	15
I	FOOD PRODUCTS	16	0.01158	0.01140	0.00994	0.00883	0.01447	0.00490	0.01000	0.00976	16
M	FABRICS AND APPAREL	17	0.00024	0.00031	0.00189	0.00018	0.00048	0.00015	0.00021	0.00021	17
D	PAPER PRODUCTS	18	0.00007	0.00015	0.00022	0.00016	0.00012	0.00005	0.00007	0.00007	18
M	PRINTING	19	0.00280	0.00555	0.00215	0.00238	0.00600	0.00097	0.00194	0.00190	19
S	CHEMICAL PRODUCTS	20	0.00082	0.00099	0.00108	0.00161	0.00123	0.00040	0.00068	0.00067	20
T	PLASTIC & PETROLEUM	21	0.02210	0.02079	0.02409	0.01805	0.03032	0.00801	0.01499	0.01465	21
B	GLASS AND STONE PRODS.	22	0.00007	0.00013	0.00013	0.00008	0.00010	0.00044	0.00049	0.00049	22
T	PRIMARY METAL PRODS.	23	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	23
	FABRICATED METAL PRODS	24	0.00001	0.00002	0.00001	0.00002	0.00001	0.00136	0.00137	0.00137	24
	MACHINERY	25	0.00066	0.00085	0.00464	0.00308	0.00085	0.00046	0.00070	0.00069	25
	ELECTRICAL PRODS.	26	0.00002	0.00003	0.00012	0.00012	0.00008	0.00012	0.00002	0.00002	26
S	TRANSPORT & WAREHOUSING	27	0.01697	0.01988	0.01958	0.02126	0.02344	0.01204	0.01827	0.01797	27
E	COMMUNICATIONS	28	0.01659	0.02812	0.01693	0.02477	0.02786	0.00964	0.01404	0.01381	28
L	ELECTRICAL UTILITY	29	0.02994	0.02596	0.02681	0.01448	0.03024	0.00787	0.01358	0.01325	29
L	GAS UTILITY	30	0.01689	0.01522	0.01500	0.01338	0.02084	0.00473	0.00447	0.00425	30
I	WATER AND SEWER	31	0.00552	0.00754	0.00653	0.00394	0.01076	0.00145	0.00278	0.00272	31
M	WHOLESALE TRADE	32	0.03969	0.04197	0.05541	0.04123	0.06435	0.08139	0.09602	0.09532	32
G	RETAIL TRADE	33	1.10809	0.11469	0.10652	0.09863	0.14907	0.04383	0.08996	0.08776	33
	F. I. & R.E.	34	0.08229	1.14177	0.08495	0.07573	0.12601	0.02985	0.04792	0.04702	34
	PERSONAL & REPAIR SER.	35	0.04767	0.04591	1.07586	0.04912	0.07151	0.01989	0.03702	0.03620	35
	BUSINESS & MISC. SERV.	36	0.02216	0.07456	0.02638	1.07035	0.04471	0.00722	0.01198	0.01176	36
	MEDICAL & NON-PROFIT	37	0.00796	0.01451	0.00829	0.00798	1.01249	0.00304	0.00608	0.00594	37
	WIPP A/G CONST 1981	38	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	0.00000	38
	WIPP A/G CONST 1982	39	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	0.00000	39
	WIPP A/G CONST 1983	40	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	40
	WIPP A/G CONST 1984	41	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	41
	WIPP NON-CONST EMP	42	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	42
	WIPP B/G CONST 1981	43	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	43
	WIPP B/G CONST 1982	44	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	44
	WIPP B/G CONST 1983	45	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	45
	WIPP B/G CONST 1984	46	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	46
	WIPP OPER A/G	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
	WIPP OPER STORAGE	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
	WIPP OPER B/G	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
	HOUSEHOLDS/PC WEEKLY	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	50
	HOUSEHOLDS/PC LOCAL	51	0.57555	0.56726	0.49495	0.44321	0.70987	0.23050	0.47999	0.46809	51
*** COLUMN SUMS ***			2.03696	2.18489	2.02238	1.92543	2.39839	1.50825	1.94089	1.92026	

SITE IDENTIFICATION STUDY
ENVIRONMENTAL SCREENING GUIDELINES

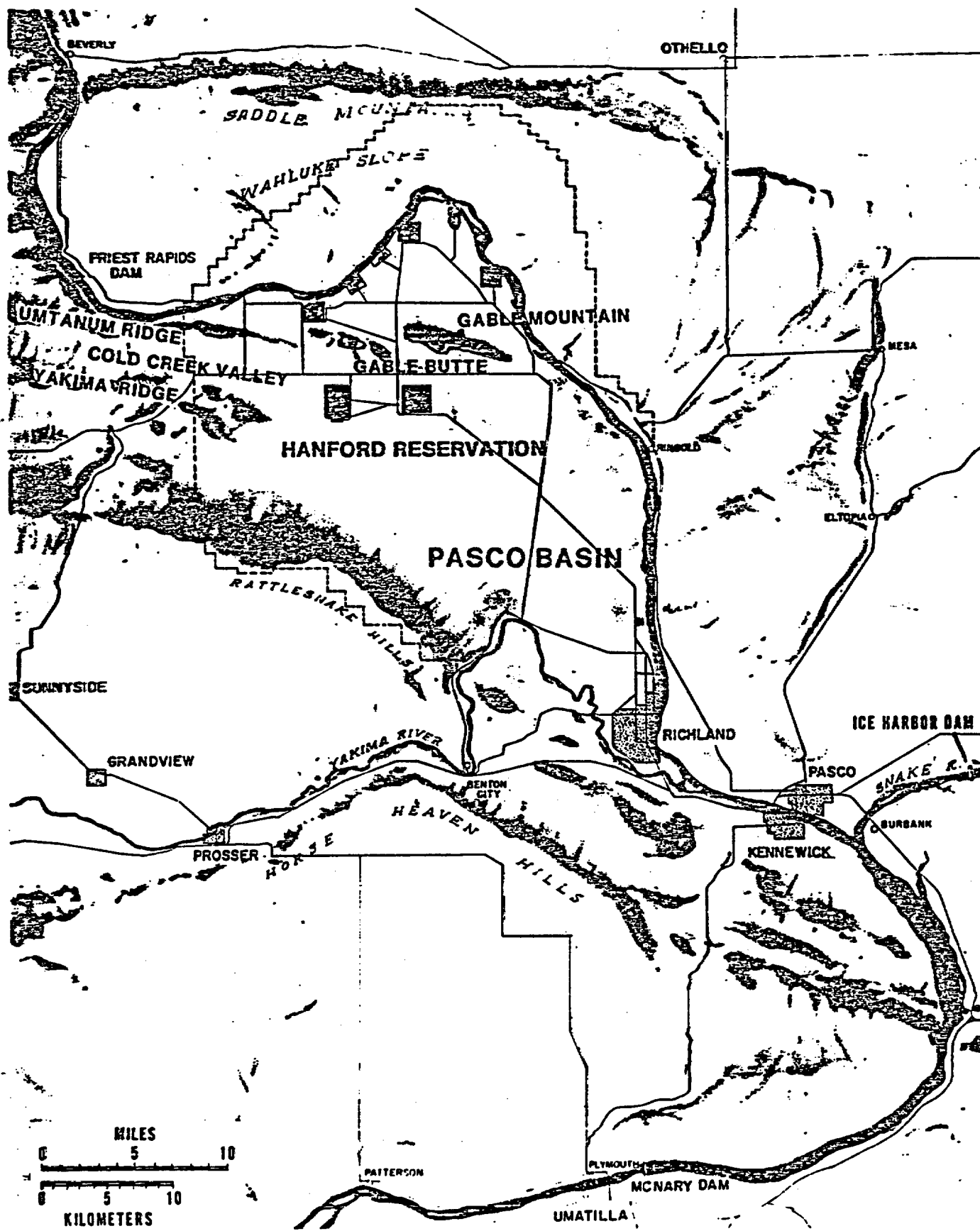
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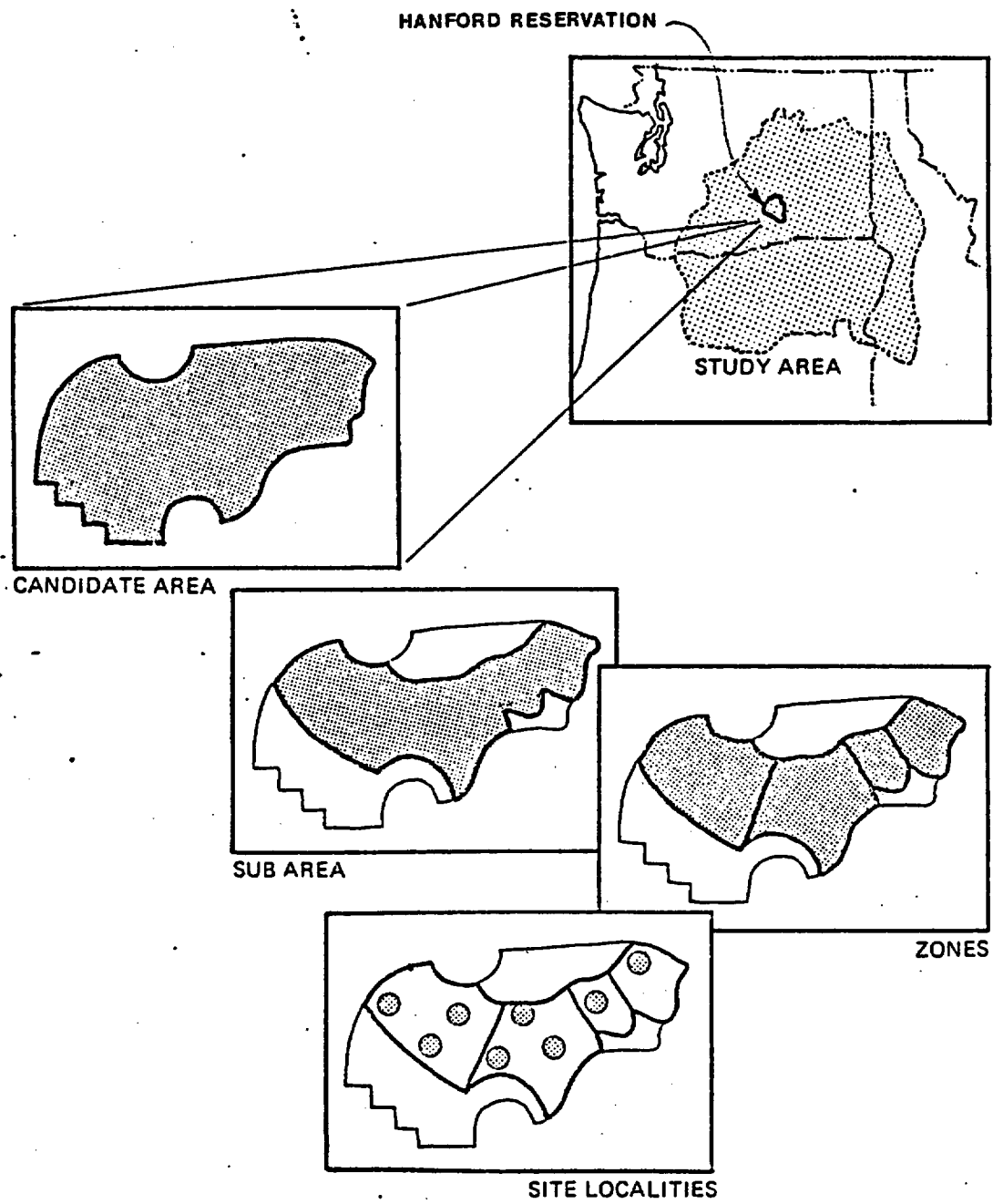
DALE ST. LAURENT
BASALT WASTE ISOLATION PROGRAM

MAY 23, 1979

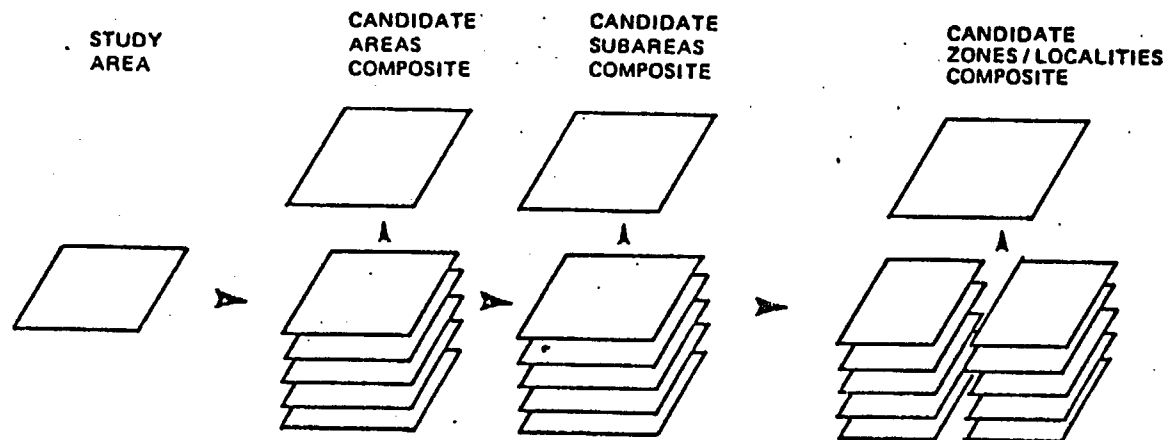


COLUMBIA PLATEAU





RELATIONSHIP OF CANDIDATE DESIGNATIONS



STUDY AREA

**SELECTION OF
CANDIDATE
AREAS**

Example Guideline

- Rock Properties

**SELECTION OF
CANDIDATE
SUBAREAS**

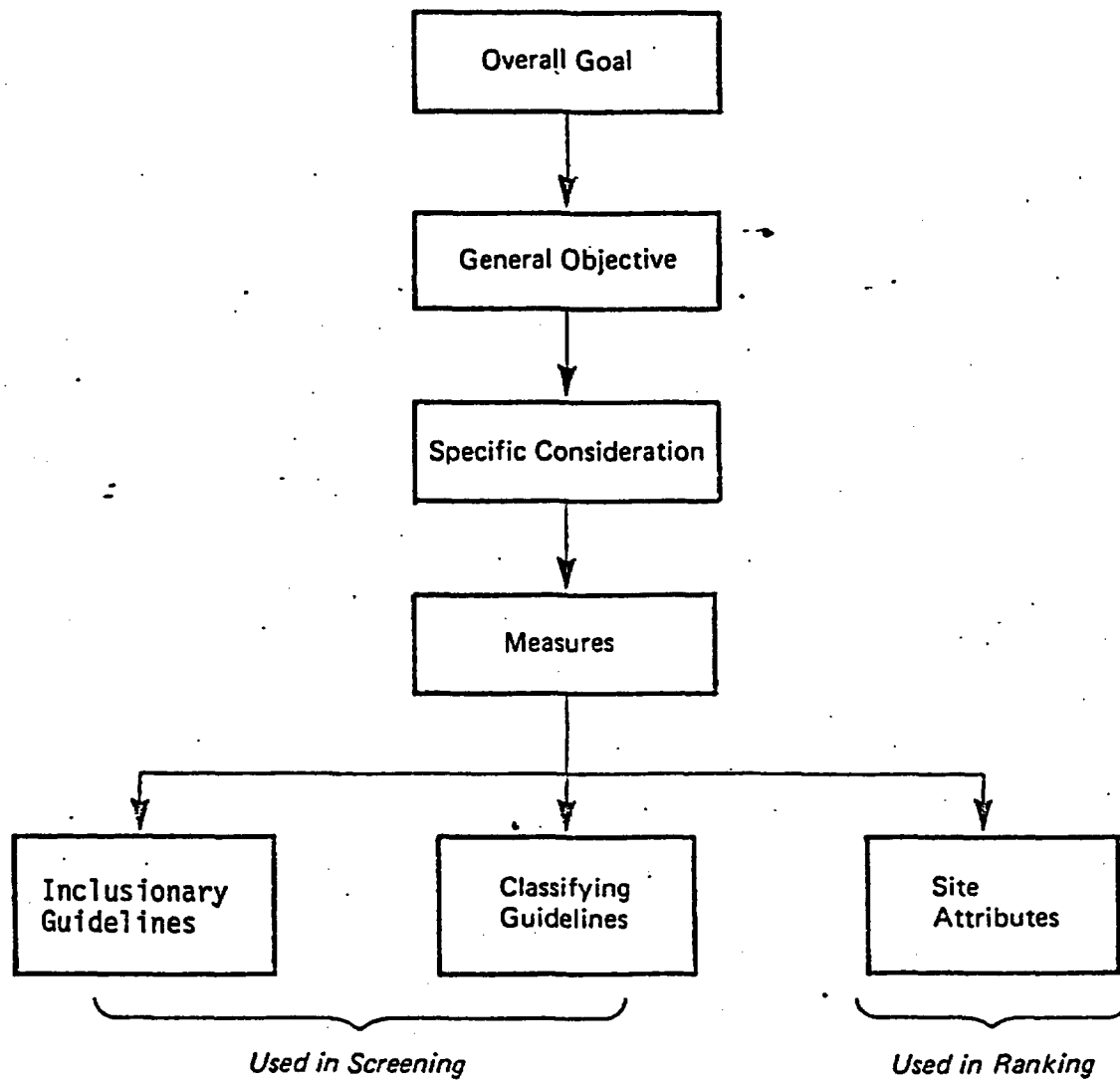
Example Guideline

- Rock Dip
- Ground Water Characteristics

**SELECTION OF
CANDIDATE
ZONES / LOCALITIES**

Example Guideline

- Subdivision by Natural and Man-made Features
- Ground Water Characteristics
- Seismicity



RELATIONSHIPS OF TERMS USED
IN SCREENING AND RANKING

SITE IDENTIFICATION APPROACH

