

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. Lawrence 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**

WMI:5/23/79



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

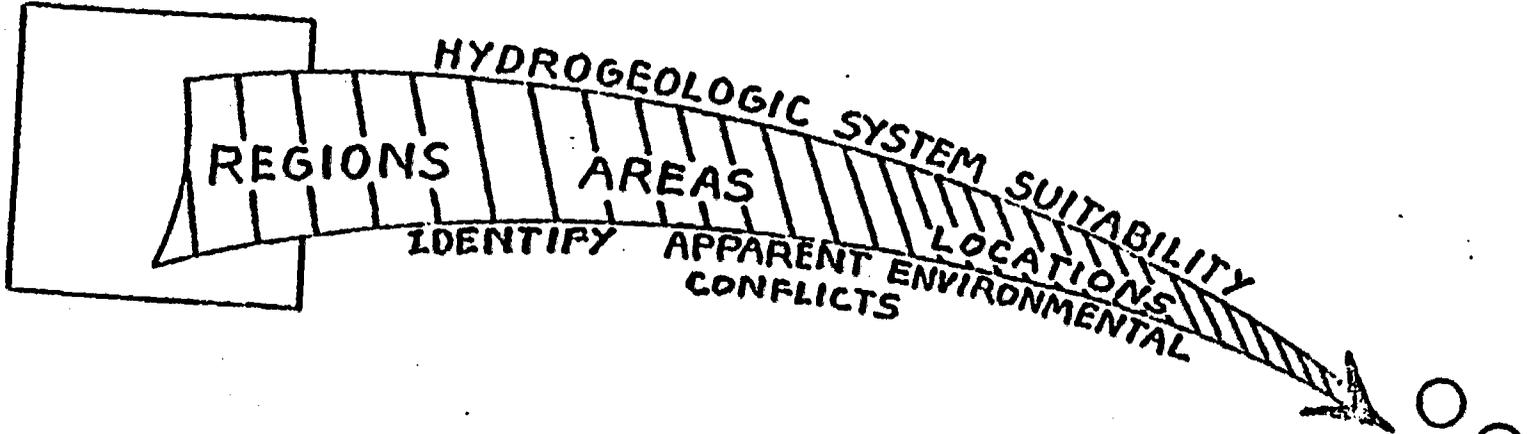
- ENVIRONMENTAL CHARACTERIZATION REPORTS - WINNOWING
 - REGIONAL
 - AREAS
 - LOCATIONS
- SITE QUALIFICATION REPORTS - ACCEPTABILITY
 - SHOULD MEET PARAGRAPH 60.11
- ENVIRONMENTAL IMPACT STATEMENTS - SELECTION
- ENVIRONMENTAL REPORTS - LICENSING

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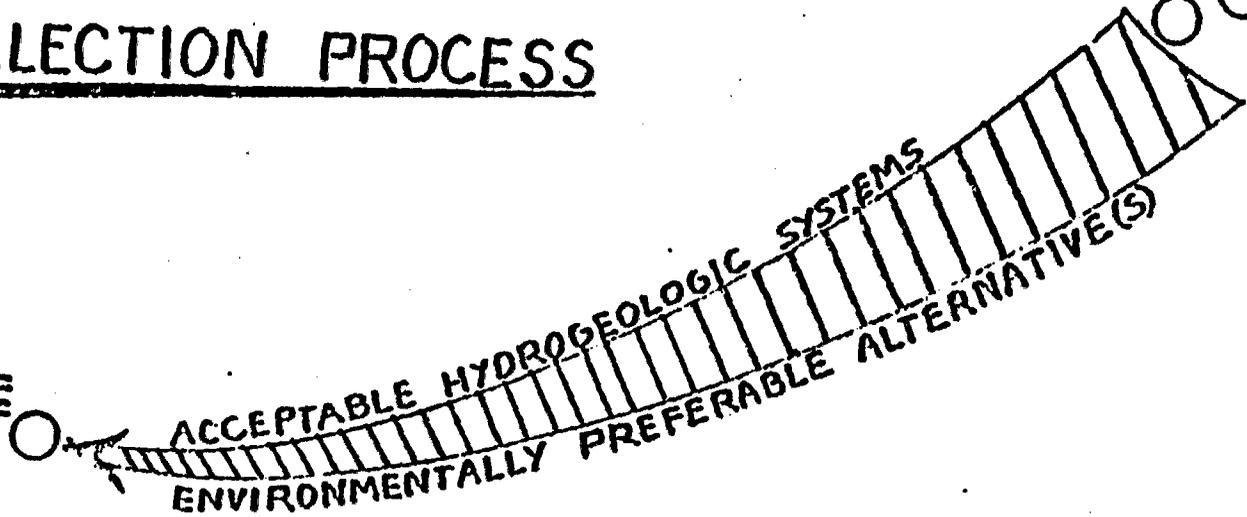
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SITE SELECTION PROCESS

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

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- 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

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2.1.1.1 PHYSIOGRAPHY AND TOPOGRAPHY

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2.1.1.3 STRATIGRAPHY

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2.1.3.6 DISPERSION CONDITIONS

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**PLAN FOR THE PREPARATION OF
ENVIRONMENTAL REPORTS**

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- 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
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- 8.0 SUMMARY COST/BENEFIT ANALYSIS
- 9.0 ENVIRONMENTAL APPROVALS AND CONSULTATION
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- 11.0 GLOSSARY, ABBREVIATIONS, AND ACRONYMS

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 - 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**

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 - 2.2 GEOSPHERE**
 - 2.3 HYDROSPHERE**
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 - 2.5 HUMAN ENVIRONMENT**
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(Continued)**

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- 4.2 FACILITY OPERATION**
- 4.3 DECOMMISSIONING**
- 4.4 TRANSPORTATION**
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(Continued)**

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 - 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

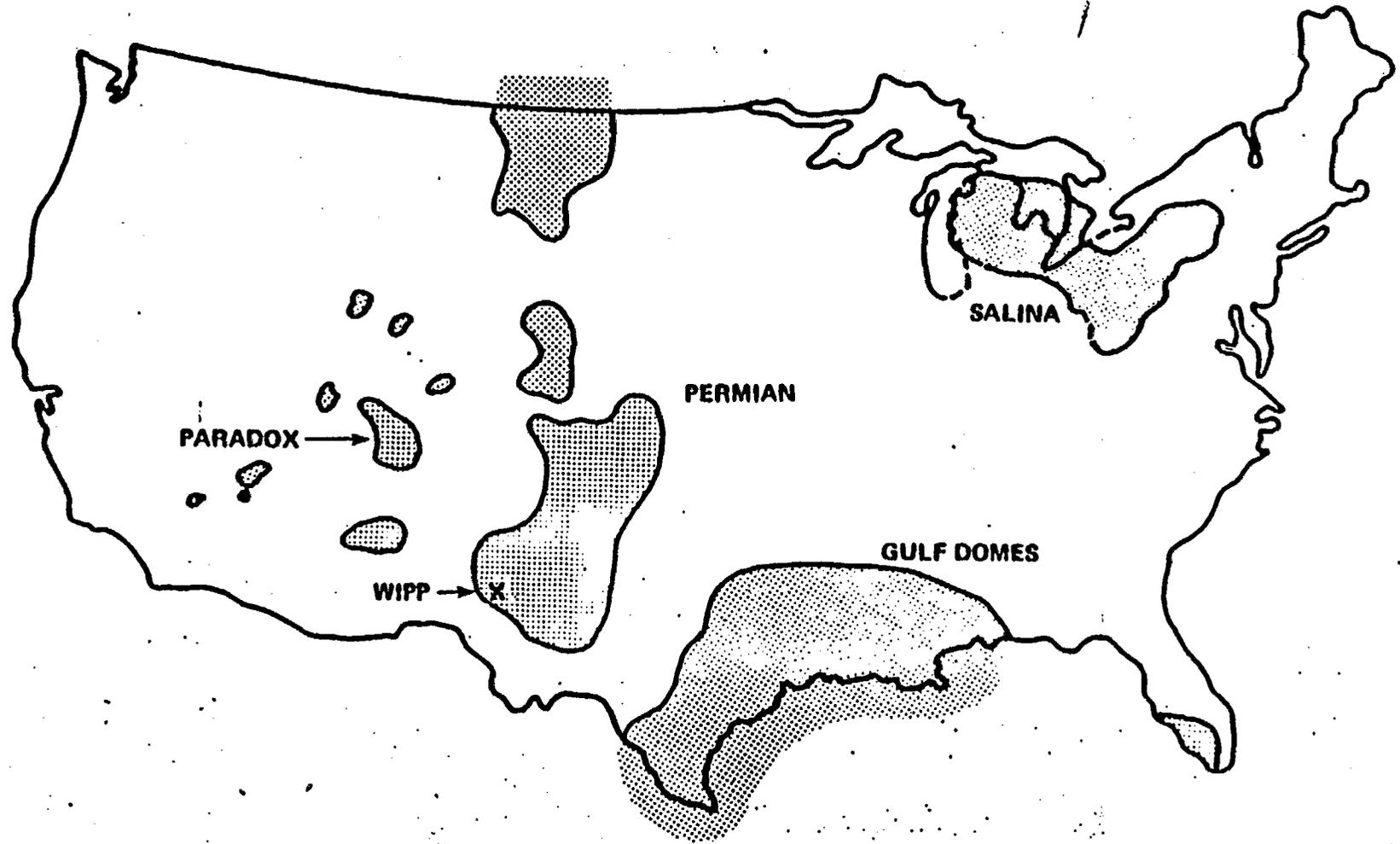
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SALT FORMATIONS OF THE UNITED STATES



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

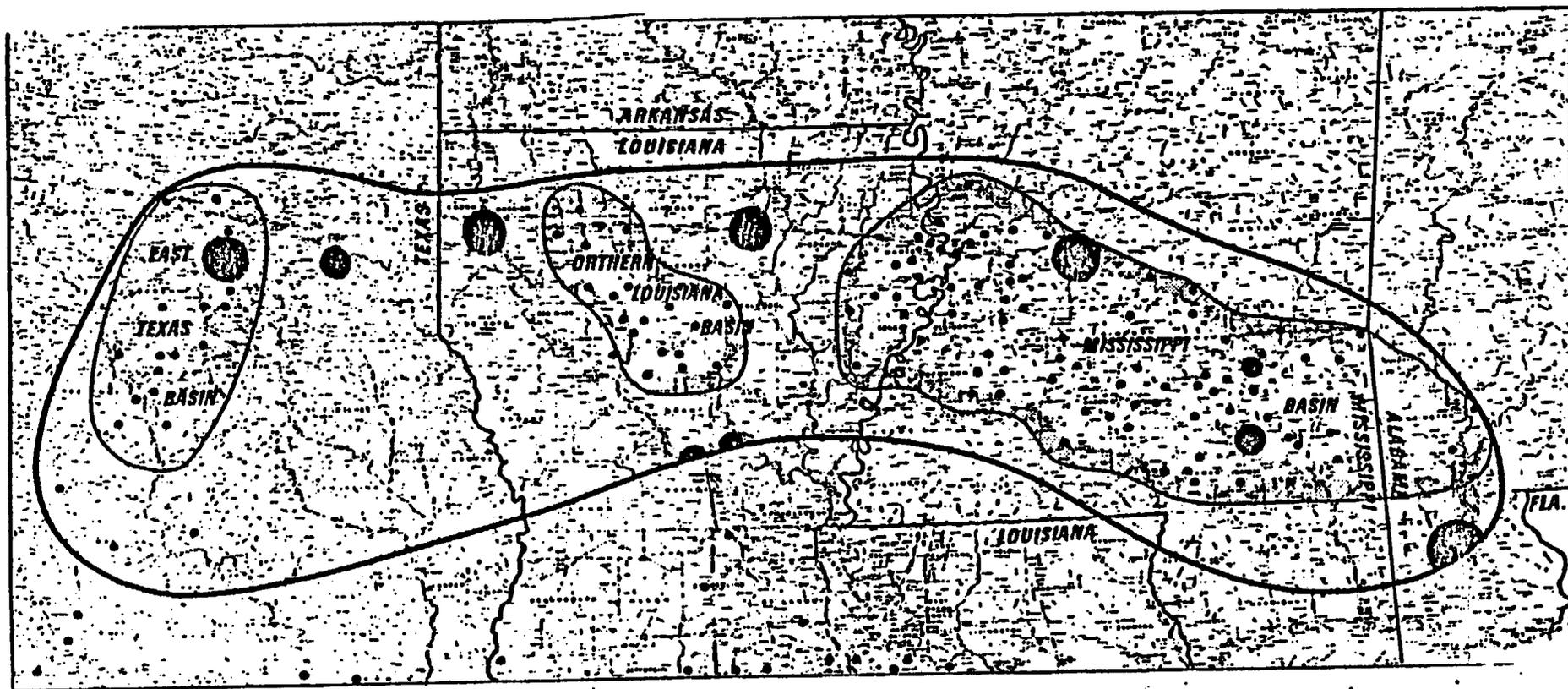
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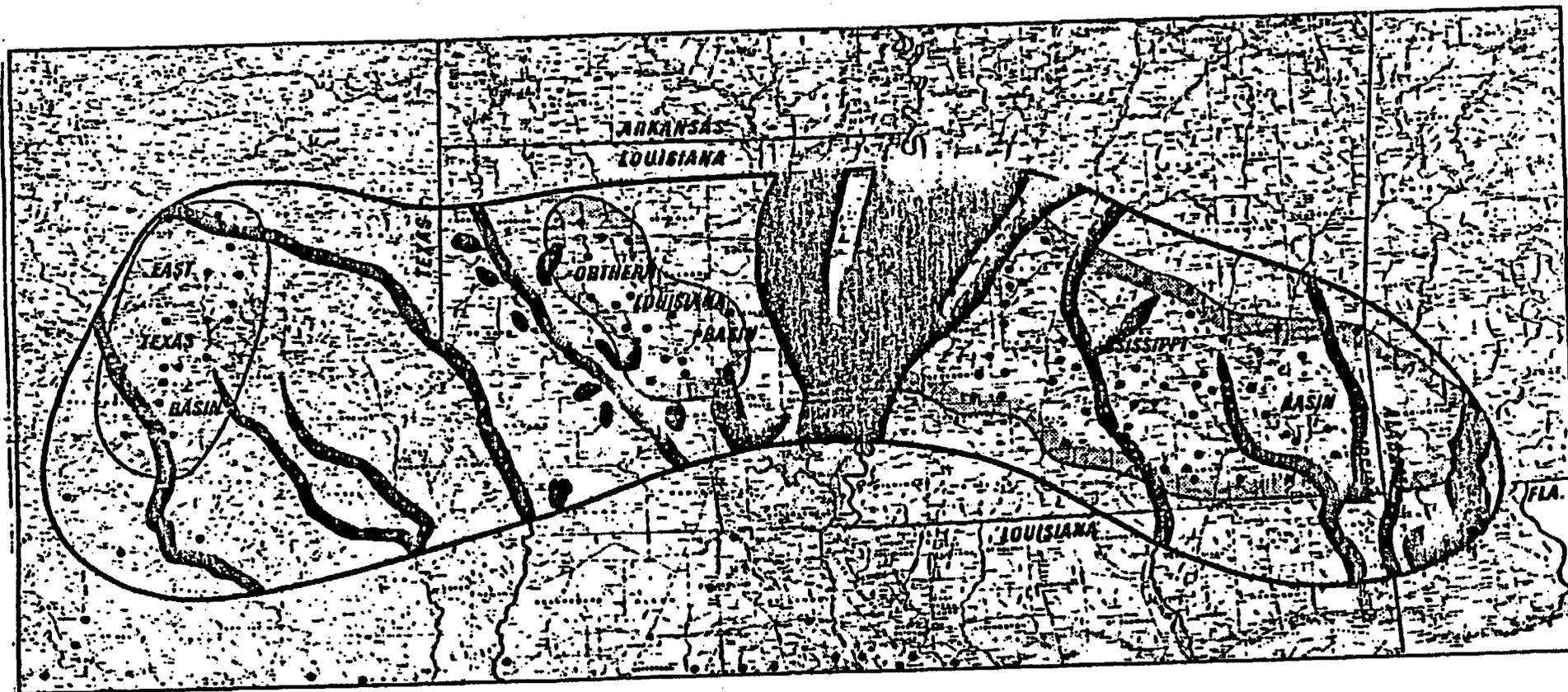
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AIRPORTS AND URBAN AREAS



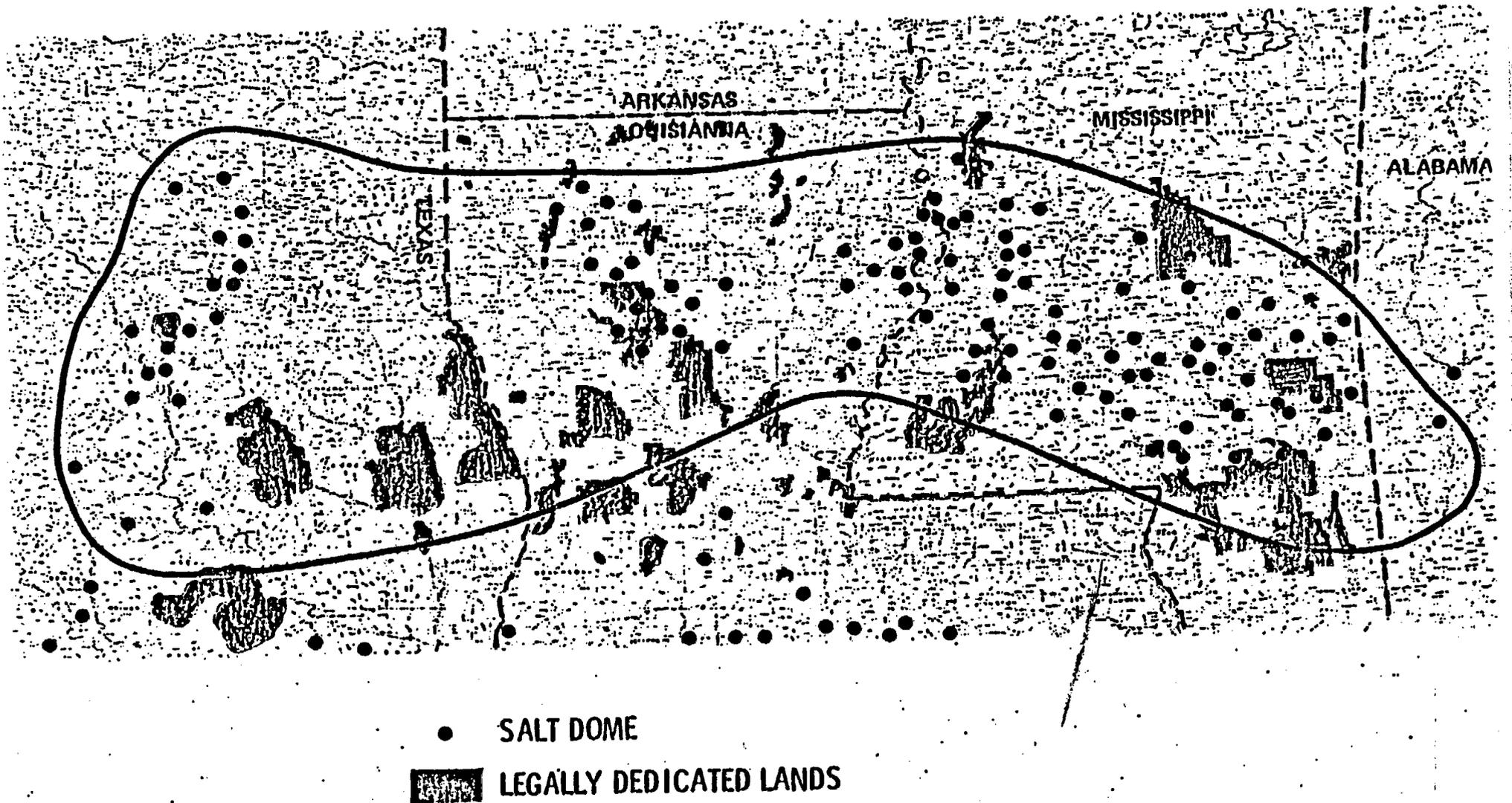
GULF INTERIOR REGION

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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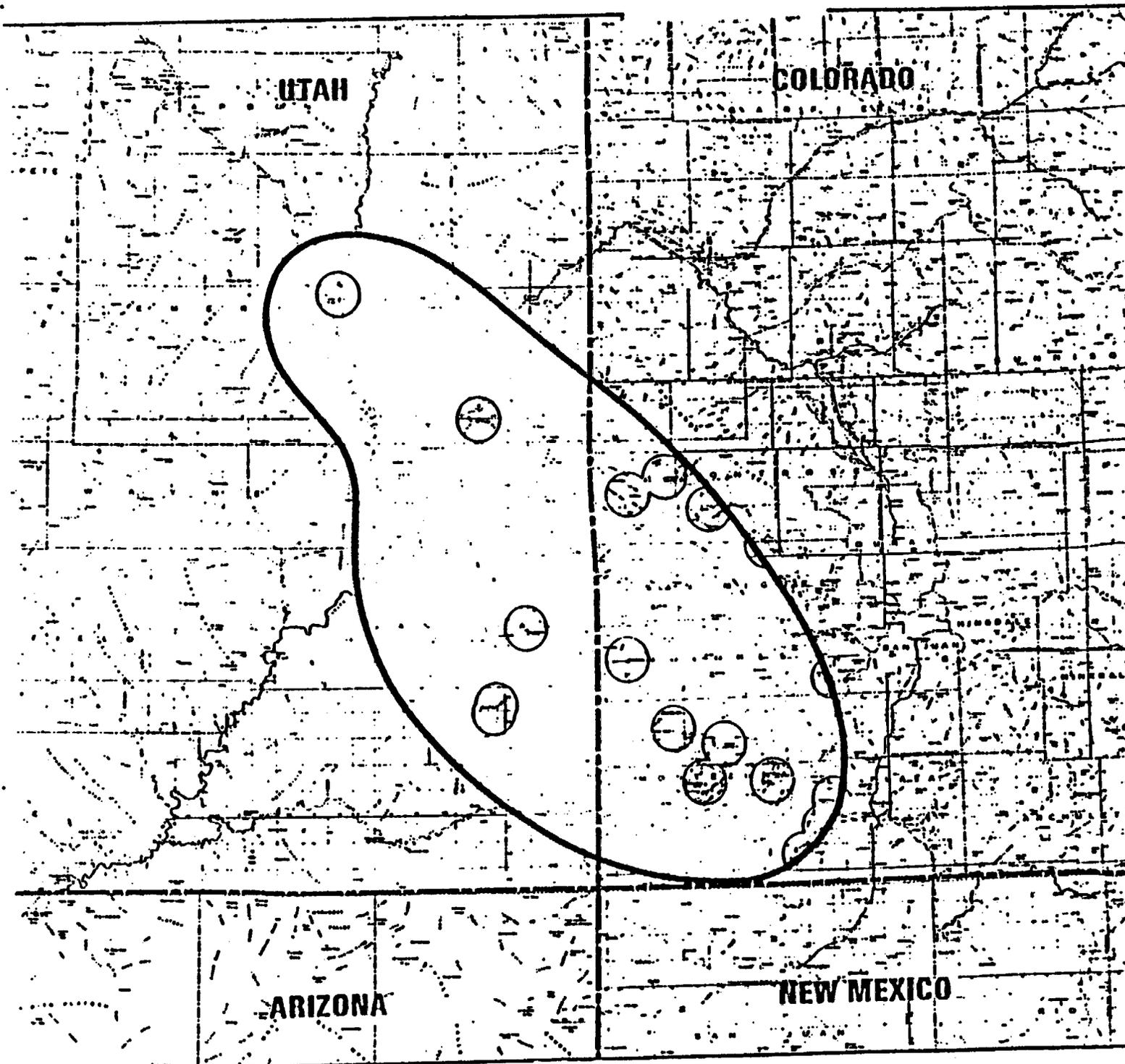
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PARADOX REGION
ENVIRONMENTAL CHARACTERIZATION

- 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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UTAH

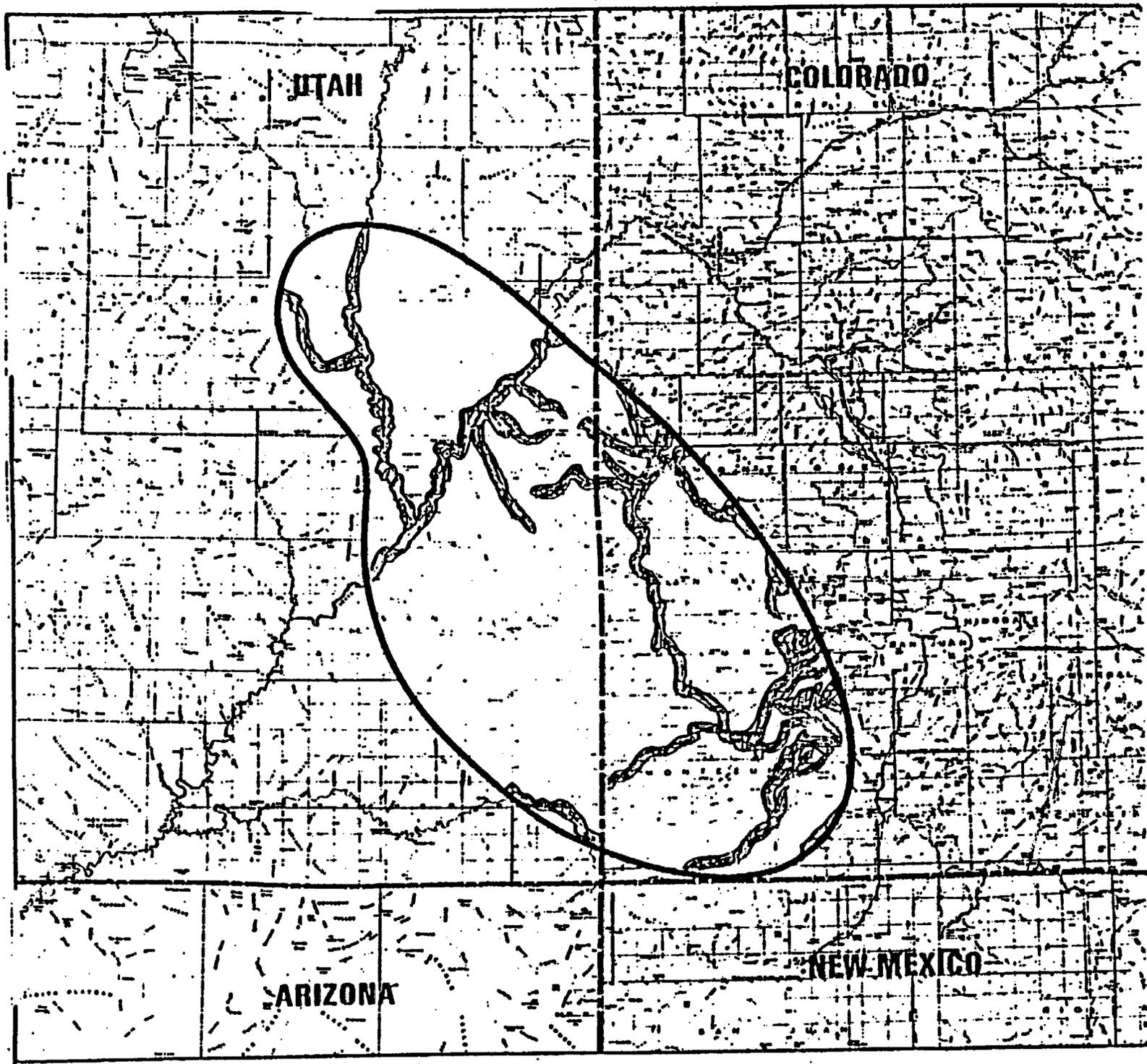
COLORADO

ARIZONA

NEW MEXICO

AIRPORTS & URBAN AREAS

PARADOX
REGION



UTAH

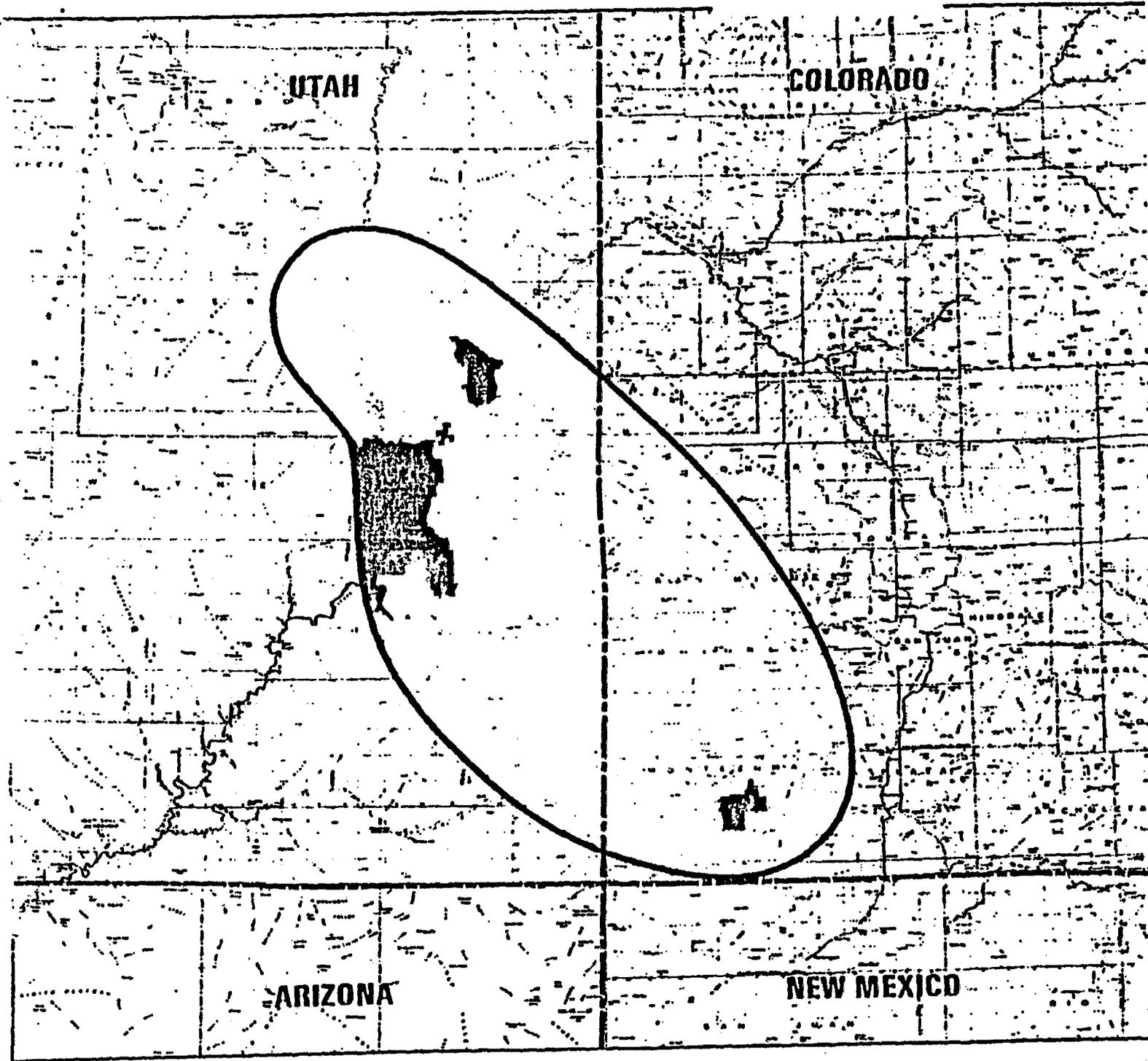
COLORADO

ARIZONA

NEW MEXICO

RIVERS & RESERVOIRS

PARADOX
REGION



UTAH

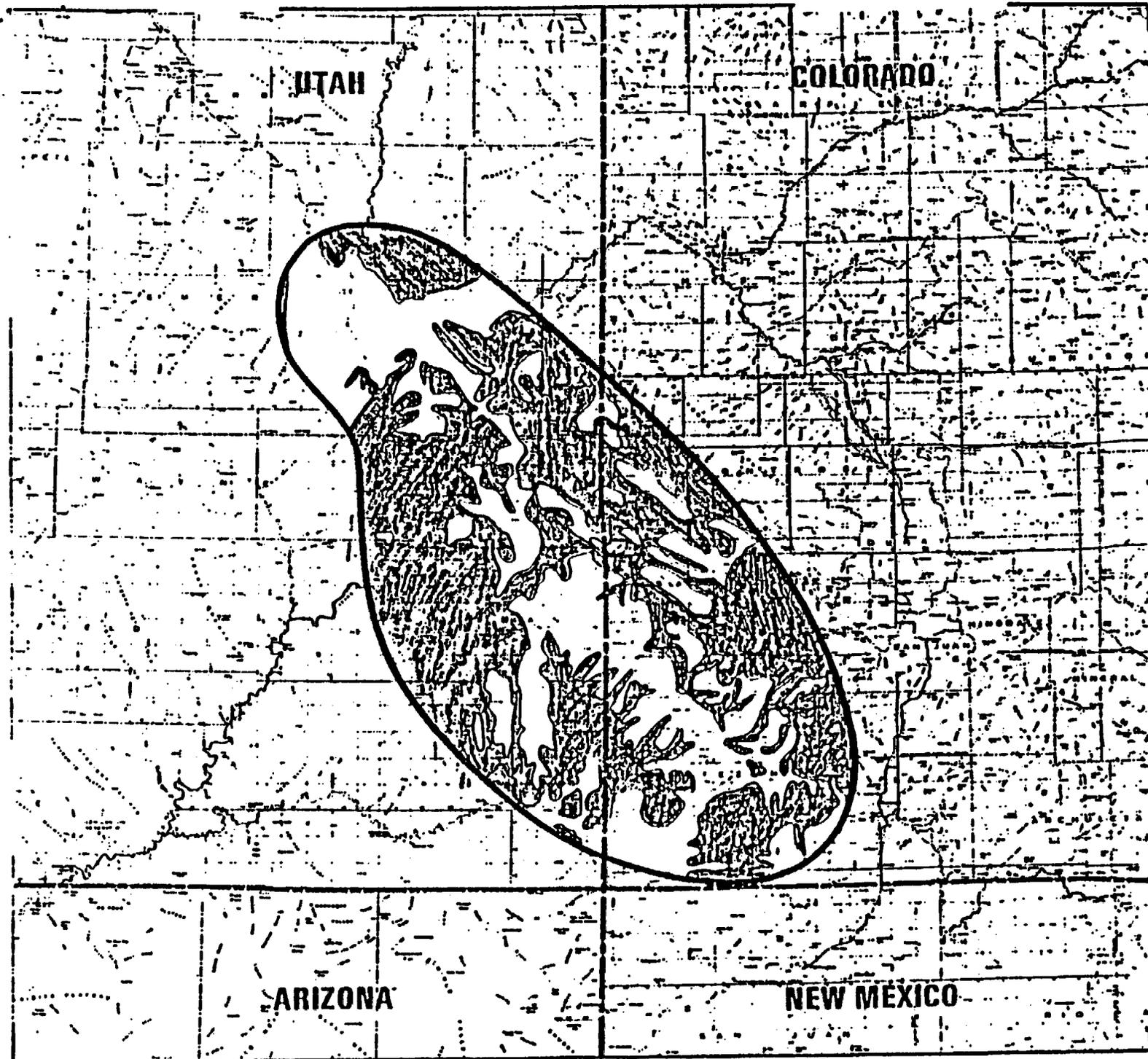
COLORADO

ARIZONA

NEW MEXICO

NATIONAL PARKS
WILDERNESS AREAS
STATE PARK

PARADOX
REGION



UTAH

COLORADO

ARIZONA

NEW MEXICO

SLOPE > 500'/MI

PARADOX
REGION

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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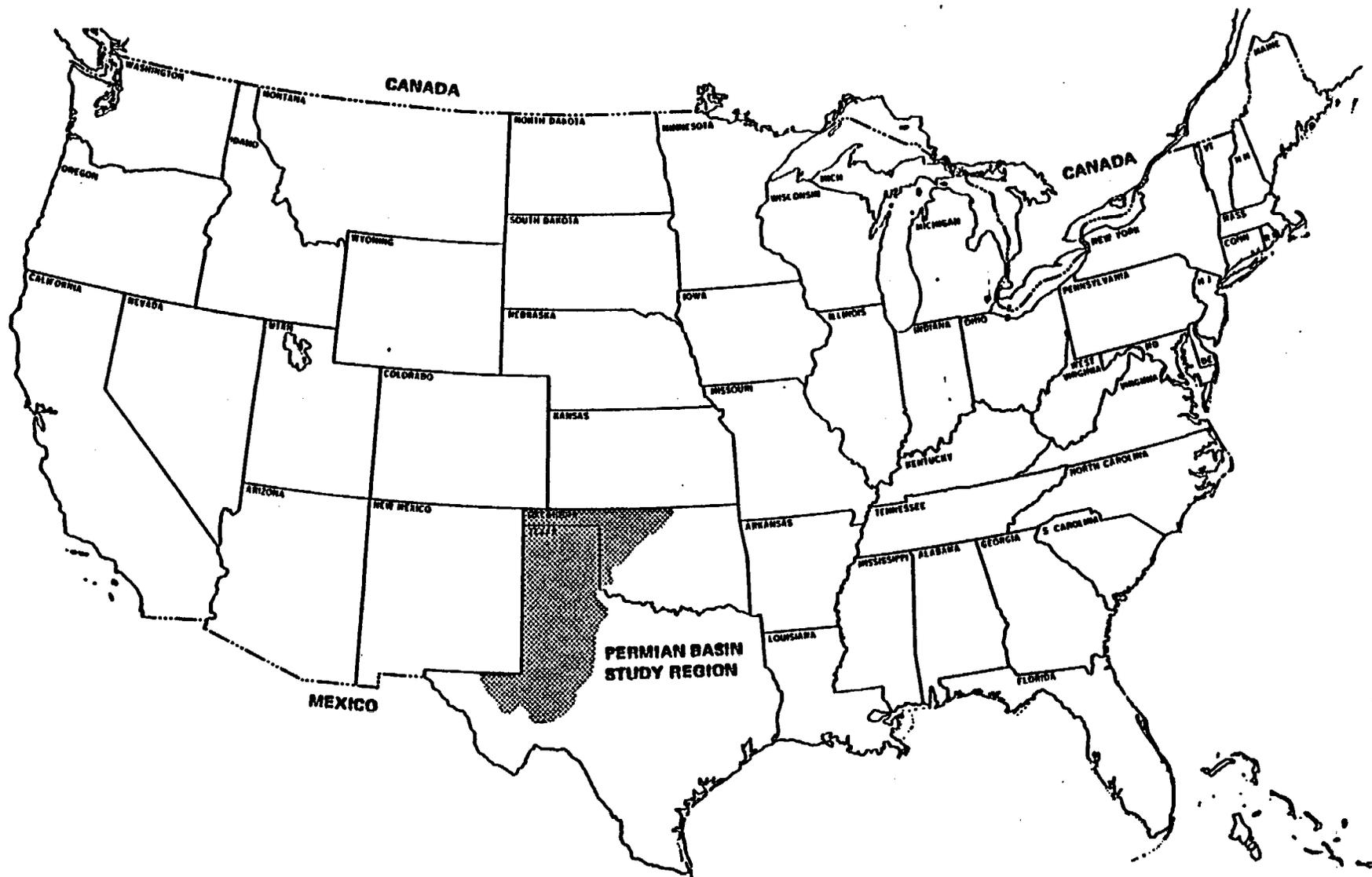
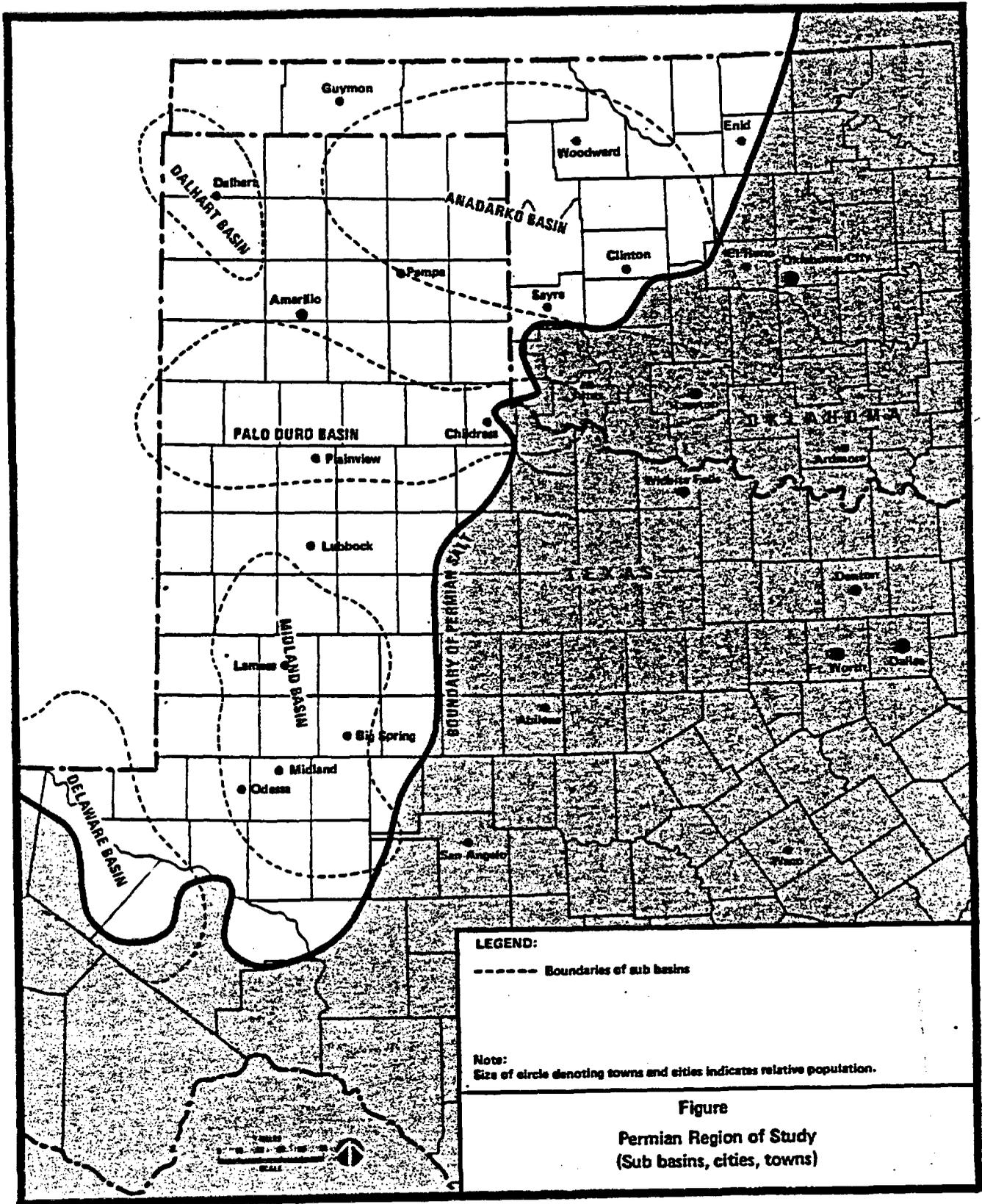


Figure
Regional Location



Guymon

Woodward

Enid

DALHART BASIN
 Dalhart

ANADARKO BASIN

Clinton

Wichita

Oklahoma City

Amarillo

Pampa

Sayre

PALO DURO BASIN

Childress

Plainview

Lubbock

MIDLAND BASIN
 Midland

Lamesa

Big Spring

Midland

Odessa

DELAWARE BASIN

BOUNDARY OF PERMIAN CITY

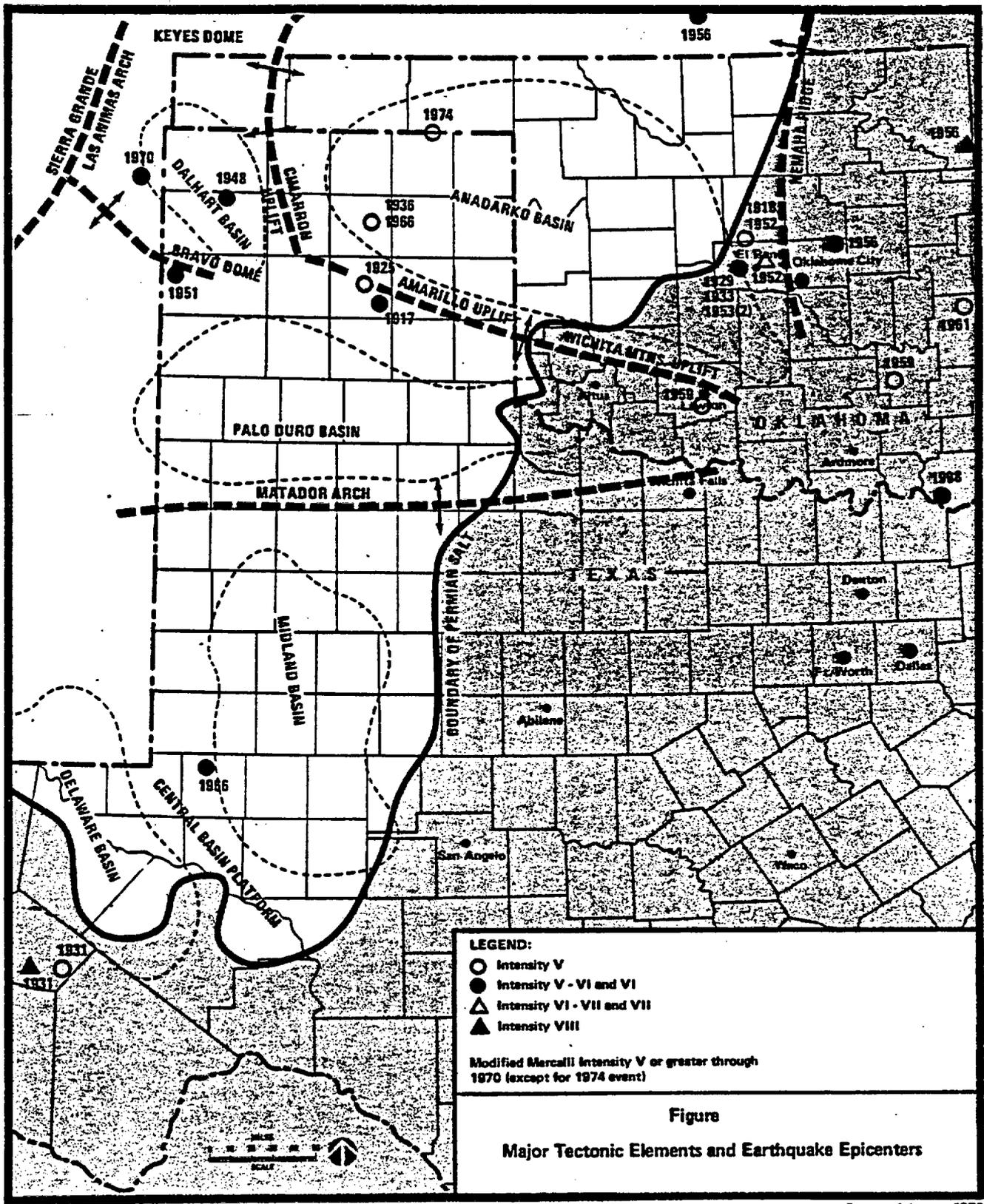
LEGEND:

- - - - - Boundaries of sub basins

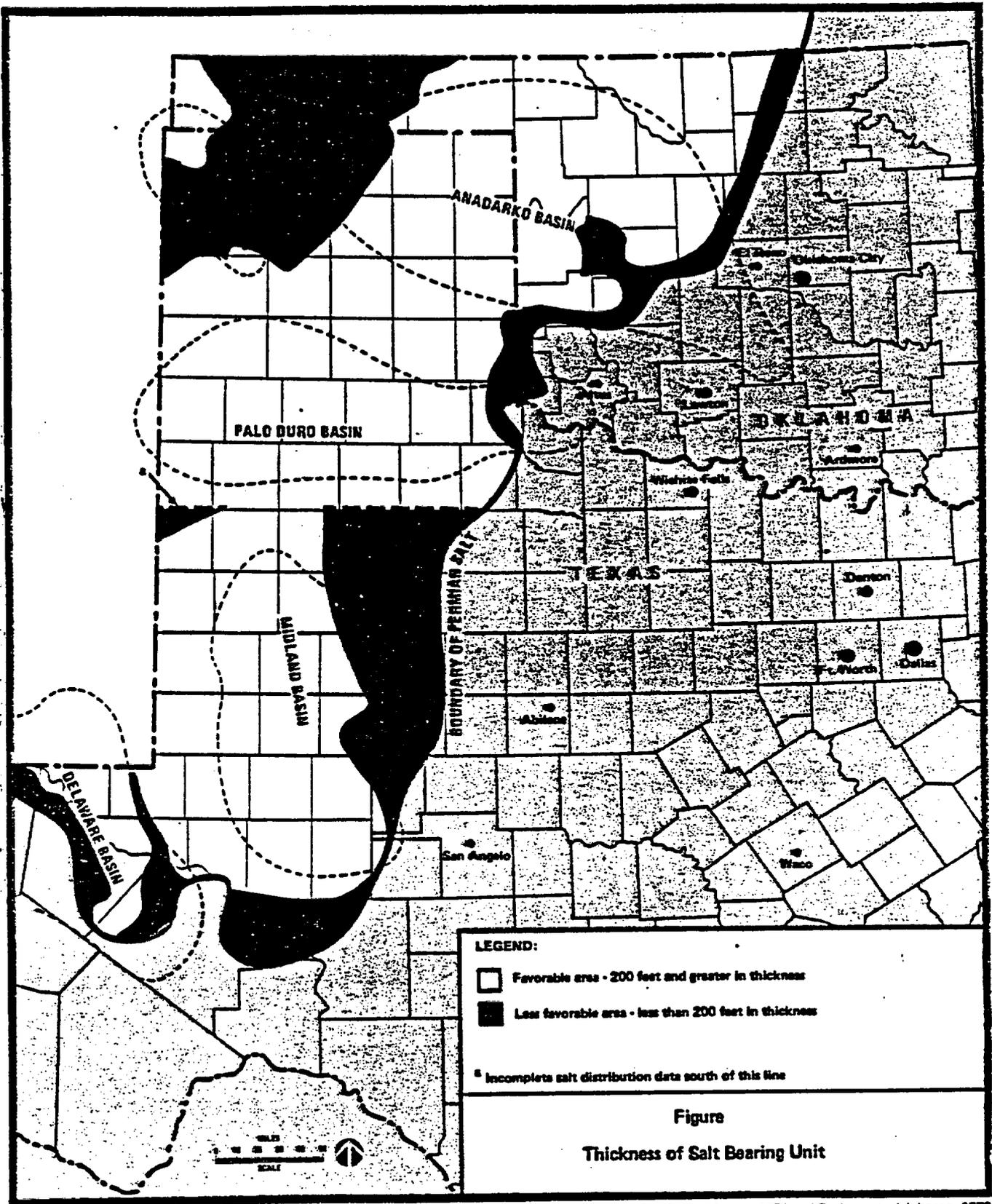
Note:
 Size of circle denoting towns and cities indicates relative population.

Figure
Permian Region of Study
(Sub basins, cities, towns)

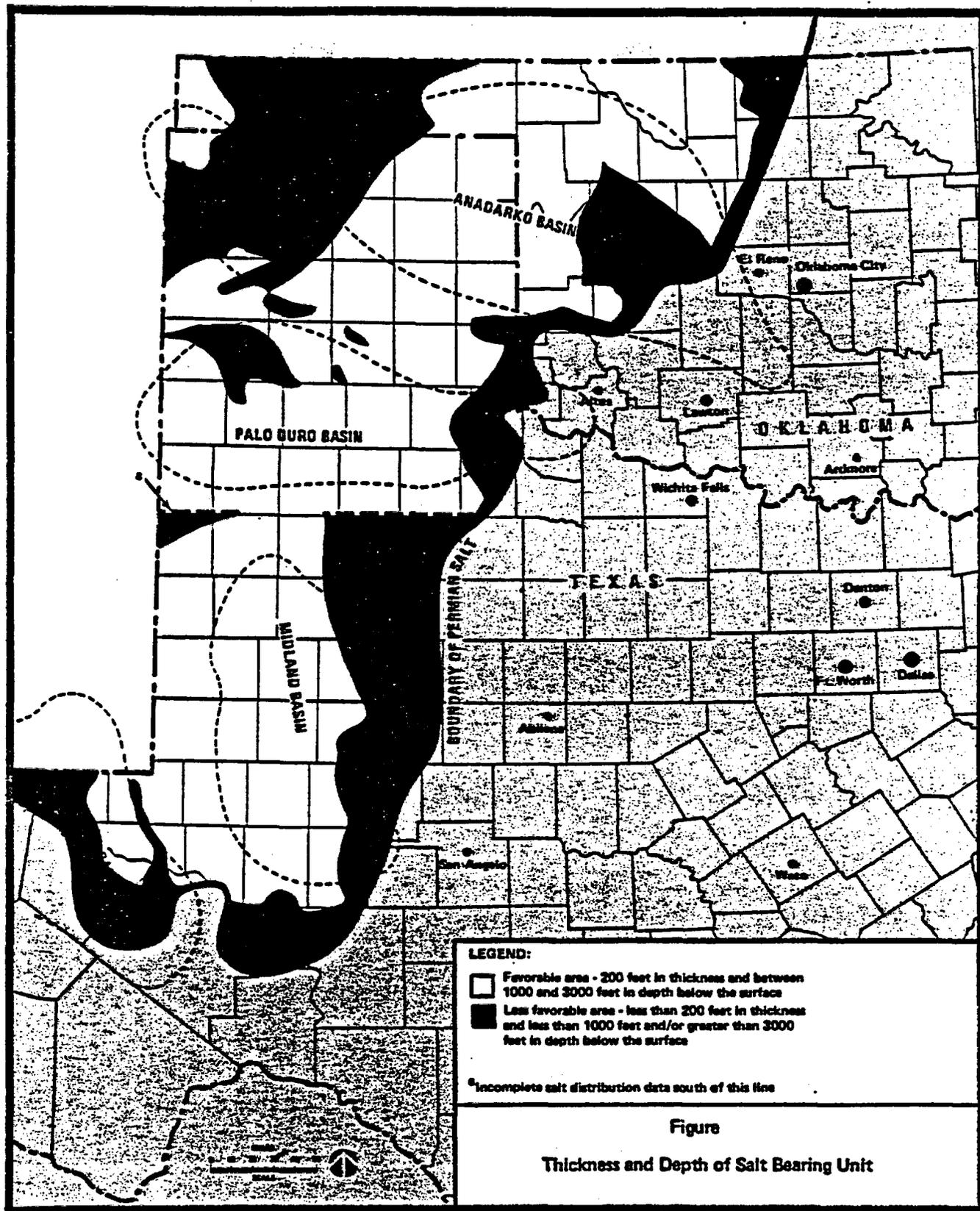
SCALE



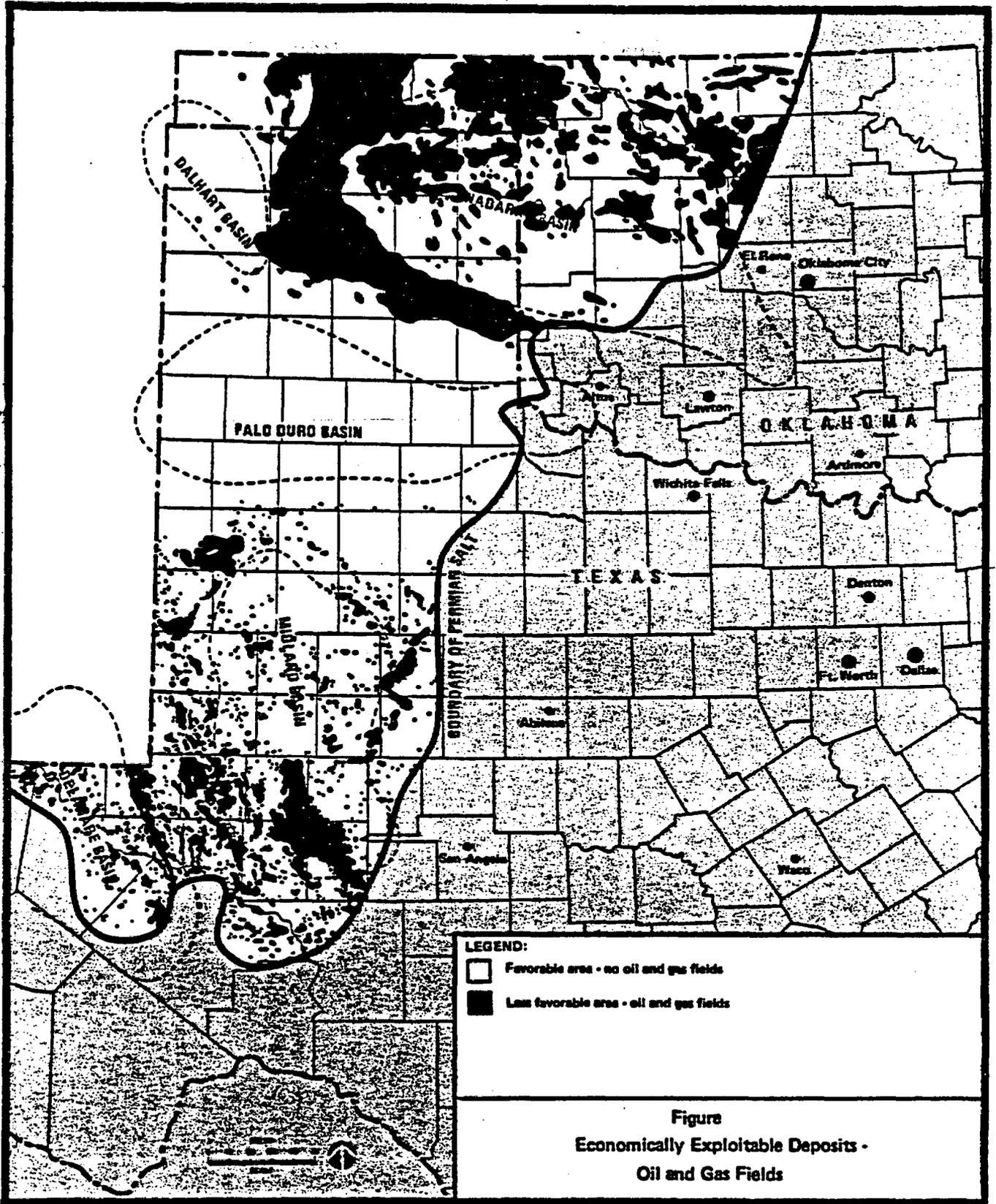
Source: Johnson, 1976



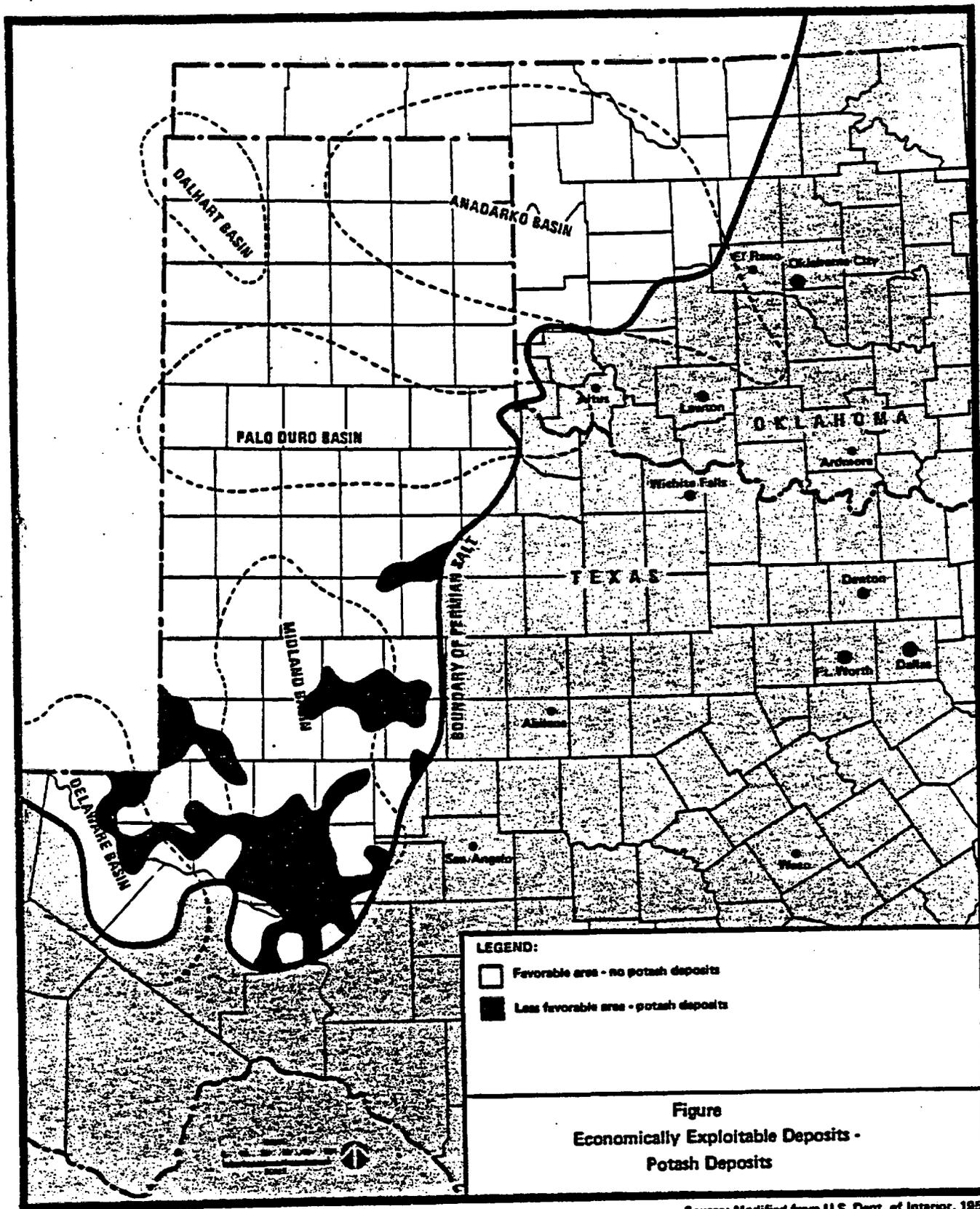
Source: Modified from Johnson, 1976 and Bachman and Johnson, 1973



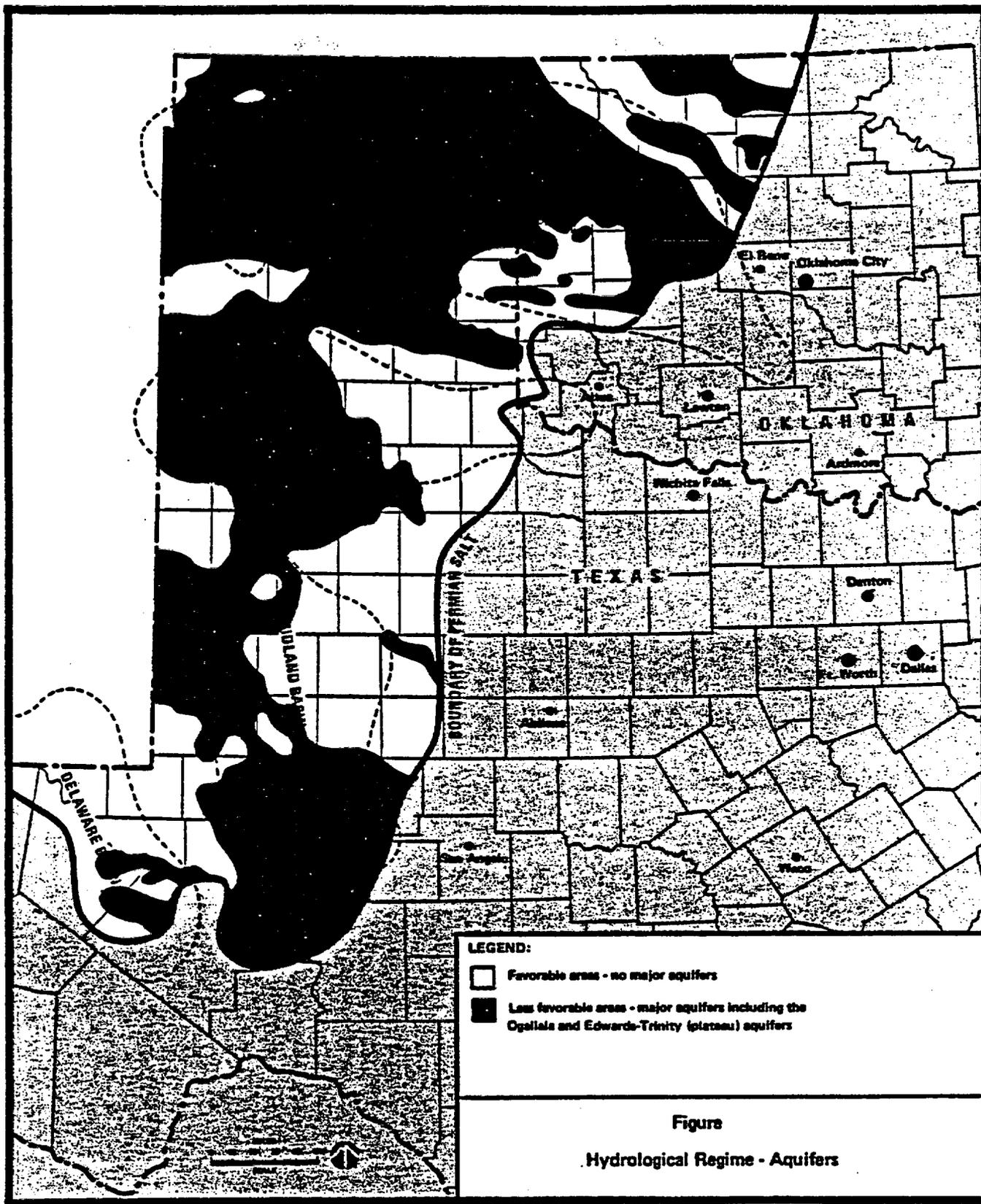
Source: Modified from Johnson, 1976 and Bachman and Johnson, 1973



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



Source: Modified from U.S. Dept. of Interior, 1955



Source: NUS, 1978

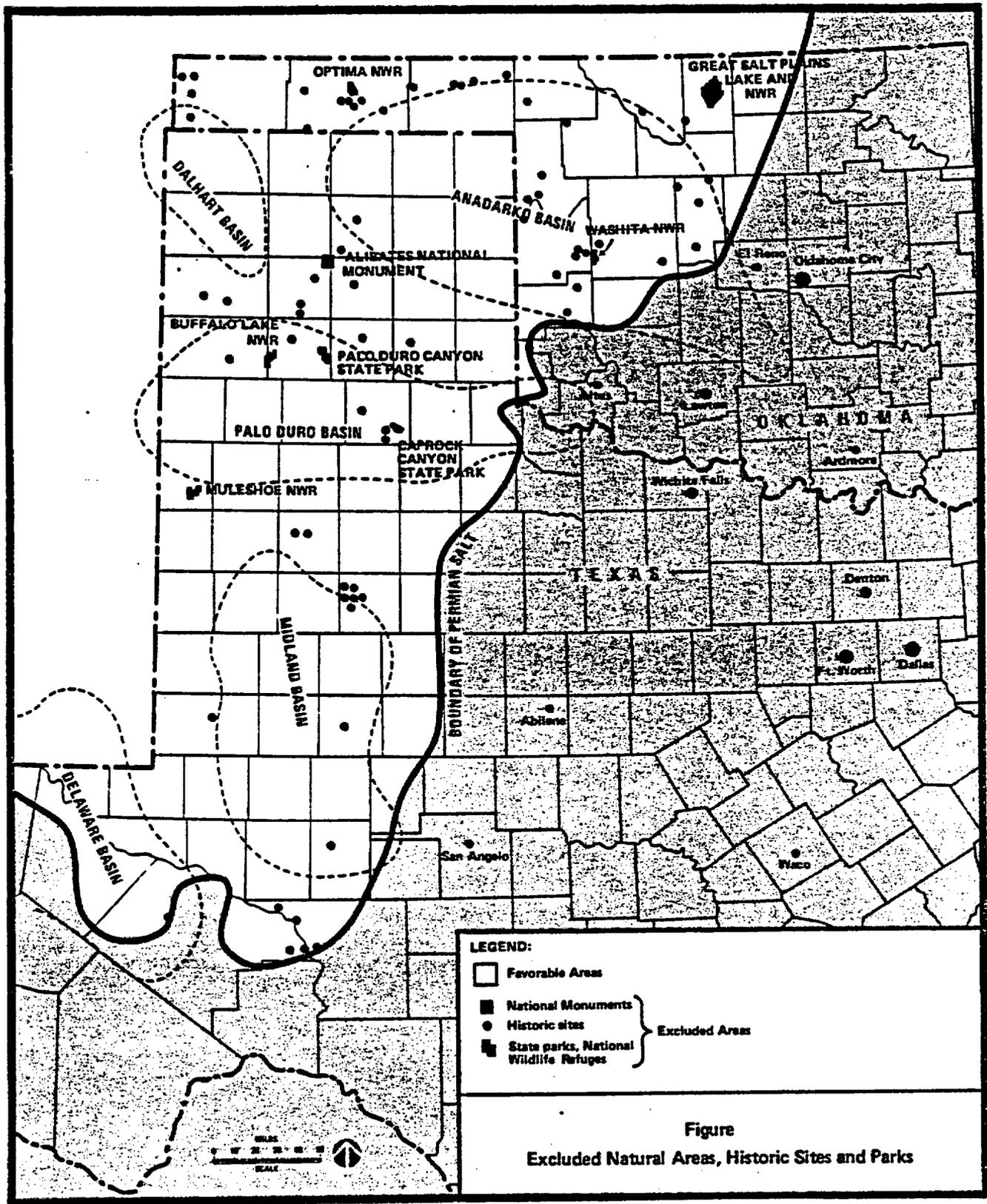
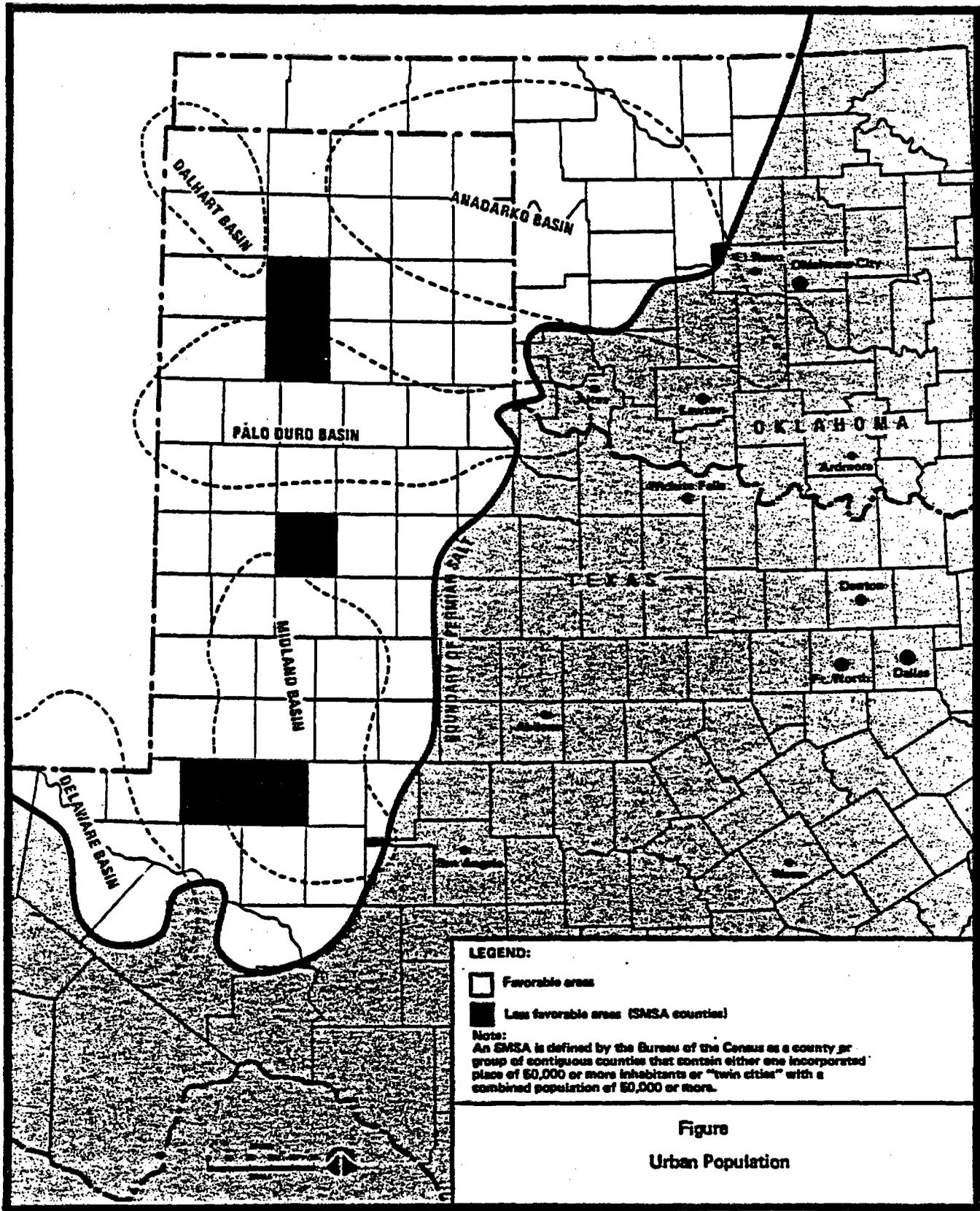
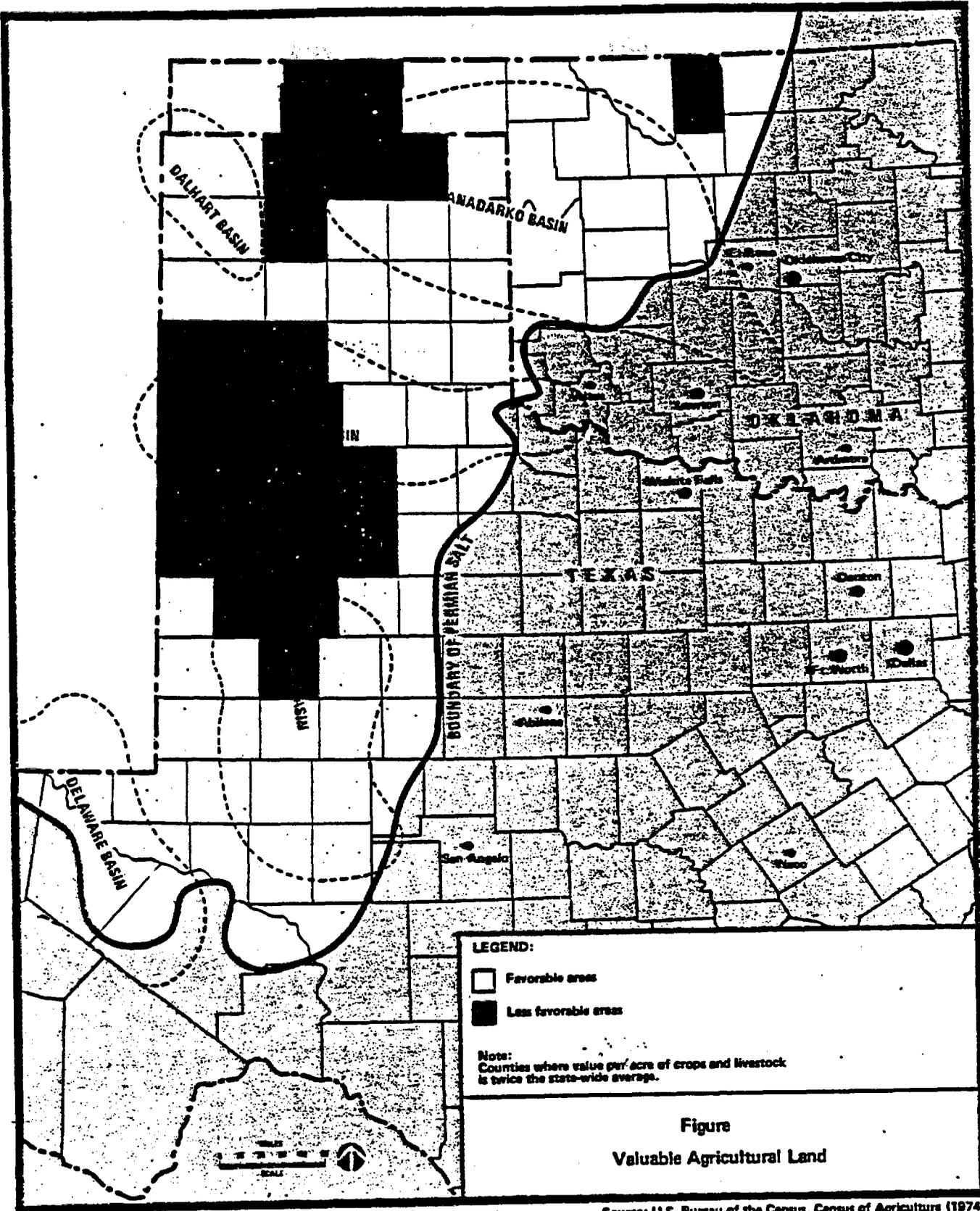


Figure
Excluded Natural Areas, Historic Sites and Parks

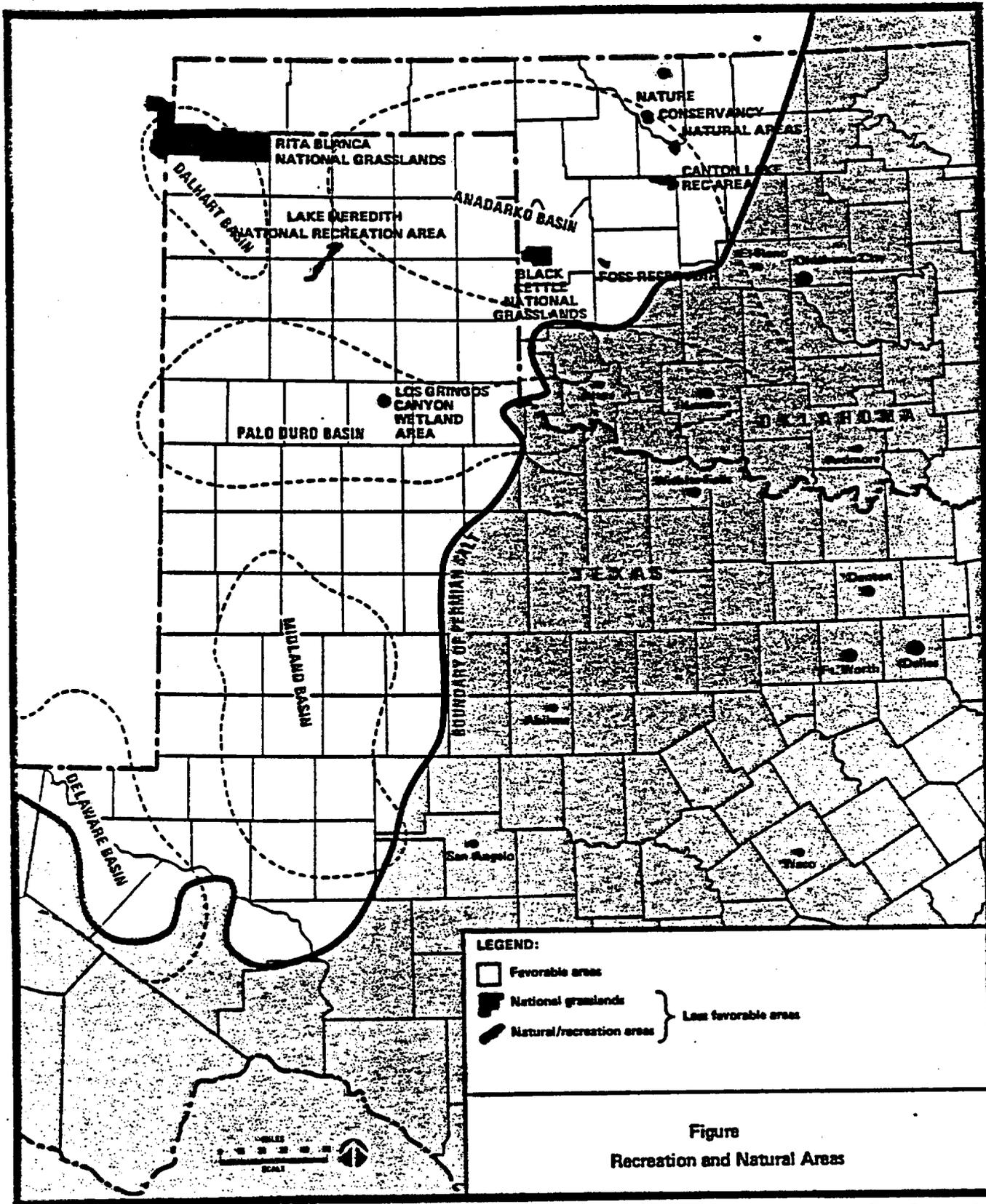
Source: National Register of Historic Places (1979)
Texas Dept. of Parks and Wildlife (1977)
U.S. Fish and Wildlife Service (1977)



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



Source: U.S. Bureau of the Census, Census of Agriculture (1974)



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

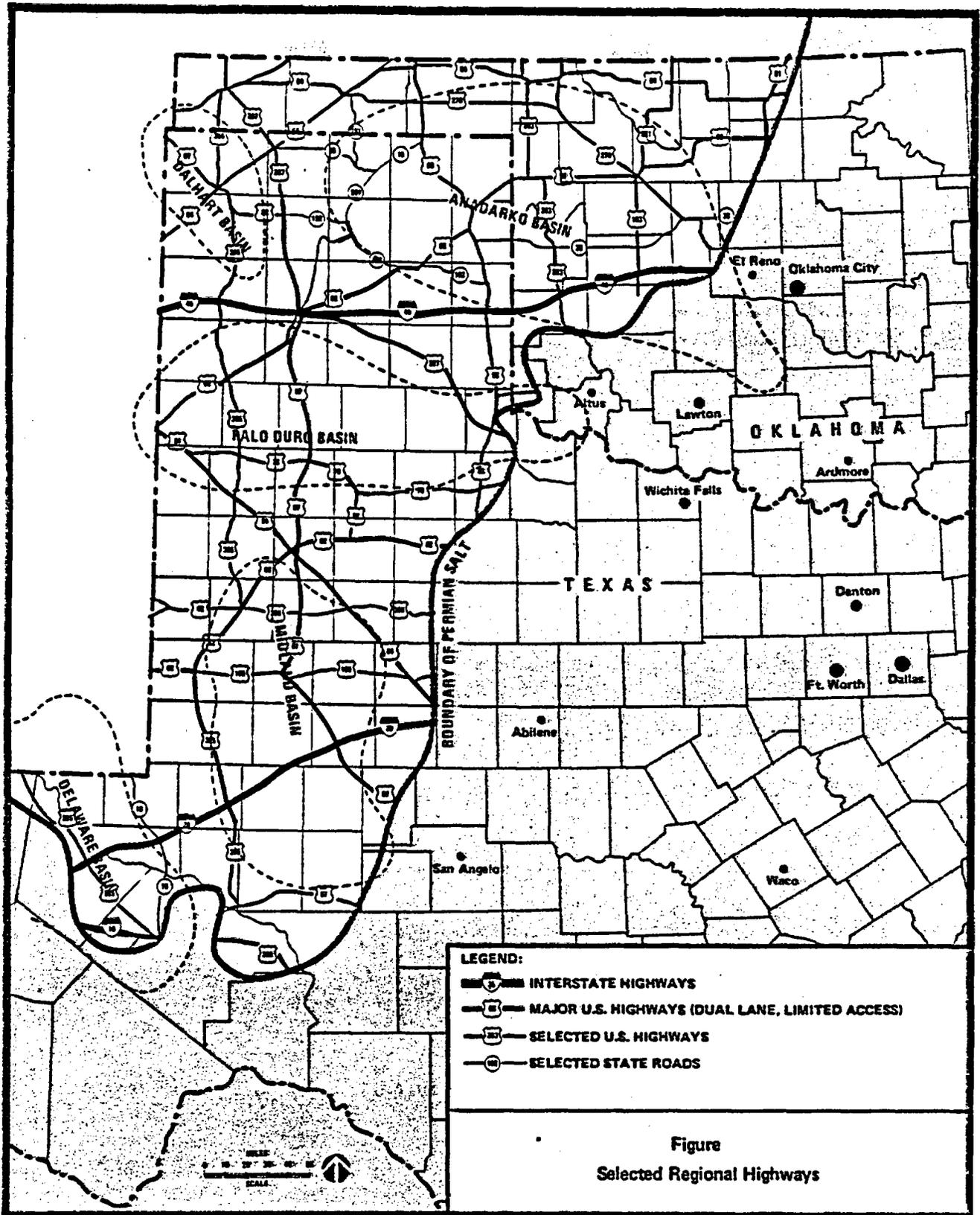
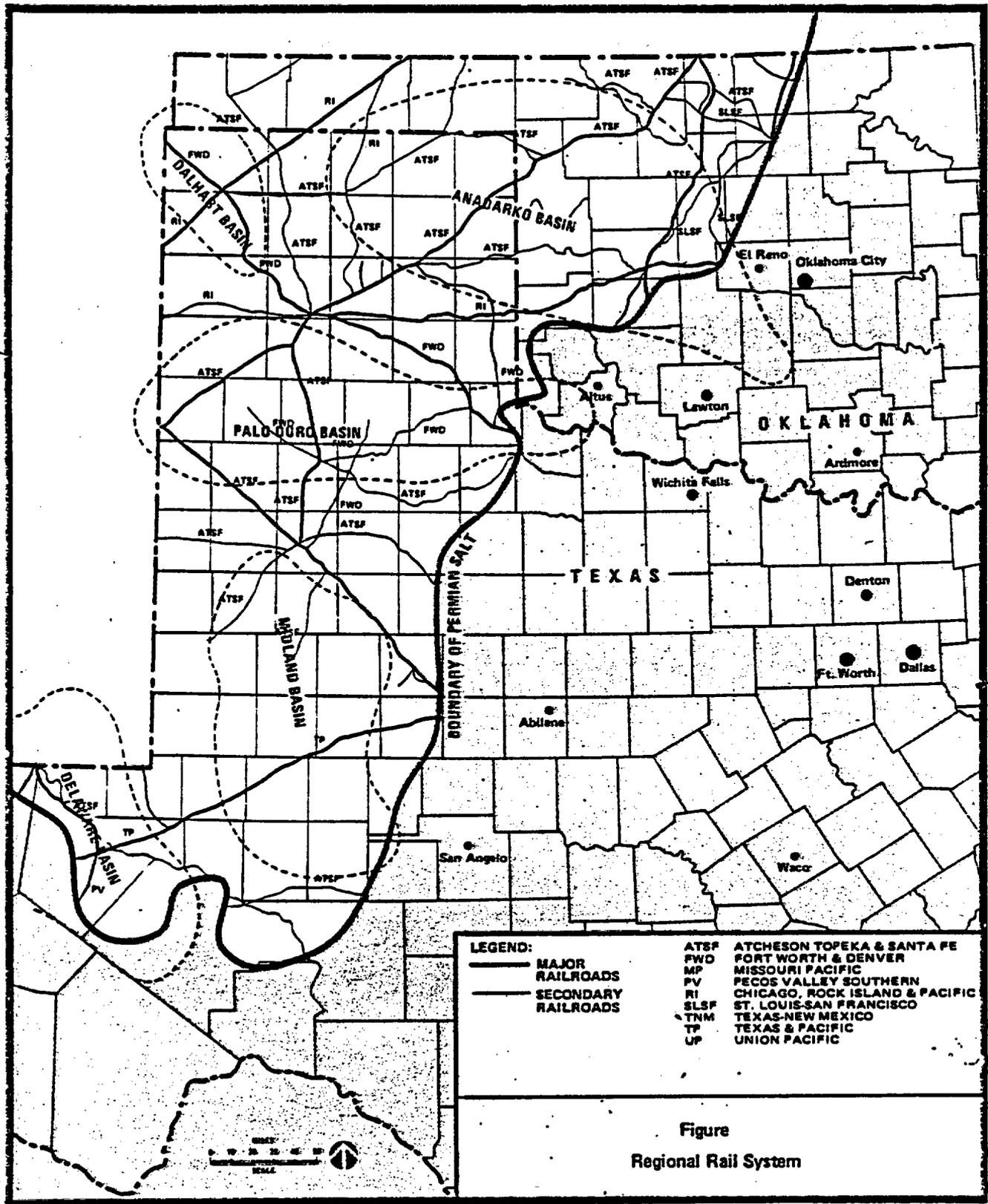


Figure
Selected Regional Highways

Source: Adapted from Rand McNally Road Atlas (1978)



LEGEND:	
	MAJOR RAILROADS
	SECONDARY RAILROADS
	ATSF
	FWD
	MP
	PV
	RI
	SLSF
	TNM
	TP
	UP
	ATCHESON TOPEKA & SANTA FE
	FORT WORTH & DENVER
	MISSOURI PACIFIC
	PECOS VALLEY SOUTHERN
	CHICAGO, ROCK ISLAND & PACIFIC
	ST. LOUIS-SAN FRANCISCO
	TEXAS-NEW MEXICO
	TEXAS & PACIFIC
	UNION PACIFIC

Figure
Regional Rail System

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

ONWI
Office of Nuclear Waste Isolation
Battelle

CONTAINMENT SYSTEMS

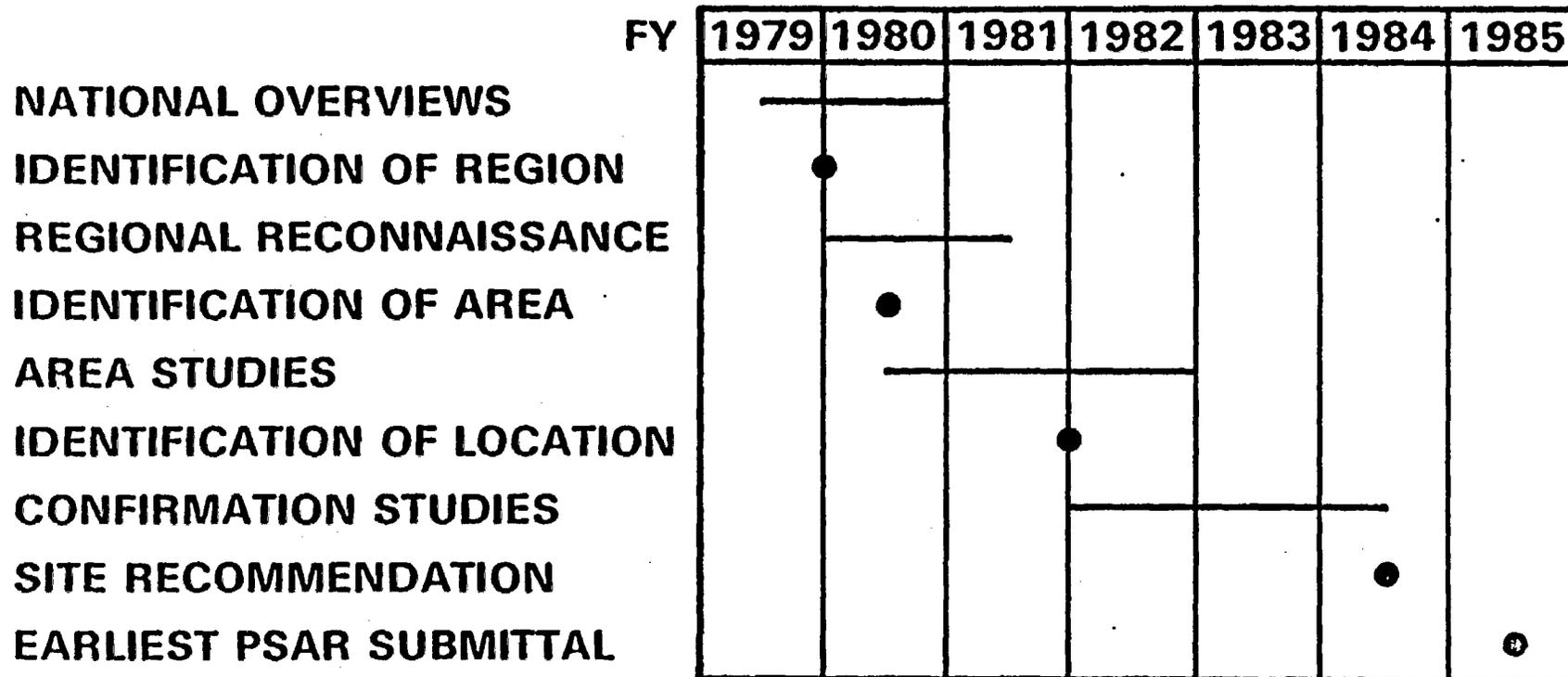
STUDIES MAY INCLUDE, BUT NOT BE LIMITED
TO THE FOLLOWING MEDIA

- 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

ON/WI
Office of Nuclear Waste Isolation
Battelle

NATIONAL SCREENING PROJECT

W. E. NEWCOMB

ONWI

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



Battelle

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



Project Management Division
Office of Nuclear Waste Isolation

SCREENING FACTORS

ENVIRONMENTAL

POPULATION DENSITY

DEDICATED LANDS

TRANSPORTATION ROUTES

WASTE SOURCES

WEN:5/23/79



Battelle

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"



WNO4

WNO3

WNO8

CARLSBAD



PECOS RIVER

WASH DRAW

W11

AEC 8

WIPP
30 SO. MILES

WNO1

H8

H6

WNO2

H2

H1

H3

P18

WNO5

P14

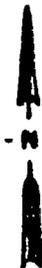
P15

H4

P17

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

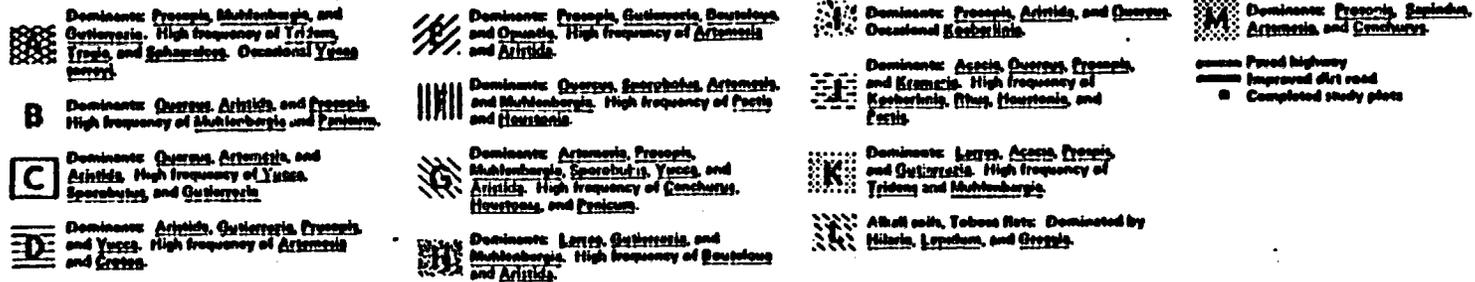
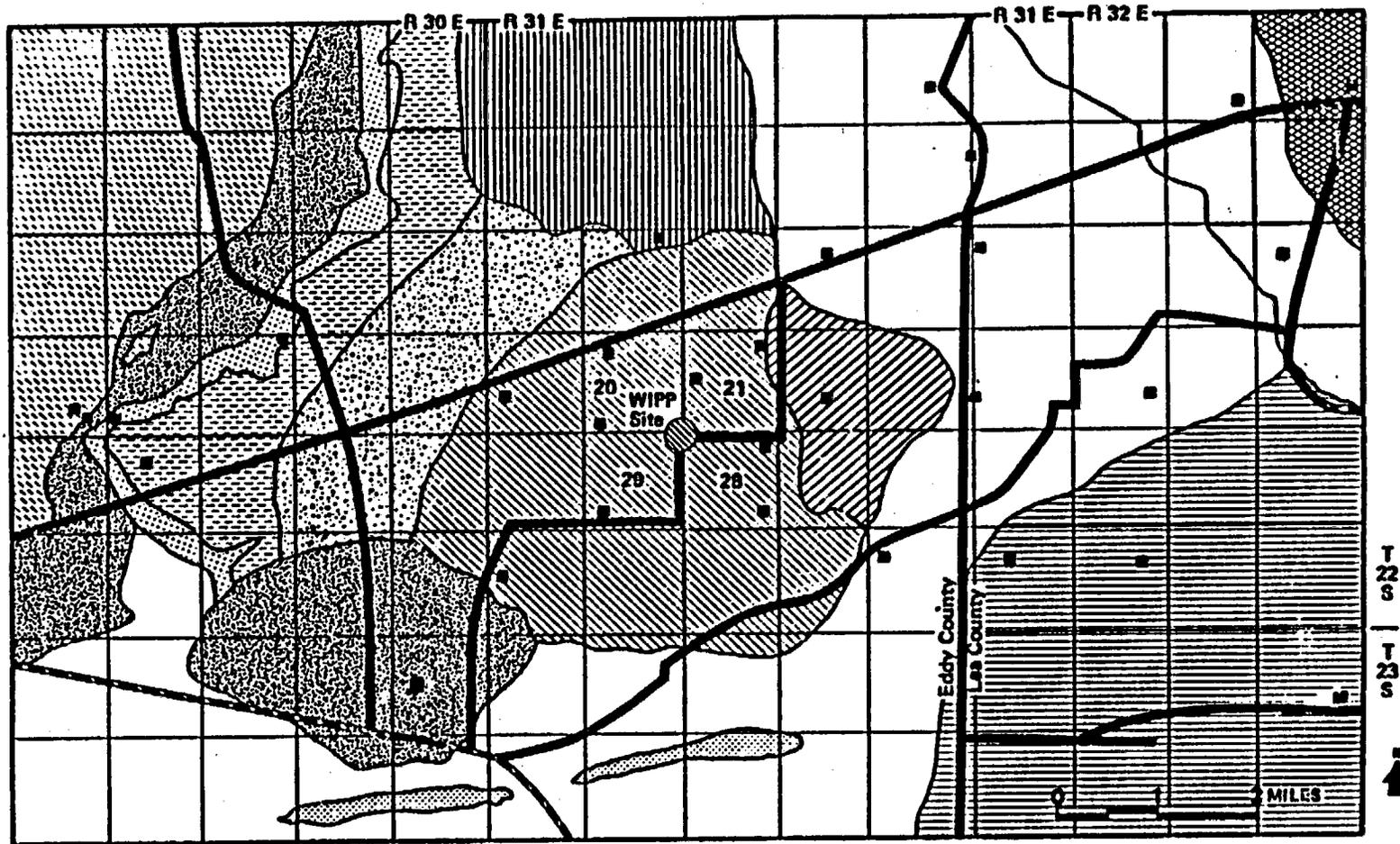


Figure H-13. Preliminary vegetation-type map of the WIPP reference site.

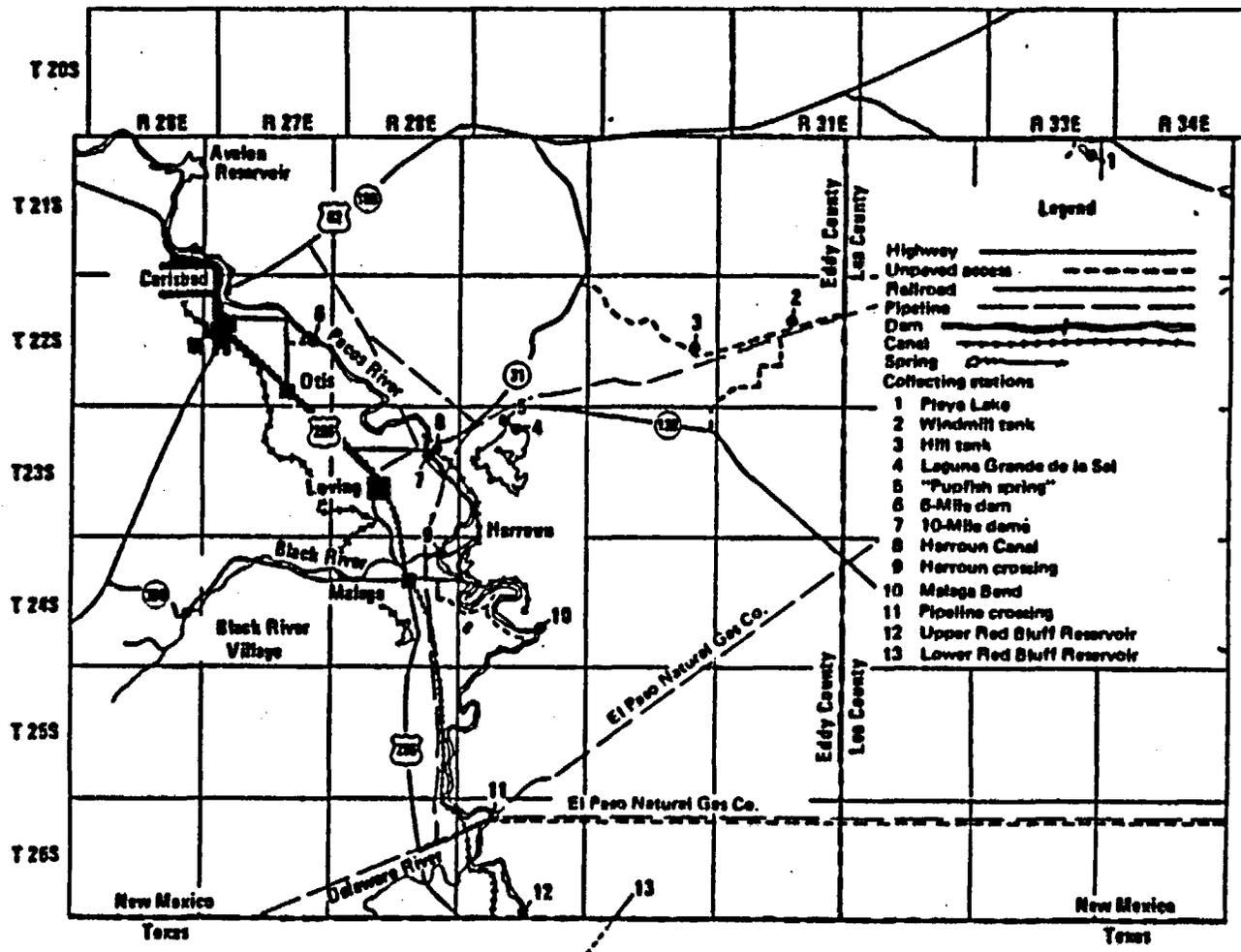


Figure H-14. Map of aquatic collecting stations.

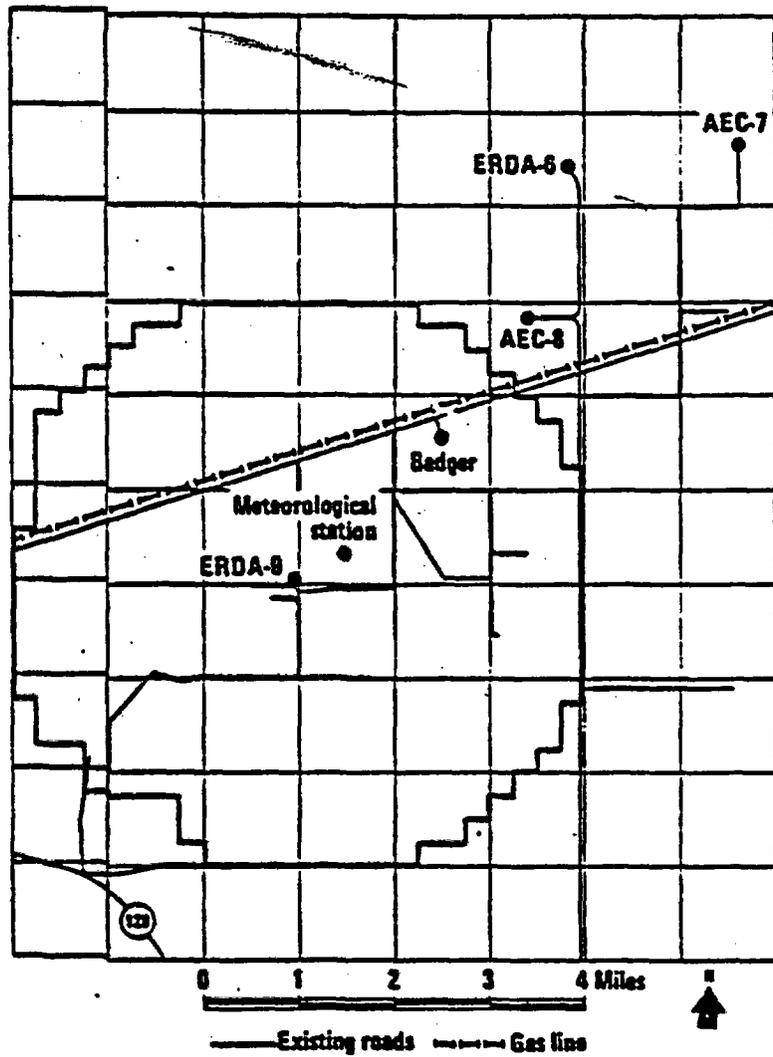


Figure H-15. Locations of thermoluminescent dosimeters in the site area. An additional thermoluminescent dosimeter will be located in Carlsbad.

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	0.00120	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	0.00100	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	0.00060	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	0.00050	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	0.00340	0.00712	0.00696	8
NATURAL GAS & LIQ. PET	9	0.00374	0.00300	0.00340	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	0.01240	0.00960	0.01648	0.00200	0.00340	0.00333	15
I FOOD PRODUCTS	16	0.01150	0.01140	0.00994	0.00803	0.01447	0.00490	0.01000	0.00976	16
M FABRICS AND APPAREL	17	0.00024	0.00031	0.00109	0.00018	0.00040	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
B PRINTING	19	0.00200	0.00555	0.00215	0.00230	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	0.00060	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	0.00036	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	0.00000	0.00001	0.00002	0.00002	26
S TRANSPORT & WAREHOUSING	27	0.01697	0.01900	0.01950	0.02126	0.02344	0.01204	0.01027	0.01797	27
C COMMUNICATIONS	28	0.01659	0.02012	0.01693	0.02477	0.02786	0.00964	0.01404	0.01301	28
L ELECTRICAL UTILITY	29	0.02994	0.02596	0.02601	0.01440	0.02596	0.00747	0.01350	0.01325	29
L GAS UTILITY	30	0.01689	0.01522	0.01500	0.01330	0.02084	0.00473	0.00447	0.00925	30
I WATER AND SEWER	31	0.00552	0.00754	0.00653	0.00394	0.01076	0.00145	0.00270	0.00272	31
M WHOLESALE TRADE	32	0.03969	0.04197	0.05541	0.04123	0.06435	0.00139	0.09602	0.09532	32
G RETAIL TRADE	33	1.10009	0.11469	0.10652	0.09863	0.14907	0.04303	0.08996	0.08776	33
F. I. & R.E	34	0.00229	1.14177	0.08495	0.07573	0.12601	0.02905	0.04792	0.04702	34
PERSONAL & REPAIR SER.	35	0.04767	0.04541	1.07586	0.04912	0.07151	0.01909	0.03702	0.03620	35
BUSINESS & MISC. SERV.	36	0.02216	0.07456	0.02630	1.07035	0.04471	0.00722	0.01190	0.01176	36
MEDICAL & NON-PROFIT	37	0.00796	0.01451	0.00829	0.00790	1.01249	0.00304	0.00600	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 OPEN A/G	47	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	47
WIPP OPEN STORAGE	48	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	48
WIPP OPEN B/G	49	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	49
HOUSEHOLDS/PC WERKLY	50	0.00000	0.00000	0.00000	0.00000	0.00000	0.02334	0.05661	0.05503	50
HOUSEHOLDS/PC LOCAL	51	0.57555	0.56726	0.49495	0.44321	0.70907	0.23050	0.47999	0.46809	51
*** COLUMN SUMS ***		2.03696	2.10409	2.02230	1.92543	2.39039	1.50025	1.94009	1.92026	

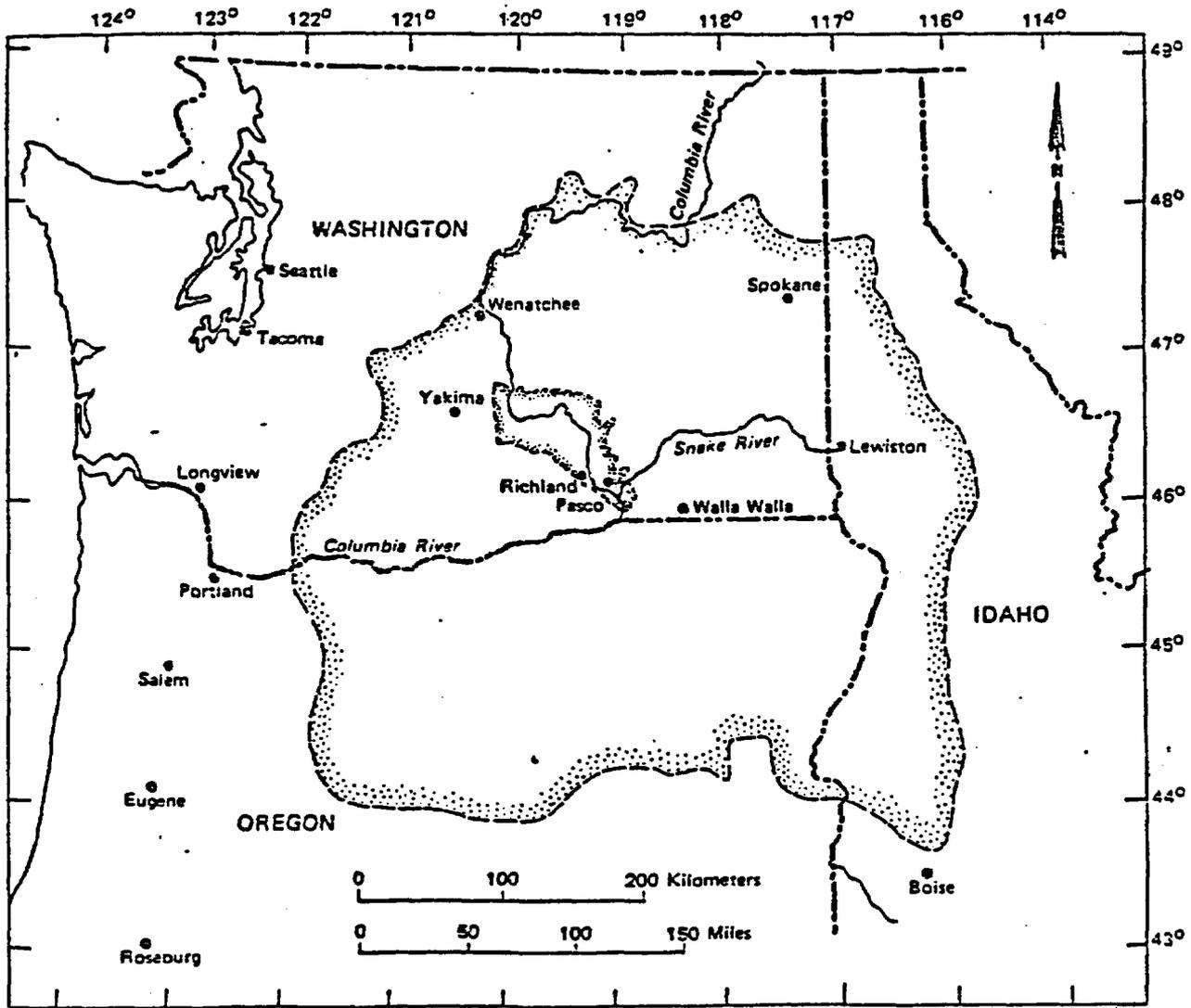
L-15

SITE IDENTIFICATION STUDY
ENVIRONMENTAL SCREENING GUIDELINES

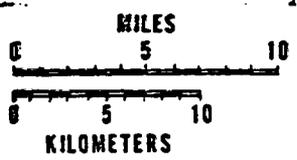
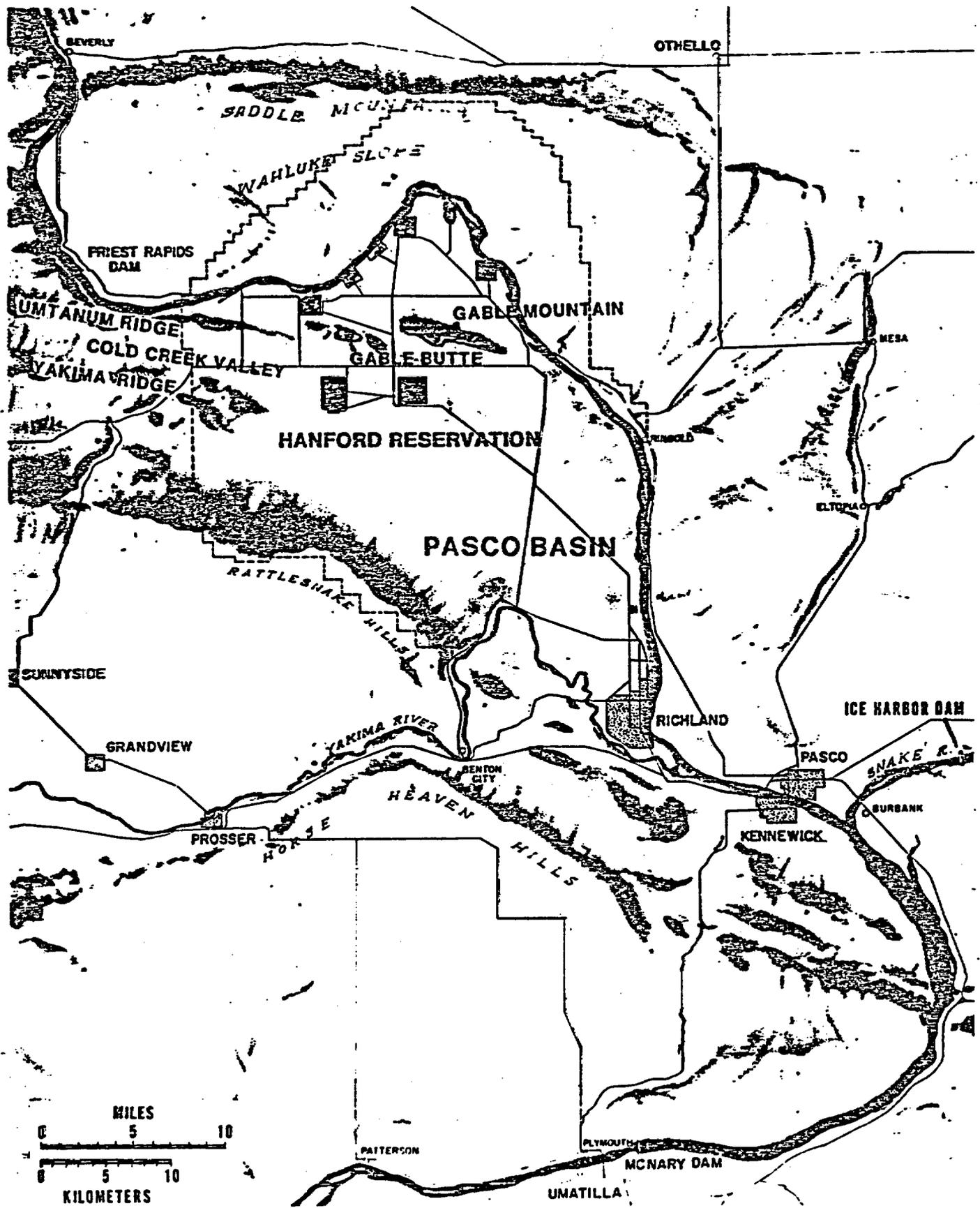
PRESENTED BY

DALE ST. LAURENT
BASALT WASTE ISOLATION PROGRAM

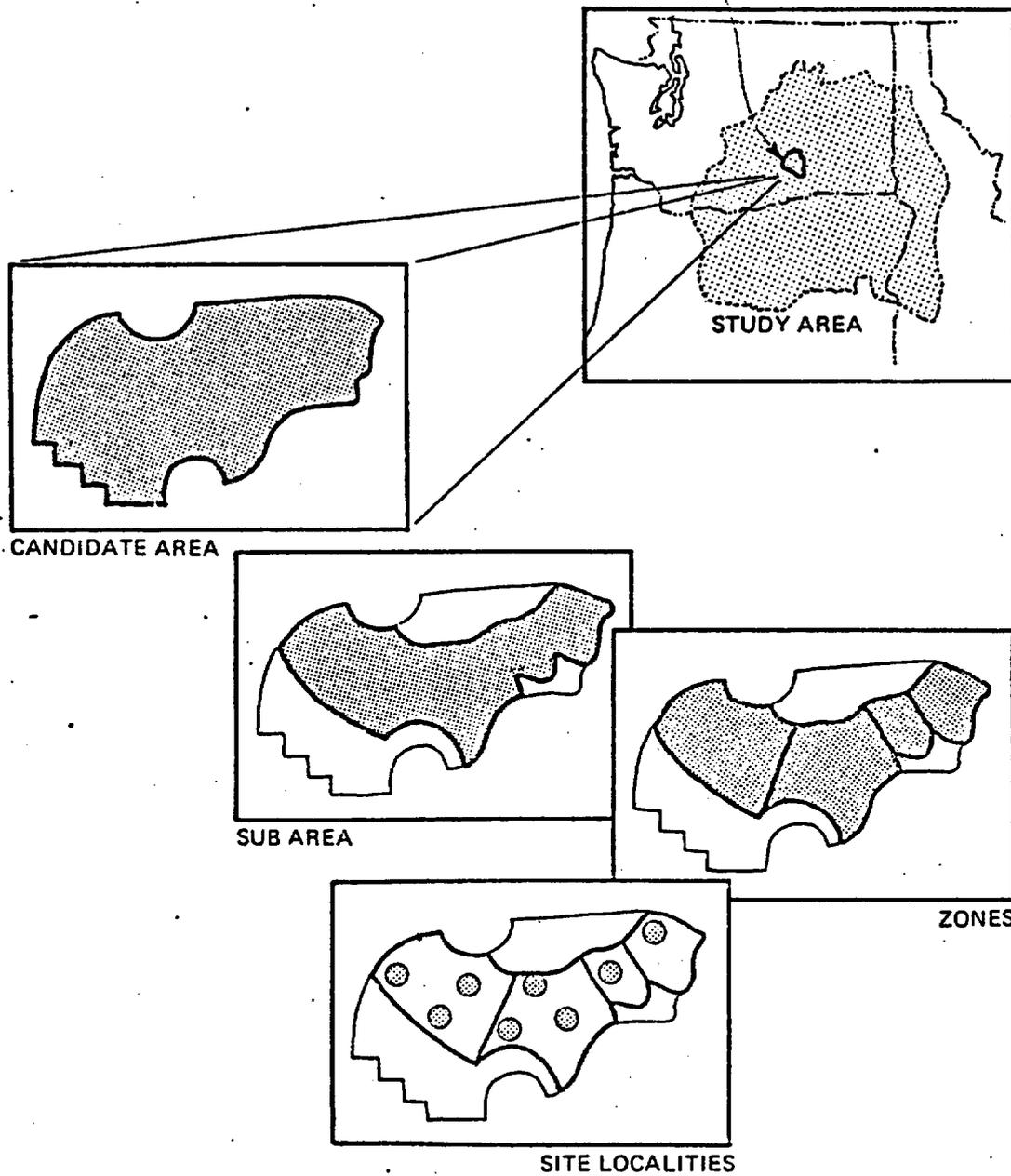
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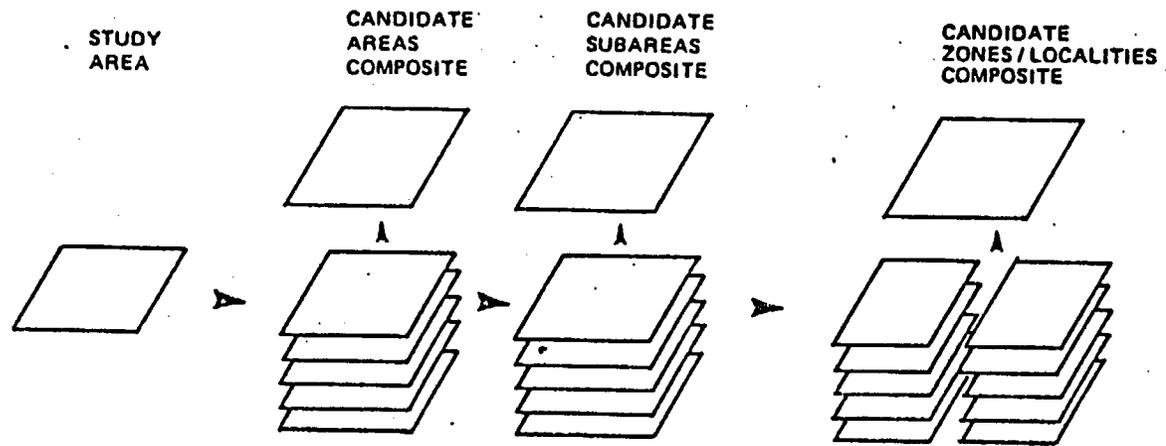
COLUMBIA PLATEAU



HANFORD RESERVATION



RELATIONSHIP OF CANDIDATE DESIGNATIONS



STUDY AREA

**SELECTION OF
CANDIDATE
AREAS**

Example Guideline

- Rock Properties

**SELECTION OF
CANDIDATE
SUBAREAS**

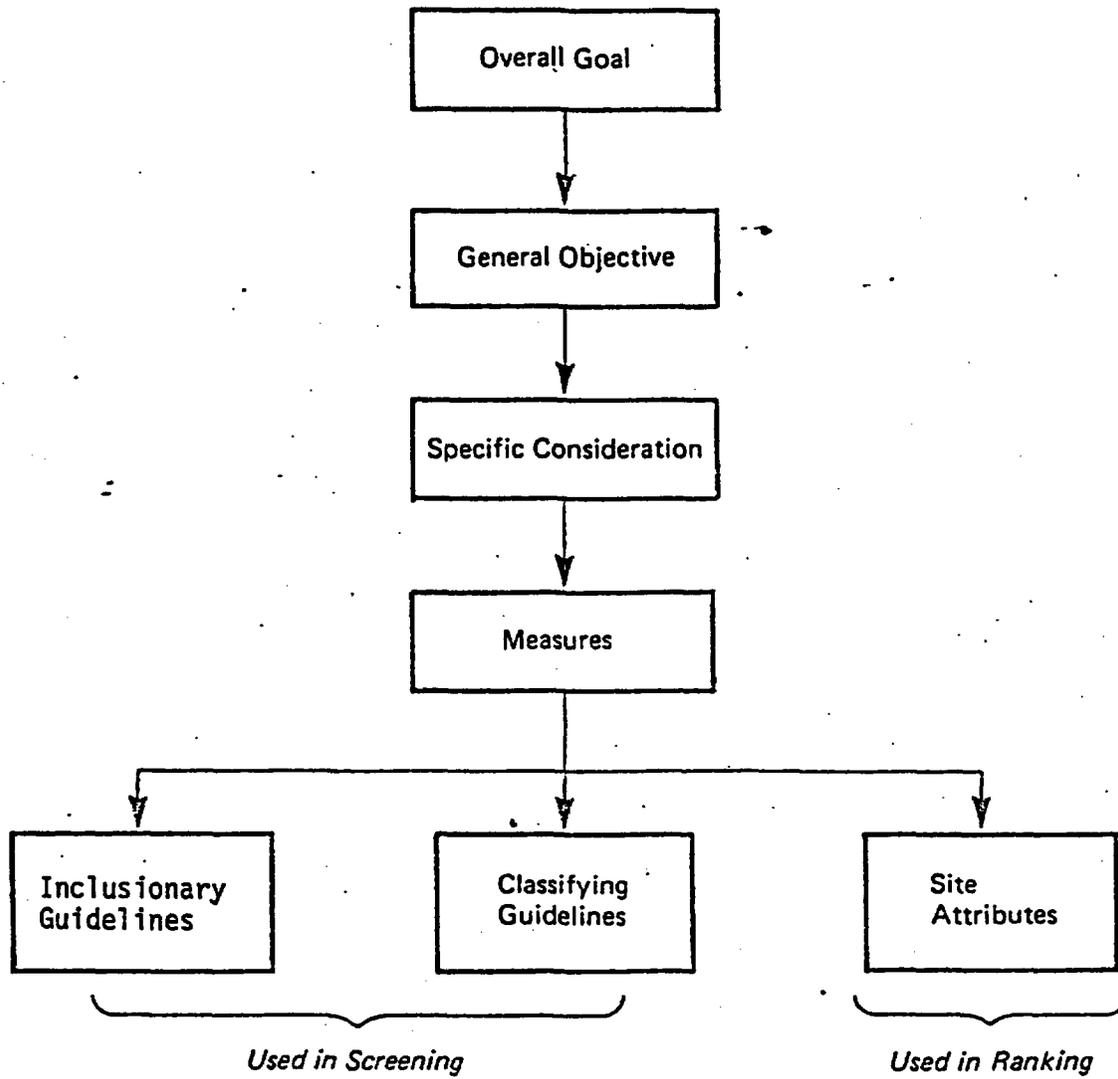
Example Guideline

- 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

