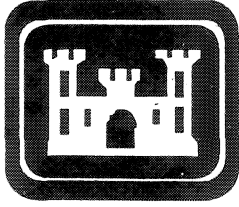


Operations Division Copy

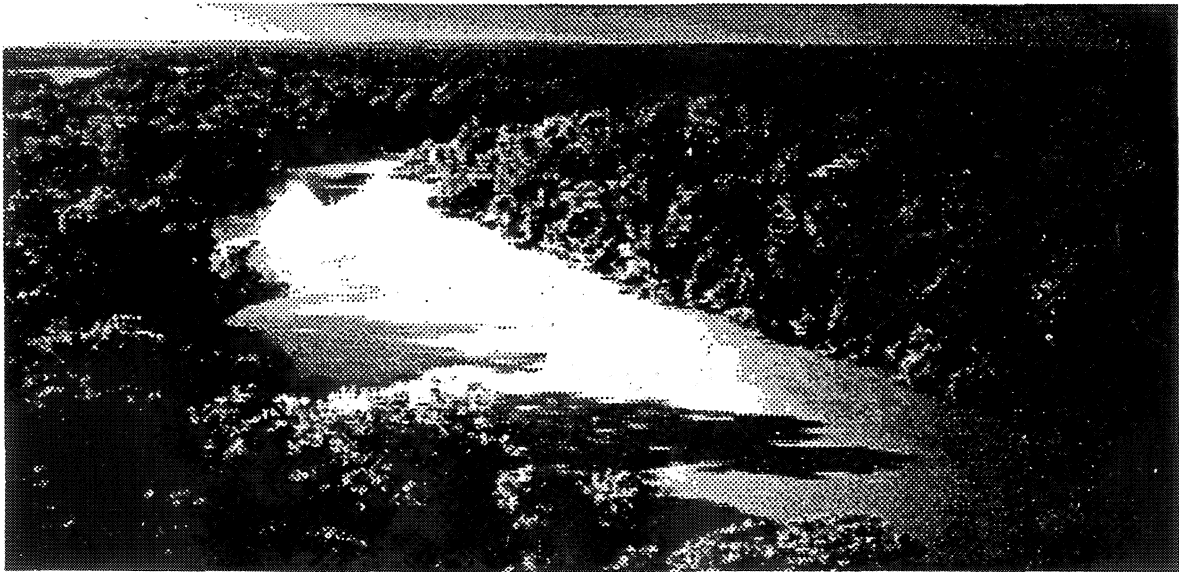


US Army Corps
of Engineers

Fort Worth District

COOPER LAKE

Sulphur River, Texas



Supplement No. 1 to

MASTER PLAN

DESIGN MEMORANDUM No. 10

White Oak Creek Mitigation Area

January 1990



DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

REPLY TO
ATTENTION OF:

CESWF-PL-R


8 November 1988

MEMORANDUM FOR: Commander, Southwestern Division, ATTN: CESWD-PL

SUBJECT: Supplement No. 1 to the Cooper Lake Master Plan, White Oak Creek Mitigation Area

1. Submitted for review and approval are ten copies of subject supplement.
2. Coordination with other Federal, State, and local agencies for review and comment is occurring simultaneously with this transmittal. Request you comment within 45 days.
3. The principal issues addressed in this supplement are as follows:
 - a. Existing resources of the White Oak Creek Mitigation Area.
 - b. Description of previous archeological studies and cultural resource investigation requirements.
 - c. Analysis of habitat suitability, discussion of mitigation opportunities and constraints, access and potential recreation opportunities.
 - d. Initial development, operations and maintenance strategies, and estimated costs.
4. All 11" X 17" plates and photos are draft copies. The final master plan plates and photos will be reproduced by photo process printing.

FOR THE COMMANDER:


MICHAEL J. MOECK, P.E.
Chief, Planning Division

Enclosure

Mr. Earls/fao/7-4522

CESWD-PL-R (CESWF-PL-R/8 Nov 88) (1105-2-10a) 1st End
SUBJECT: Supplement No. 1 to the Cooper Lake Master Plan, White
Oak Creek Mitigation Area

Cdr, Southwestern Division, Corps of Engineers, 1114 Commerce St.,
Dallas, Texas 75242-0216 18 JAN 1989

FOR: Commander, Fort Worth District, Corps of Engineers
ATTN: CESWF-PL-R

1. Supplement approved subject to revisions in accordance with enclosed comments.
2. Please send only four copies of the final supplement.

FOR THE COMMANDER:

For [Signature]

BARRY G. ROUGHT, P.E.
Chief, Planning Division

2 Encls
Dup cy encl 1 wd
Added 1 encl
2. SWD Cmts

CESWF-PL-RR (CESWF-PL-R/8 Nov 88) (1110-2-240a) 2nd End Cotten/bc/4-2095
SUBJECT: Supplement No. 1 to the Cooper Lake Master Plan, White Oak Creek
Mitigation Area

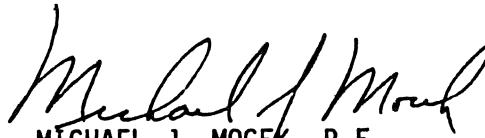
DA, Fort Worth District, Corps of Engineers, PO Box 17300, Fort Worth, TX
76102-0300 6 FEB 90

FOR Commander, Southwestern Division, ATTN: CESWD-PL

1. Submitted for review and approval are ten copies of Supplement No. 1 to the Cooper Lake Master Plan, White Oak Creek Mitigation Area (Revised). In addition to revisions made in accordance with the preceding 1st endorsement, additional changes have been made which reflect comments from the Texas Parks and Wildlife Department and additional site information obtained subsequent to approval of this document.
2. Significant issues addressed in the revised supplement are as follows:
 - a. A more detailed description of proposed development features in the moist soil management area.
 - b. Language which, when approved, will permit Fort Worth District to negotiate with affected county governments for assistance in the construction and maintenance of public access roads and parking areas at the perimeter of the Mitigation Area.
 - c. Inclusion of a project maintenance compound for use by Texas Parks and Wildlife project operations personnel.
 - d. Revised cost estimates, based on detailed cost studies conducted in accordance with EC 1110-2-538.
 - e. Exclusion of costs associated with fish and wildlife features at Cooper Lake from costs for the White Oak Creek Mitigation Area authorized by PL 99-662. Cooper perimeter land development costs were included in the draft supplement.
3. Fort Worth District has completed an Environmental Assessment in accordance with Section 404 B(1) of the Clean Water Act, and has prepared a Finding of No Significant Impact related to the development of the moist soil management area. Copies of the EA and FONSI are enclosed with this endorsement. Public notice will be made of the availability of the EA and FONSI upon approval of this Supplement by SWD.
4. The revisions to this supplement have been coordinated with the U.S. Fish and Wildlife Service and Texas Parks and Wildlife Department. Both agencies concur with the recommendations presented herein.

FOR THE COMMANDER:

5 Encls
wd encls 1 and 2
Added 3 encls
3-5. as


MICHAEL J. MOCEK, P.E.
Chief, Planning Division

CESWD-PL-R (CESWF-PL-R/8 Nov 88) (1105-2-10c) 3d End
Mr. Koechley/bre/767-2313
SUBJECT: Supplement No. 1 to the Cooper Lake Master Plan, White
Oak Creek Mitigation Area

DA, Southwestern Division, Corps of Engineers, 1114 Commerce
St., Dallas, TX 75242-0216 21 MAR 1990 *Jm*

FOR Commander, Fort Worth District, ATTN: CESWF-PL-R

1. The subject supplement to the master plan is approved subject to the following comment.
2. Chapter 7, Funding Limitations. This paragraph should be revised to indicate that a Post Authorization Change Report is being prepared to address the costs for increases for real estate acquisition and for cultural resources.
3. Chapter 5, paragraph 5.05, Perimeter Fencing. This paragraph proposes a 25-30 feet wide cleared strip around the entire perimeter for a fire line. Much of this area traverses highly erosive soils, for this reason the perimeter clearing should be reduced to 15 feet.
4. Your response to question 4, page 10 of the 404(b)(1), Evaluation Report, indicates you have not received a State Water Quality Certificate. If this is the case, you may not legally begin work involving fill to U.S. waters or wetlands.

FOR THE COMMANDER:

[Handwritten Signature]
BARRY G. ROUGHT, P.E.
Director, Directorate of Planning

53 Encls

CF (w/encls):
DAEN-CWO-R (4 cys)

CESWF-PL-RR (CESWF-PL-R/8 NOV 88) (110-2-240a) 4th End Cotten/bc/4-2095
SUBJECT: Supplement No. 1 to the Cooper Lake Master Plan, White Oak Creek
Mitigation Area

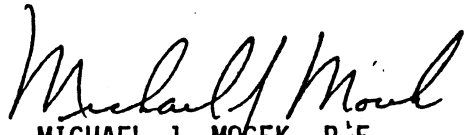
DA, Fort Worth District, Corps of Engineers, P.O. Box 17300, Fort Worth, TX
76102-0300 11 April 1990

FOR Commander, Southwestern Division, ATTN: CESWD-PL

1. Submitted are ten copies of pages 71/72, 81, and 82/83 for Supplement No. 1 to the Cooper Lake Master Plan, White Oak Creek Mitigation Area (Revised). These pages have been revised to reflect changes requested by your staff.
2. Public notice of the EA and FONSI have been issued, and an application has been sent to the Texas Water Commission for a Water Quality Certificate. Work involving fill in U.S. waters or wetlands will not begin until we have received the Certificate.

FOR THE COMMANDER:

6 Encls
wd encl 3
Added 1 encl
6 Revised pages


MICHAEL J. MOCEK, P.E.
Chief, Planning Division

EXECUTIVE SUMMARY

The construction of Cooper Lake will result in the loss of bottomland hardwoods and their associated wildlife habitats. The U.S. Army Corps of Engineers in coordination with the U.S. Fish and Wildlife Service has identified measures to offset these losses. The *Supplemental Environmental Impact Statement (SEIS)*, for the Cooper Lake and Channels project addressed the loss of bottomland hardwoods and wildlife habitats due to the construction and impoundment of Cooper. The *SEIS* recommended that an additional 25,500 acres of land of similar habitat type in the White Oak Creek area 60 miles below Cooper Dam be acquired and developed to mitigate for these losses. Additionally, the plan recommended that all Federal lands around the perimeter of Cooper Lake not needed for project operations or recreation be designated as a wildlife management area. The filing of the *SEIS* with the Environmental Protection Agency in 1981 was instrumental in the eventual dissolution of a permanent injunction against the project, allowing the construction of Cooper Lake to continue.

In 1983, a post authorization change report entitled *Report on Acquisition of Wildlife Mitigation Lands*, was forwarded to higher Corps authority for review and approval. The Water Resources Development Act of 1986, PL 99-662, authorized the acquisition and development of approximately 25,500 acres in the White Oak Creek area, substantially in accordance with the Report of the Chief of Engineers.

Design Memorandum No. 10, Cooper Lake Master Plan, addressed the issue of mitigation for the perimeter lands at Cooper Lake and presented a plan for the development and management of features to improve wildlife habitats.

RED RIVER BASIN, TEXAS

SUPPLEMENT NO. 1
TO THE
MASTER PLAN
DESIGN MEMORANDUM NO. 11

FOR

COOPER LAKE

SULPHUR RIVER, TEXAS

White Oak Creek Mitigation Area

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Status of Design Memoranda

**RED RIVER BASIN
SULPHUR RIVER, TEXAS
COOPER LAKE AND CHANNELS**

STATUS OF DESIGN MEMORANDA

Design:			
Memorandum		SWD	OCE
Number	Title	Submitted	Approval
1	Hydrology and Hydraulics Analysis	7 May 58	23 Jun 58
1-A	Revised Hydrology and Hydraulics Analysis	2 Nov 64	4 Jan 65
	Suppl. No. 1 - Revised Hydrology and Hydraulics Analysis	3 Dec 85	6 Feb 86 Not Req'd
2A-1	GDM-Levees and Channels Upstream from Cooper Reservoir	20 Dec 57	15 May 58
2A-2	GDM - Channels and Levees Downstream from Cooper Reservoir	15 Aug 58	6 Oct 58
2B	GDM - Cooper Dam and Reservoir	30 Nov 61	14 Dec 61 Not Req'd
2B	GDM - Revised - Cooper Dam and Reservoir	14 Jun 67	26 Jun 67
	Suppl. No. 1 - Plan Selection Report	18 Feb 77	3 May 77
	Suppl. No. 1-Rev. - Plan Selection Report	5 Jul 77	11 Aug 77 Not Req'd
	Suppl. No. 2 - Plan Selection Report	13 Mar 81	27 Mar 81 27 Apr 81
3	Detail Design - Cooper Dam and Spillway, Consisting of Vol. 1 - Main Text, Vol. 2 - Plates and Vol. 3 - Appendices	27 Apr 77	28 Dec 77
	Addendum 1 Vol. 1, Addendum 1 Vol. 2, Addendum 1 Vol. 3	25 Apr 79	6 Aug 79 Not Req'd
3	Embankment Spillway and Outlet Works (Revised)	5 Feb 86	23 Apr 86 Not Req'd

STATUS OF DESIGN MEMORANDA (Continued)

<u>Design: Memorandum Number</u>	<u>Title</u>	<u>Submitted</u>	<u>SWD Approval</u>	<u>OCE Approval</u>
3	Suppl. No. 1 - Hopkins County Levee	9 Sep 86	31 Mar 87	Not Req'd
4	Alternative Service Spillway Site Cost Study	30 Sep 69		26 Jan 70
6A	Real Estate - Dam Site	7 Nov 58		1 Apr 59
6B	Real Estate - Reservoir Lands	15 Apr 68		9 Dec 68
6C	Relocation Tucker Cemetery	11 Mar 78	21 Mar 78	***
6C	Relocation Tucker Cemetery (Revised)	12 Jul 85	11 Sep 85	18 Dec 85
6D	Relocation of Friendship and Liberty Grove Cemeteries	10 Jul 87	Oct 87	8 Jan 88
7	Reservoir Clearing	24 Jul 69		3 Nov 69
7	Reservoir Clearing (Revised)	28 Oct 88	17 Jan 89	Not Req'd
8	Construction Materials of Cooper Dam Revised-Construction Materials for Cooper Dam	29 May 59 1 Oct 69		3 Aug 59 16 Dec 69
8	Revised-Supplement No. 1 - Sources of Construction Materials	17 Feb 78	17 Mar 78	Not Req'd
8	Revised-Supplement No. 2 - Construction Materials	12 Nov 85	3 Dec 85	Not Req'd
9	Preliminary Master Plan	Apr 68		22 May 68

STATUS OF DESIGN MEMORANDA (Continued)

<u>Design: Memorandum Number</u>	<u>Title</u>	<u>Submitted</u>	<u>SWD Approval</u>	<u>OCE Approval</u>
10	Master Plan	4 Sep 87	24 Nov 87	Not Req'd
10	Master Plan (Revised) Supplement No. 1	20 Jan 88 This report	15 Apr 88	Not Req'd
11	Relocation of Utilities	20 Aug 70		24 Sep 70
	Suppl. No. A - Reloc. Gas Line (South Access Road)	1 May 78	12 Jun 78	Not Req'd
	Suppl. No. 2 - Reloc. Electric and Gas Lines	24 Apr 87	22 Jun 87	Not Req'd
12	Relocation of Delta and Hopkins County Roads	10 Feb 86	6 Mar 86	Not Req'd
14	Relocation of FM 1528	27 Mar 87	9 Jun 87	Not Req'd
15	Site Geology	10 Mar 78		11 May 78
17	Recreation Facilities	***		
18	Project Building	***		
20	Relocation - West Delta Water Supply Corporation	5 Jun 86	4 Mar 87	Not Req'd
21	Disposition of State Highway 24, Farm to Market 71, Farm to Market 1531, and Farm to Market 1880	4 Sep 87	30 Oct 87	Not Req'd

STATUS OF DESIGN MEMORANDA (Continued)

<u>Design: Memorandum Number</u>	<u>Title</u>	<u>Submitted</u>	<u>SWD Approval</u>	<u>OCE Approval</u>
22	Real Estate - Acquisition of Wildlife Mitigation Lands	23 Sep 88		9 Nov 88
23	Reservoir Filling Plan/Flood Emergency Plan	**		

** Not Yet Scheduled

*** Action Suspended

Chapter I - Introduction

CHAPTER I

INTRODUCTION

1.01 PURPOSE

The creation of Cooper Lake will result in the loss of bottomland hardwood habitat. While both the *Final Supplemental Environmental Impact Statement* and the *Cooper Lake Master Plan* address the compensation to be provided for wildlife habitat loss, this supplement elaborates specifically on the development and management of the White Oak Creek Mitigation Area.

Background - In May 1971, project construction at Cooper Lake was halted by a court injunction pending the filing of an Environmental Impact Statement (EIS) in compliance with the National Environmental Policy Act of 1969. The New Orleans District, Corps of Engineers prepared an EIS, which was filed with the Council on Environmental Quality on June 24, 1977. The U.S. District Court for the Eastern District of Texas, on December 8, 1978, declared the Environmental Impact Statement to be legally inadequate and enjoined the project until deficiencies were corrected. One of the deficiencies cited was the lack of an adequate fish and wildlife mitigation plan. A *Supplemental Environmental Impact Statement (SEIS)* was prepared by the Fort Worth District, Corps of Engineers, in coordination with the U.S. Fish and Wildlife Service (USFWS), and filed with the Environmental Protection Agency in March 1981. The *SEIS* was subsequently filed with the court in July 1981. In March 1983, the court issued an Amended Memorandum Opinion and Permanent Injunction against the construction of the lake. An appeal

was initiated in May 1983 and on July 16, 1984, the New Orleans Fifth Circuit Court of Appeals reversed the District Court's opinion and dissolved the injunction against the construction of Cooper Lake. Construction of the project has proceeded since that time with deliberate impoundment scheduled for 1991.

Acquisition and development costs associated with mitigation will be a joint cost of the Cooper Lake and Channels Project, divided proportionately between the Federal Government and the project sponsors, the North Texas Municipal Water District, the Sulphur River Municipal Water District (made up of the cities of Sulphur Springs, Commerce, and Cooper), and the city of Irving, Texas. Operations and maintenance costs will be shared by the Federal Government, the project sponsors, and the State of Texas. These costs are discussed in detail in Chapter VI of this supplement.

1.02 SCOPE

The scope of this Supplement to the Master Plan is to address, in general, the authority for the acquisition, development, and management of all lands identified and designated for the purpose of wildlife mitigation for the Cooper Lake project, and more specifically, to discuss the development, management and operation of those lands which are located within the White Oak Creek area.

Selection of Lands for Mitigation - At the time when the fish and wildlife mitigation plan for Cooper Lake was formulated, Corps policy directed that consideration be given to the management of lands already in public ownership prior to the acquisition of specific mitigation lands. Corps policy (consistent with USFWS policy) directs that, to the extent possible, mitigation measures be in-kind, i.e. they are to be of similar type and quality, and they

should be developed contiguous to the project, or at least within the same basin. The USFWS recommended plan of improvement, which is addressed in the *SEIS*, included the recommended acquisition of approximately 34,000 acres of additional land for wildlife mitigation. After review of available public lands, both federal and state, within a 150 mile radius of the project, it was determined that existing lands had neither available tracts of bottomland hardwoods sufficient in size, or that existing lands were already being managed for wildlife purposes. Two areas then were considered for acquisition - the uplands and flood plain upstream of the project, along with lands along the Sulphur River downstream of the dam site; and the lands upstream of the existing Wright Patman Lake, along the Sulphur River and White Oak Creek flood plains, about 60 miles below Cooper Lake Dam. The latter area was selected because it met the following criteria: the lands are within the same river basin as the Cooper Lake project; the acreage contains sufficient bottomland hardwoods; wildlife habitats in the area are in-kind; and the lands are within the perpetual flowage easements of Wright Patman Lake, which are already encumbered by the United States. The *Corps Recommended Plan* for terrestrial mitigation, in Appendix B of the *SEIS*, recommended the acquisition of approximately 25,500 acres within the White Oak Creek area, with compensation credit to be given for the development and management of approximately 10,000 acres of perimeter lands at Cooper Lake for wildlife mitigation purposes. This plan was subsequently approved (see authorization below), and the *Cooper Lake Master Plan* allocates all Cooper Lake perimeter lands not needed for project operations or recreation as a wildlife management area. The management of these perimeter lands is addressed in Chapter VIII of the master plan.

This *Supplement No. 1* to the master plan specifically addresses the plans for development and management of approximately 25,500 acres

within the White Oak Creek area. These lands are hereafter referred to as the White Oak Creek Mitigation Area.

1.03 AUTHORITIES FOR SUPPLEMENTAL FEATURES

The *Report on Acquisition of Wildlife Mitigation Lands* was sent to the Board of Engineers for Rivers and Harbors in September 1981. This report contained the *Corps Recommended Plan* from the *SEIS*, which included the recommendation that the existing Cooper Lake and Channels Project be modified to include fee acquisition of approximately 25,500 acres of land presently encumbered by a flowage easement for the Wright Patman Lake Project, and that these lands be developed and managed for wildlife mitigation purposes. The Board of Engineers for Rivers and Harbors endorsed this plan in their letter to the Chief of Engineers on October 19, 1981 (Appendix C). The Report of the Chief of Engineers to the Secretary of the Army, dated May 21, 1982, also endorsed the *Corps Recommended Plan* (Appendix C). The *Corps Recommended Plan* for mitigation was authorized by Congress in Public Law 99-662, the Water Resources Development Act of 1986.

1.04 CORPS ACTIONS PRIOR TO THIS SUPPLEMENT

Three significant activities have been initiated prior to this supplement which have direct bearing on the subject of this document.

Texas Parks and Wildlife Involvement - The formulation of the *Corps Recommended Plan* in the *SEIS* included coordination with the Texas Parks and Wildlife Department (TPWD). In a letter dated 6 January 1982, Mr. Charles Travis, TPWD Executive Director, indicated that the Texas Parks and Wildlife Commission has approved TPWD's acceptance of operations and maintenance (O&M) responsibilities for the wildlife mitigation lands, both at Cooper Lake and in the White Oak Creek area (Appendix C). Given this level

of commitment, the *Cooper Lake Master Plan* and this *Supplement No. 1* assume TPWD to be the project operator for mitigation lands at Cooper Lake and the White Oak Creek Mitigation Area.

Design Memorandum No. 10, Cooper Lake Master Plan, directly addresses the issue of mitigation for the perimeter lands at Cooper Lake. In accordance with the *Corps Recommended Plan* for mitigation in the *SEIS*, all perimeter lands not required for project operations or recreation have been designated as a wildlife management area. Chapter II of the master plan discusses the resources available at the Cooper Lake project; Chapter V identifies the lands which are designated as a wildlife management area; and Chapter VIII presents a plan for the development and management of features to improve the wildlife habitats on these lands. TPWD will operate and maintain these lands concurrently with the White Oak Creek Mitigation Area as a total package to accomplish the mitigation goals for the Cooper Lakes and Channels Project.

Design Memorandum No. 22, Real Estate Acquisition Plan for the White Oak Creek area, identifies the tracts within the Wright Patman Lake flowage easement which are to be acquired in fee. The property boundaries shown in this supplement and the land area measurements described herein are based on the proposed acquisition lines shown in Design Memorandum No. 22. Because all the tracts within the proposed Mitigation Area have not been surveyed at the time of the development of this document, the exact acreages of the tracts are not known. If the property surveys indicate that the proposed tracts fall significantly short of the authorized 25,500 acres, additional tracts will be acquired within the flowage easement along the Sulphur River, immediately north of Interstate 30.

Chapter 11 - Existing Conditions

CHAPTER II

EXISTING CONDITIONS

2.01 GENERAL

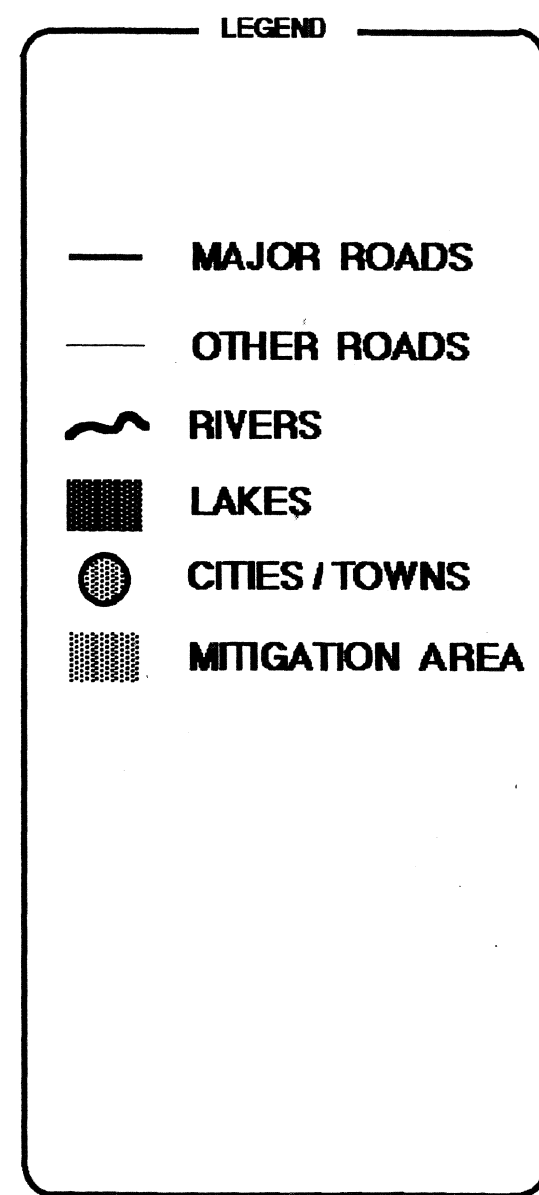
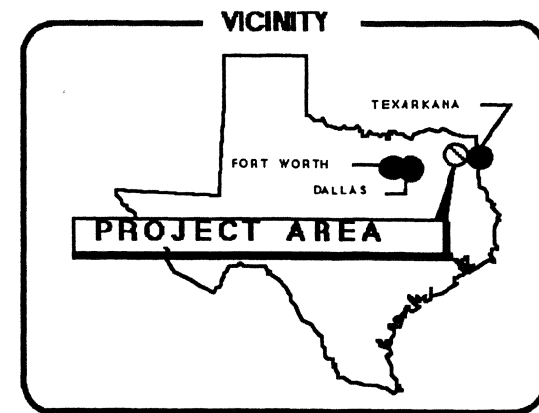
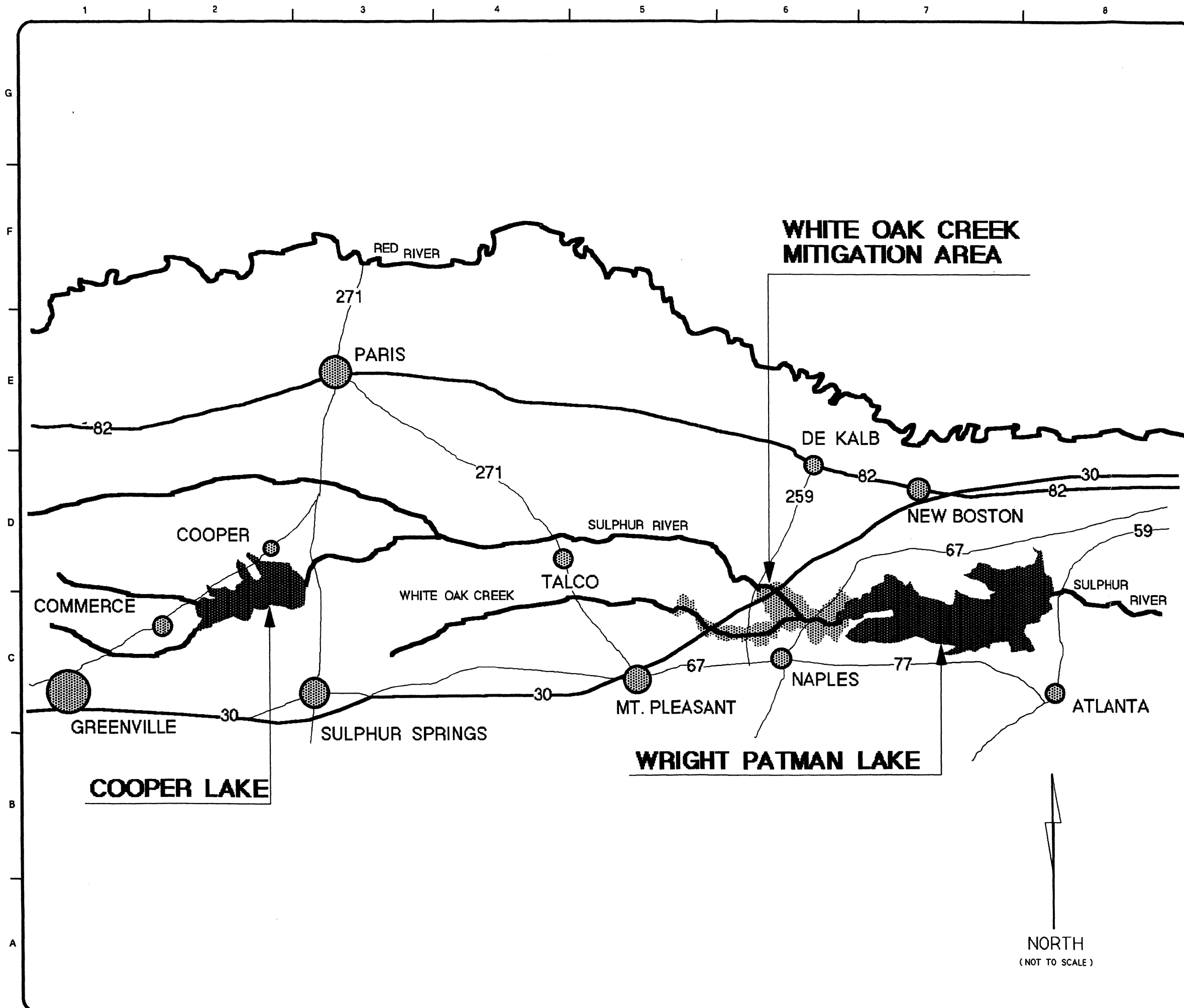
The White Oak Creek Mitigation Area covers approximately 25,500 acres in Bowie, Cass, Morris, and Titus Counties, Texas (Plate 2-1). Its boundary generally coincides with that portion of the Wright Patman Lake flowage easement boundary located along the Sulphur River south of Interstate Highway 30, and along White Oak Creek (Plate 2-2). Much of the area is forested bottomland and is subjected to periodic overflow from approximately 16.9 river miles of the Sulphur River and 25.6 river miles of White Oak Creek.

2.02 CLIMATE

Mean annual precipitation in the project area is 44-48 inches. First and last freeze dates occur in early November and late March, respectively. Mean annual temperature is 64-66 degrees Fahrenheit, with 230 to 245 days in the growing season.

2.03 SOILS

The U.S. Department of Agriculture Soil Conservation Service (SCS) will publish a modern soil survey in 1990 for Titus and Morris Counties and by 1995 for Cass County. A modern soils survey has already been published for Bowie County (1980). When available this soil information will be useful for detailed natural resource planning.



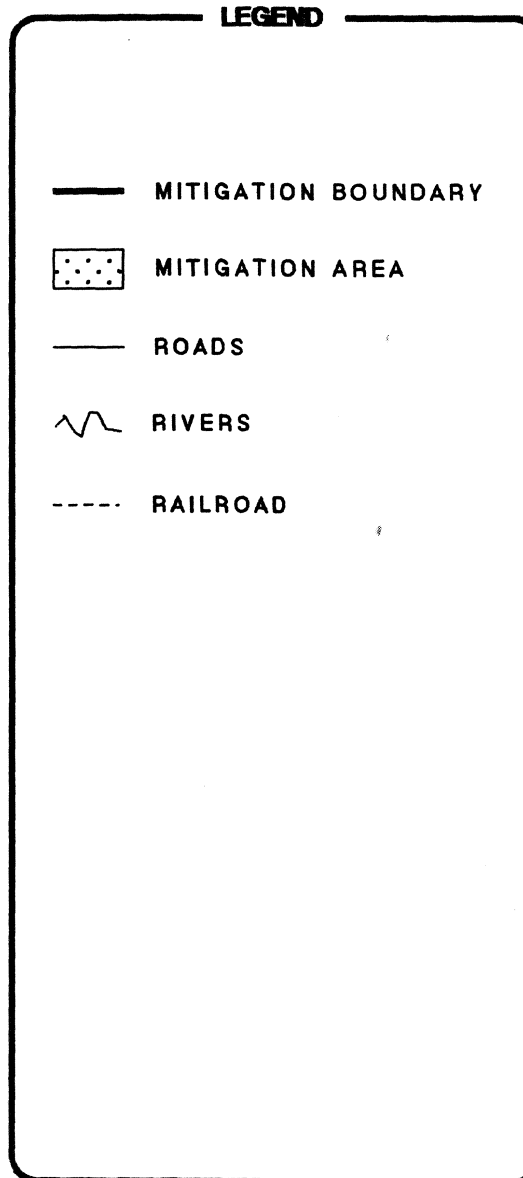
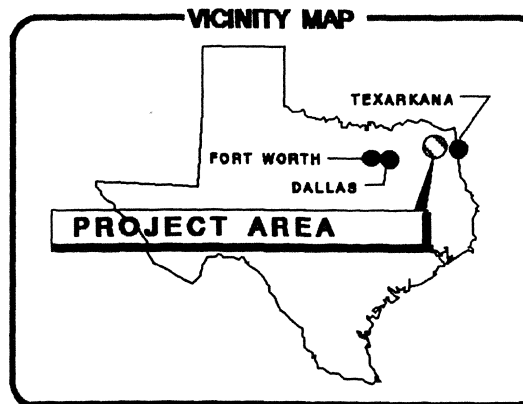
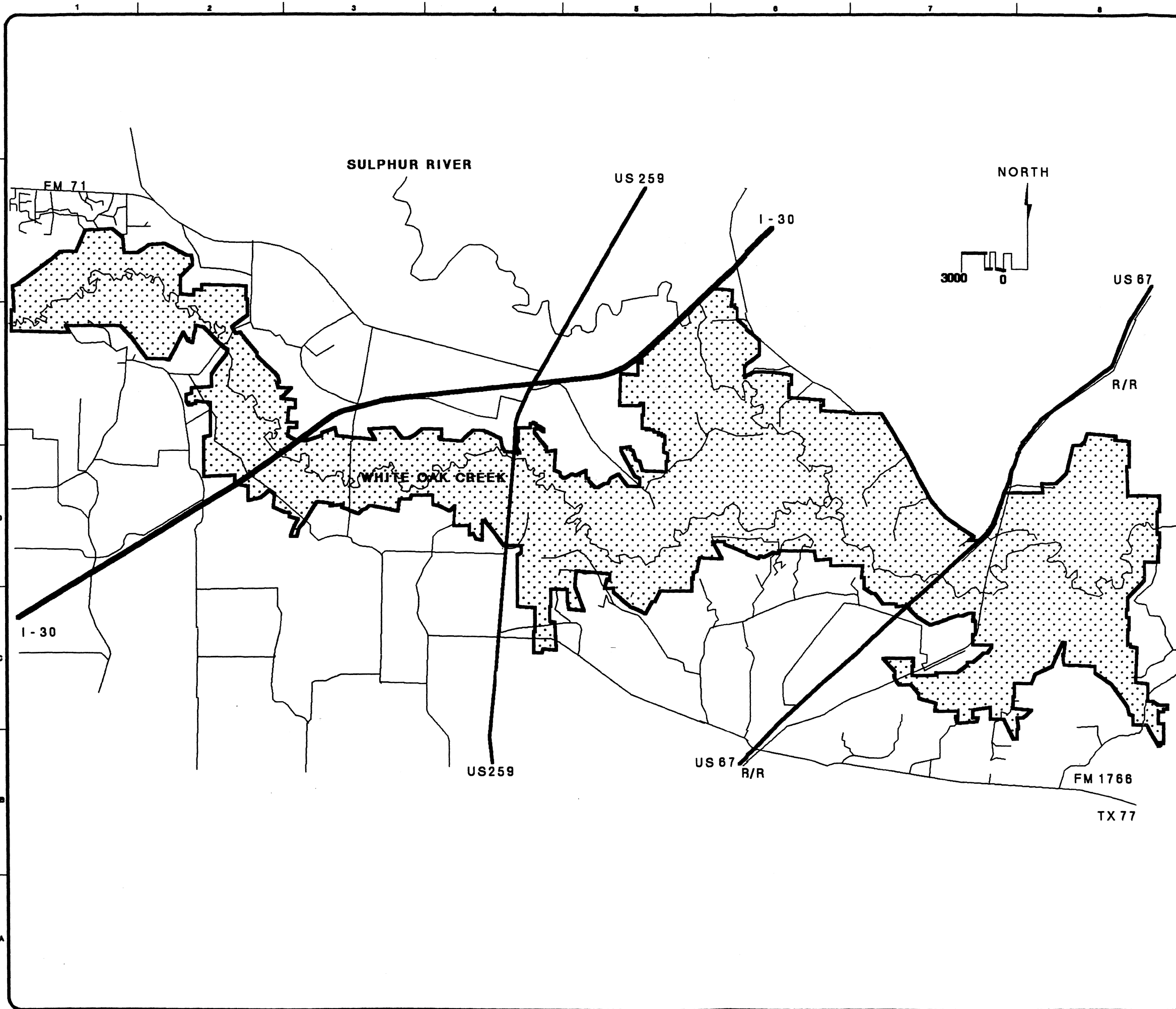
U. S. ARMY ENGINEER DISTRICT, FORT WORTH
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**SUPPLEMENT NO. 1 TO THE MASTER PLAN
 WILDLIFE MITIGATION LANDS
 PROJECT LOCATION MAP**

HYTATD NO.	DATE: APRIL, 68
CONTRACT NO.	SHEET NO. SEQUENCE NO.
DRAWING NUMBER	1 OF 1 2-1

NORTH
 (NOT TO SCALE)



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**SUPPLEMENT NO. 1 TO THE MASTER PLAN
WHITE OAK CREEK
MITIGATION AREA**

INVITATION NO.	DATE: APRIL, 68
CONTRACT NO.	SHEET NO. 1 OF 1
DRAWING NO.	SEQUENCE NO. 2 OF 2

Since detailed soils information was lacking during planning for the majority of the project site, a general soil association map was compiled using maps and soil descriptions supplied by SCS (Plate 2-3).

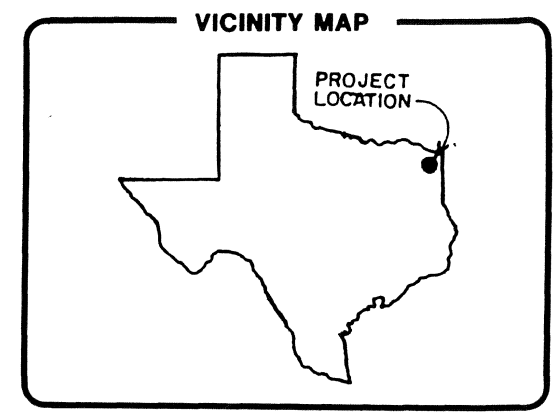
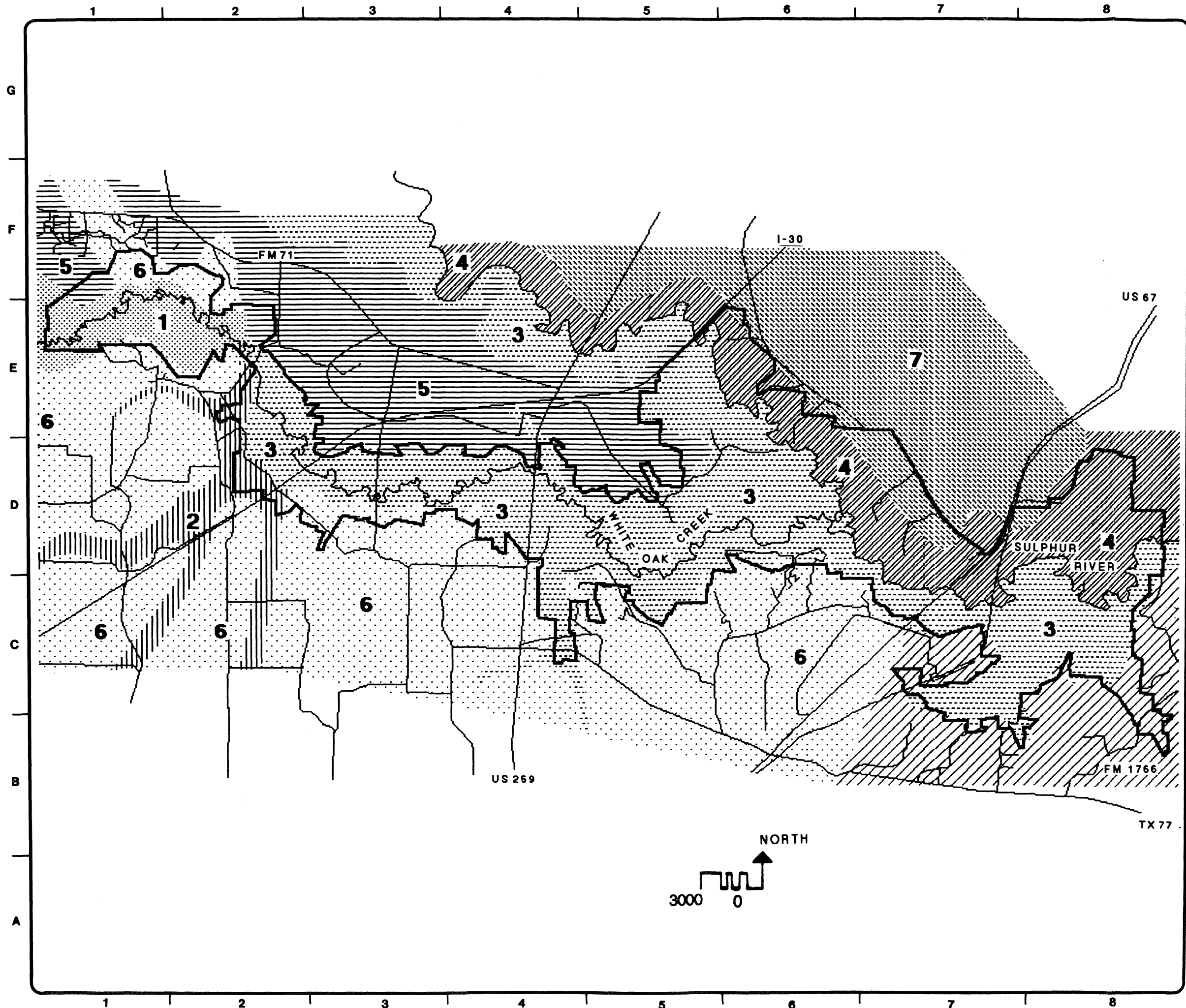
Bottomland Soils

1. Estes - This is an area of nearly level, somewhat poorly drained, loamy, very slowly permeable, acid soils. Estes soils make up about 61 percent of the unit. The remaining 39 percent is made up of soils that are either sandy, more permeable, or better drained. The soils of this unit are primarily used for woodlands. A few areas are in pastures.

2. Nahatche - This is an area of nearly level, moderately well drained to somewhat poorly drained, loamy, moderately permeable, frequently flooded, and acid soils. Nahatche soils make up about 73 percent of the unit. The remaining 27 percent is made up of clayey, occasionally flooded, or better drained soils. This unit is mainly used for woodlands and pastures. A few small areas are cropped.

3. Kaufman-Gladewater - This is an area of nearly level, somewhat poorly drained, clayey, very slowly permeable, frequently flooded, non-acid soils. Kaufman soils make up about 54 percent of the unit and Gladewater soils about 22 percent of the unit. The remaining 24 percent is made up of soils that differ mainly in being loamy or better drained. These soils are mainly used for woodlands. A small acreage has been cleared and planted to improved pastures.

4. Gladewater-Texark - This is an area of poorly drained, very slowly permeable clayey soils that are frequently flooded. Gladewater soils make up about 40 percent of the unit; Texark soils, about 11 percent; and other soils, about 49 percent. Most of these soils are used for woodlands and for wildlife habitat.



LEGEND

SOIL ASSOCIATIONS

BOTTOMLAND SOILS

- 1 ESTES
- 2 NAHATCHE
- 3 KAUFMAN - GLADEWATER
- 4 GLADEWATER-TEXARK

TERRACE SOILS

- 5 DERLY-RAINO-TALCO

UPLAND SOILS

- 6 WOODTELL - FREESTONE
- 7 SAWYER-EYLAU- WOODTELL
- 8 KIRVIN - BOWIE

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**SUPPLEMENT NO. 1 TO THE MASTER PLAN
WHITE OAK CREEK MITIGATION AREA
GENERAL SOILS MAP**

INVITATION NO.	DATE:
CONTRACT NO.	SHEET NO. SEQUENCE
DRAWING NUMBER	1 of 1 2 ND -3

Terrace Soils

5. Derly-Raino-Talco - This is an area of nearly level, moderately well drained to somewhat poorly drained, loamy soils on stream terraces. Derly soils make up about 34 percent of the unit; Raino soils about 14 percent; and Talco soils about 11 percent. The remaining 41 percent is made up of better drained or frequently flooded soils. This unit is used mainly for woodlands. A few small areas are used for pastures and croplands.

Upland Soils

6. Woodtell-Freestone - This is an area of gently sloping to moderately steep, moderately well drained, loamy soils. Woodtell soils make up about 52 percent of the unit and Freestone soils about 29 percent. The remaining 19 percent is made up of soils that are sandy, wet, or loamy flood plain soils. This unit is used primarily for pastures and woodlands, but in some areas it is cultivated.

7. Sawyer-Eylau-Woodtell - This is an area of moderately well drained, moderately slowly permeable to very slowly permeable soils. Sawyer soils make up about 39 percent of the unit; Eylau soils, about 14 percent; and Woodtell soils, about 12 percent. The soils in this map unit are used mainly for pastures and woodlands, but in some areas they are cultivated.

8. Kirvin-Bowie Association - This is an area of gently rolling upland soils used for pastures and woodlands. Kirvin soils make up about 45 percent of the association. They are gently sloping, well drained, and moderately slowly permeable. Bowie soils make up about 35 percent of the association. They are gently undulating, well drained, and moderately permeable. The remaining 20 percent of the association consists of soils in narrow floodplains or soils that are moderately well drained.

2.04 WILDLIFE RESOURCE INVENTORY

The White Oak Creek Mitigation Area is located within the Post Oak Savannah ecological area of Texas (Gould 1962). The Post Oak Savannah is a gently rolling to hilly region dominated by open pastures interspersed by hardwood trees and woodlots. Bottomland hardwood forests occur along the floodplains of major drainage areas. The White Oak Creek Mitigation Area is primarily a bottomland hardwood forest.

Several federally listed threatened or endangered species may occur at the Mitigation Area (Table 2-1). None are likely to be adversely affected by acquisition and management of these lands as described herein.

Texas Parks and Wildlife Department files (White Oak Creek Ecological Management Unit Data Base, unpublished 1987 data) provided much of the following data on adjacent land uses, climate, plant and animal species, and cover types in the region. Flora and fauna lists, which are more thorough than the lists provided herein, are included in the *Cooper Lake Master Plan*.

2.05 ADJACENT LAND USES

The Texas Parks and Wildlife Department lists wheat, soybeans, oats, sorghum, rice, hay, timber, vegetables, peaches, peanuts, watermelons, and corn as major crops in the project vicinity. Livestock production involves hogs, poultry, and dairy and beef cattle (stocked at an average rate of one animal per 3-5 acres). Coastal bermudagrass (*Cynodon dactylon*) and bahia (*Paspalum notatum*) are commonly introduced range grasses.

TABLE 2-1
Federally Listed Threatened or Endangered Species
That May Occur at the White Oak Creek Mitigation Area

<u>Listed Species</u>	<u>Scientific Name</u>	<u>Status</u>
American peregrine falcon	<u>Falco peregrinus anatum</u> (Statewide migrant)	ENDANGERED
Arctic peregrine falcon	<u>Falco peregrinus tundrius</u> (Statewide migrant)	THREATENED
Bald eagle	<u>Haliaeetus leucocephalus</u> (Statewide migrant)	ENDANGERED
Black-capped vireo	<u>Vireo atricapillus</u> (Statewide migrant)	ENDANGERED
Interior least tern	<u>Sterna antillarum athalassos</u> (Statewide migrant)	ENDANGERED
Piping plover	<u>Charadrius melodus</u> (Statewide migrant)	THREATENED
Red-cockaded woodpecker ¹	<u>Picoides borealis</u>	ENDANGERED

1/ The Texas Parks and Wildlife Department has received reports regarding Red-cockaded woodpecker occurrence in Cass County, Texas (David Sierra, pers. commun.) Extent has not been determined.

Major petroleum fields are located at Sulphur Bluff, approximately 16 miles northeast of Sulphur Springs; Talco, approximately 5 miles east of Hagensport; Trix-Liz, approximately 10 miles east of Hagensport; and Pewitt Ranch, just north of and adjacent to the White Oak Creek Mitigation Area. Major coal mining sites include Como-Winfield and a site 3 miles east of Mount Pleasant on U.S. Highway 67.

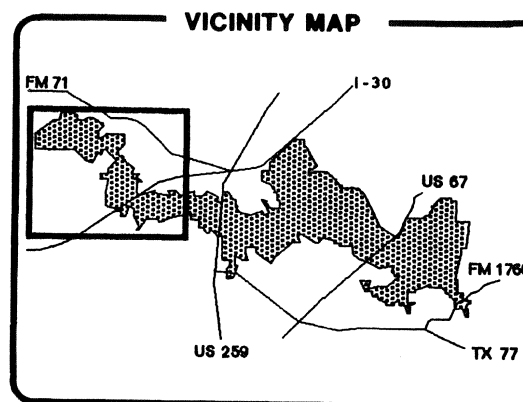
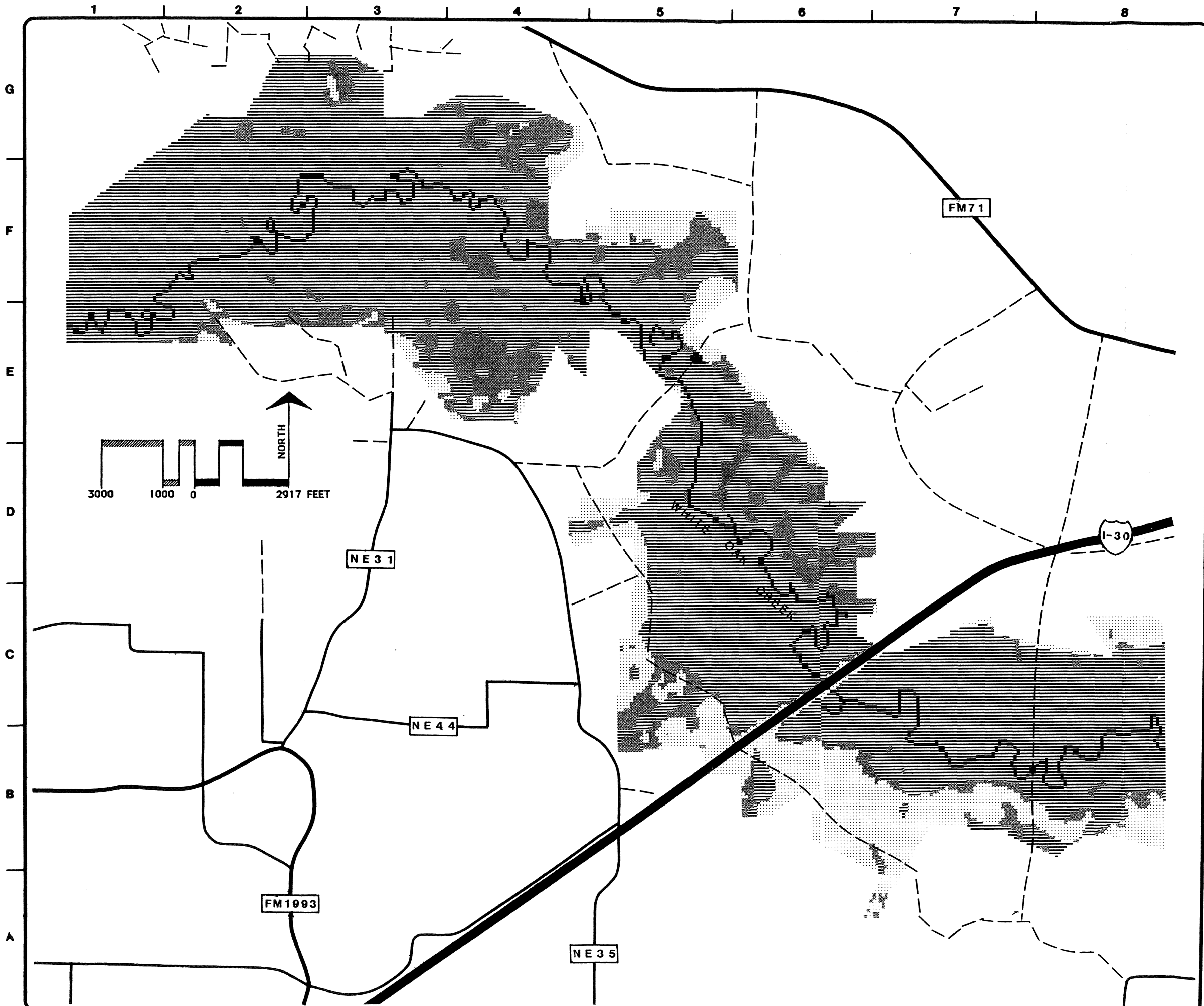
2.06 HABITAT TYPES / MANAGEMENT UNITS

The major habitat types at the White Oak Creek Mitigation Area are row crop agricultural lands, bottomland hardwood forests, pine-hardwood forests, herbaceous wetlands, upland pastures, and aquatic habitats. The distribution of habitats is shown on Plate 2-4 and the approximate acreages of each habitat are listed in Table 2-2.

TABLE 2-2
Habitat Type Quantities for the White Oak Creek Mitigation Area

<u>Habitat Type</u>	<u>Acreage</u>	<u>Percent</u>
Row Crop Agricultural Lands	964	4.0
Upland Pastures	3208	13.0
Pine Forests	111	0.5
Pine-Hardwood Forests	2863	11.6
Bottomland Hardwood Forests	16,703	68.0
Bottomland Forest Regrowth	144	0.6
Aquatic Habitats	528	2.1
Roads	<u>53</u>	<u>0.2</u>
	24,574 ¹	100.0

1/ Exact acreage is not yet known. See page 5, last paragraph.



LEGEND

EXISTING ROADS

- INTERSTATE HIGHWAY
- U.S. HIGHWAY
- STATE HIGHWAY
- FARM TO MARKET
- COUNTY (SURFACED)
- COUNTY (UNSURFACED)
- PRIVATE (SURFACED)
- PRIVATE (UNSURFACED)
- RAILROAD

VEGETATIVE COVER

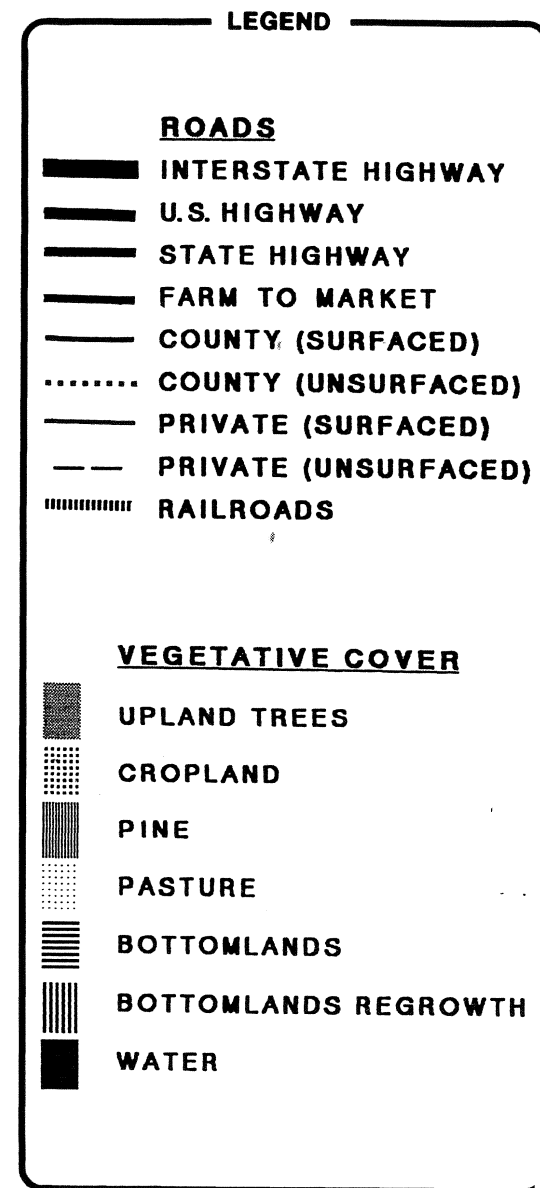
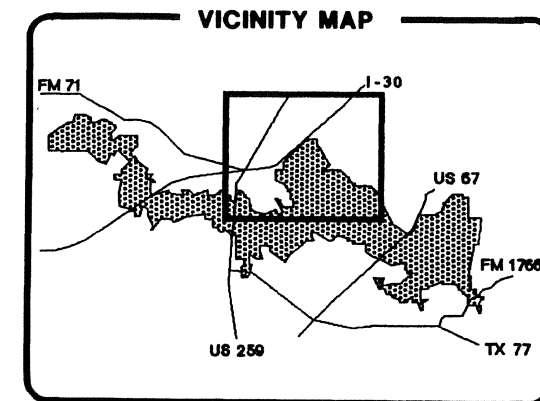
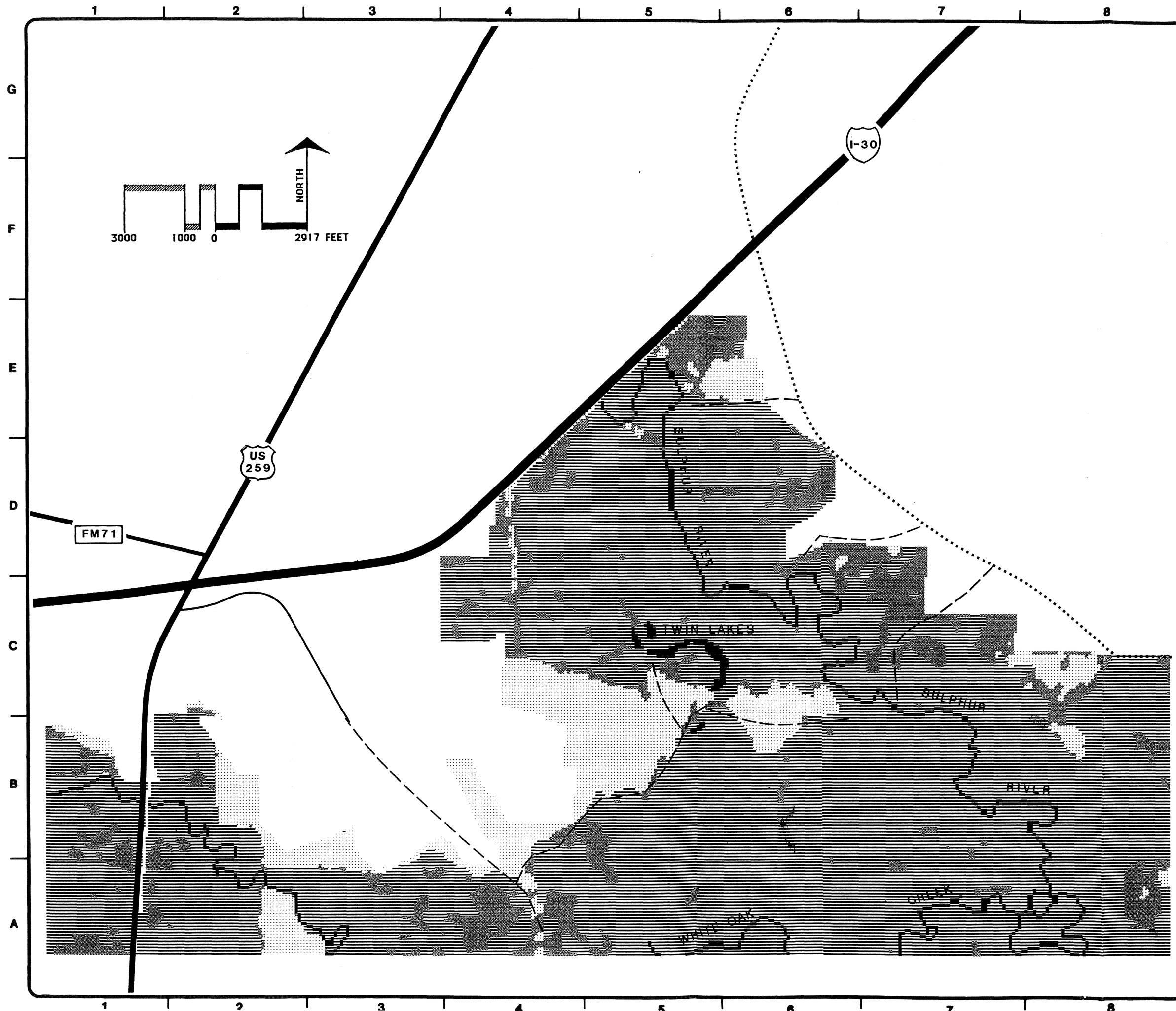
- PINE - HARDWOOD FORESTS
- CROPLAND
- PINE
- PASTURE
- BOTTOMLAND HARDWOOD FORESTS
- BOTTOMLANDS REGROWTH
- WATER

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**SUPPLEMENT NO. 1 TO THE MASTER PLAN
WHITE OAK CREEK MITIGATION AREA
VEGETATIVE COVER MAP**

INVITATION NO.	DATE: APRIL 89
CONTRACT NO.	SHEET NO. SEQUENCE
DRAWING NUMBER	1 of 4 2 nd 4

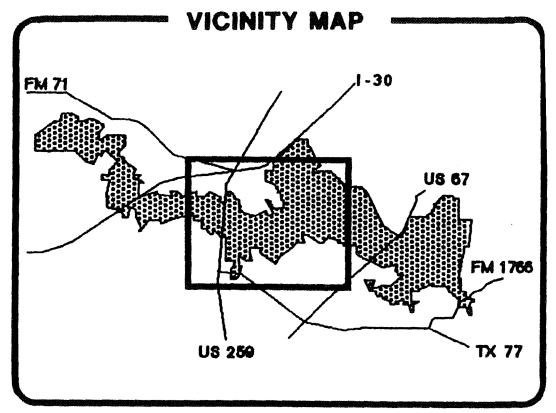
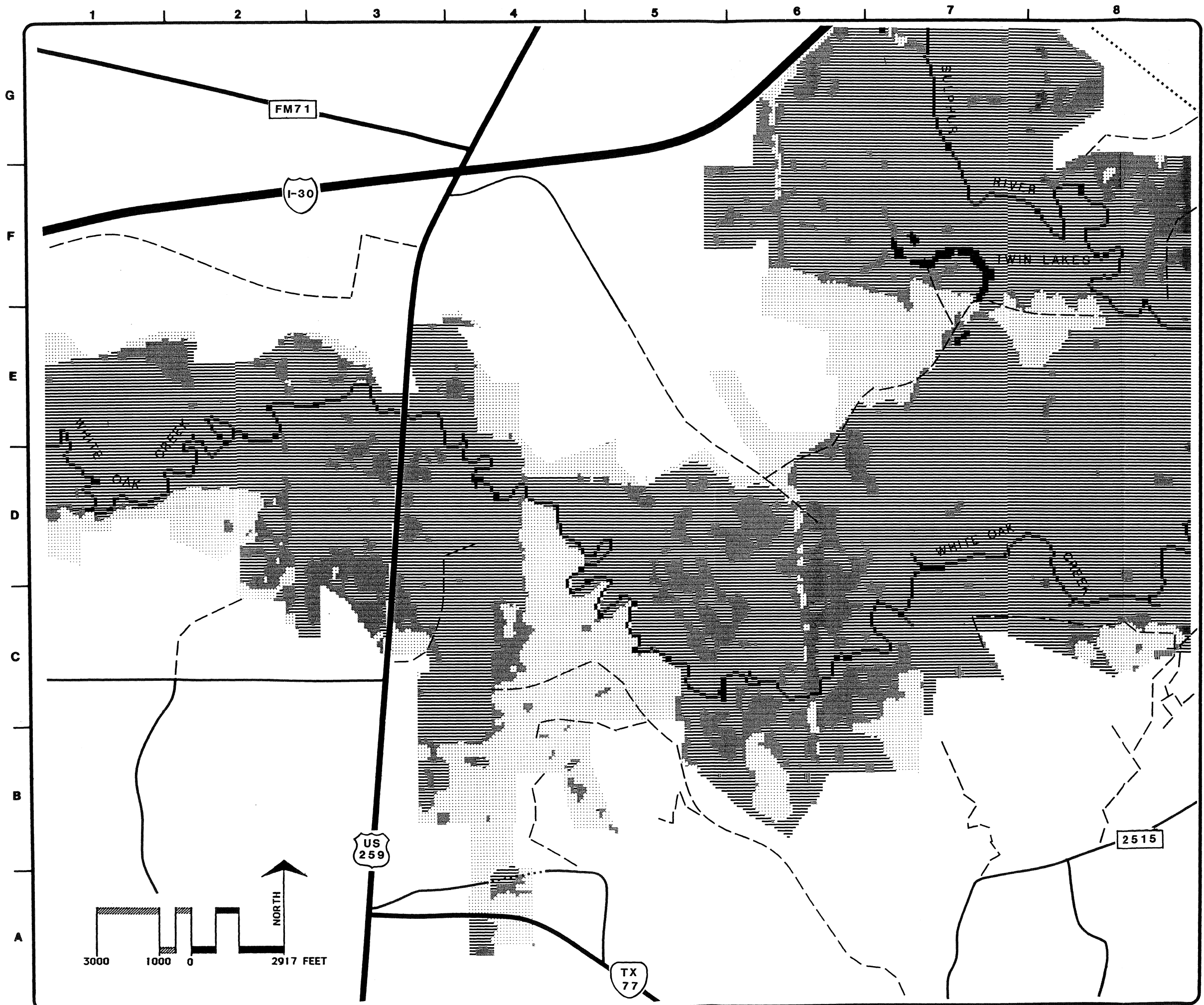


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SUPPLEMENT NO. 1 TO THE MASTER PLAN
WHITE OAK CREEK MITIGATION AREA
VEGETATIVE COVER MAP

INVITATION NO.	DATE: APRIL 68
CONTRACT NO.	SHEET NO. SEQUENC
DRAWING NUMBER	2 of 4 2-4



LEGEND

EXISTING ROADS

- INTERSTATE HIGHWAY
- U.S. HIGHWAY
- STATE HIGHWAY
- FARM TO MARKET
- COUNTY (SURFACED)
- COUNTY (UNSURFACED)
- PRIVATE (SURFACED)
- PRIVATE (UNSURFACED)
- RAILROAD

VEGETATIVE COVER

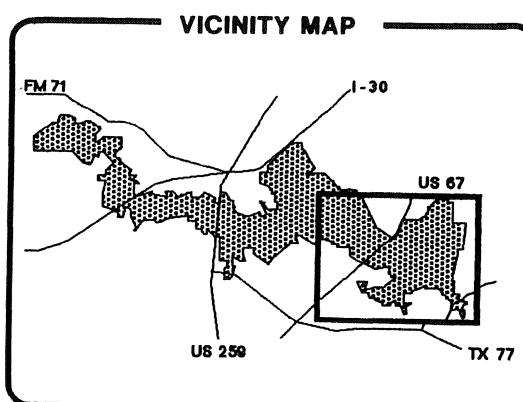
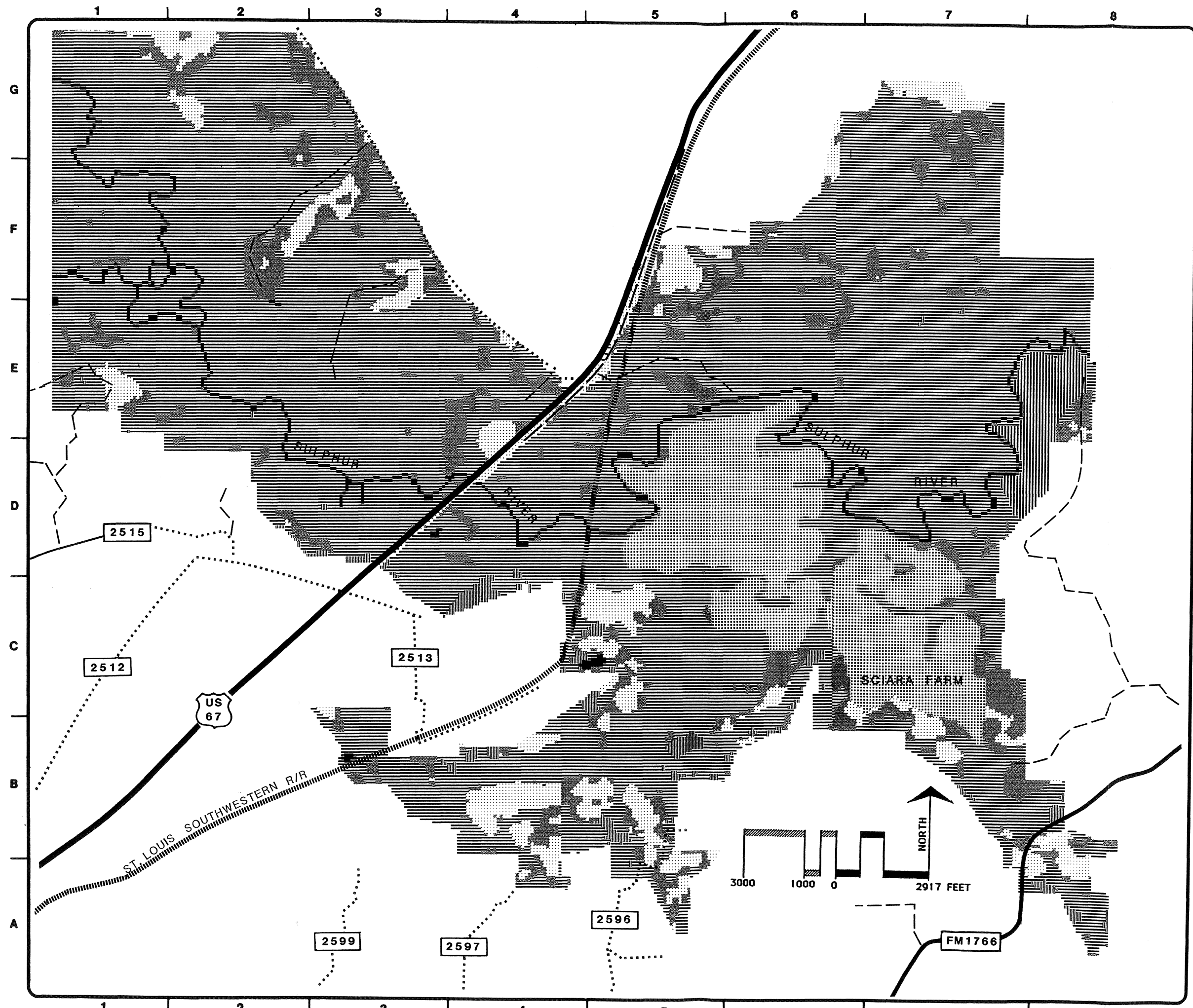
- PINE - HARDWOOD FORESTS
- CROPLAND
- PINE
- PASTURE
- BOTTOMLAND HARDWOOD FORESTS
- BOTTOMLANDS REGROWTH
- WATER

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SUPPLEMENT NO. 1 TO THE MASTER PLAN
WHITE OAK CREEK MITIGATION AREA
VEGETATIVE COVER MAP

INVITATION NO.	DATE: APRIL, 88
CONTRACT NO.	SHEET NO. SEQUENCE
DRAWING NUMBER	3 of 4 2-4



LEGEND

EXISTING ROADS

- INTERSTATE HIGHWAY
- U.S. HIGHWAY
- STATE HIGHWAY
- FARM TO MARKET
- COUNTY (SURFACED)
- COUNTY (UNSURFACED)
- PRIVATE (SURFACED)
- PRIVATE (UNSURFACED)
- RAILROAD

VEGETATIVE COVER

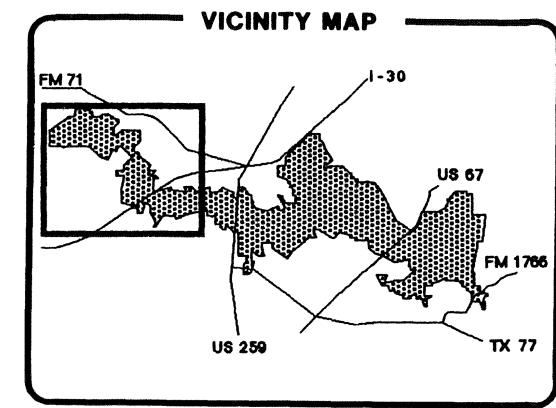
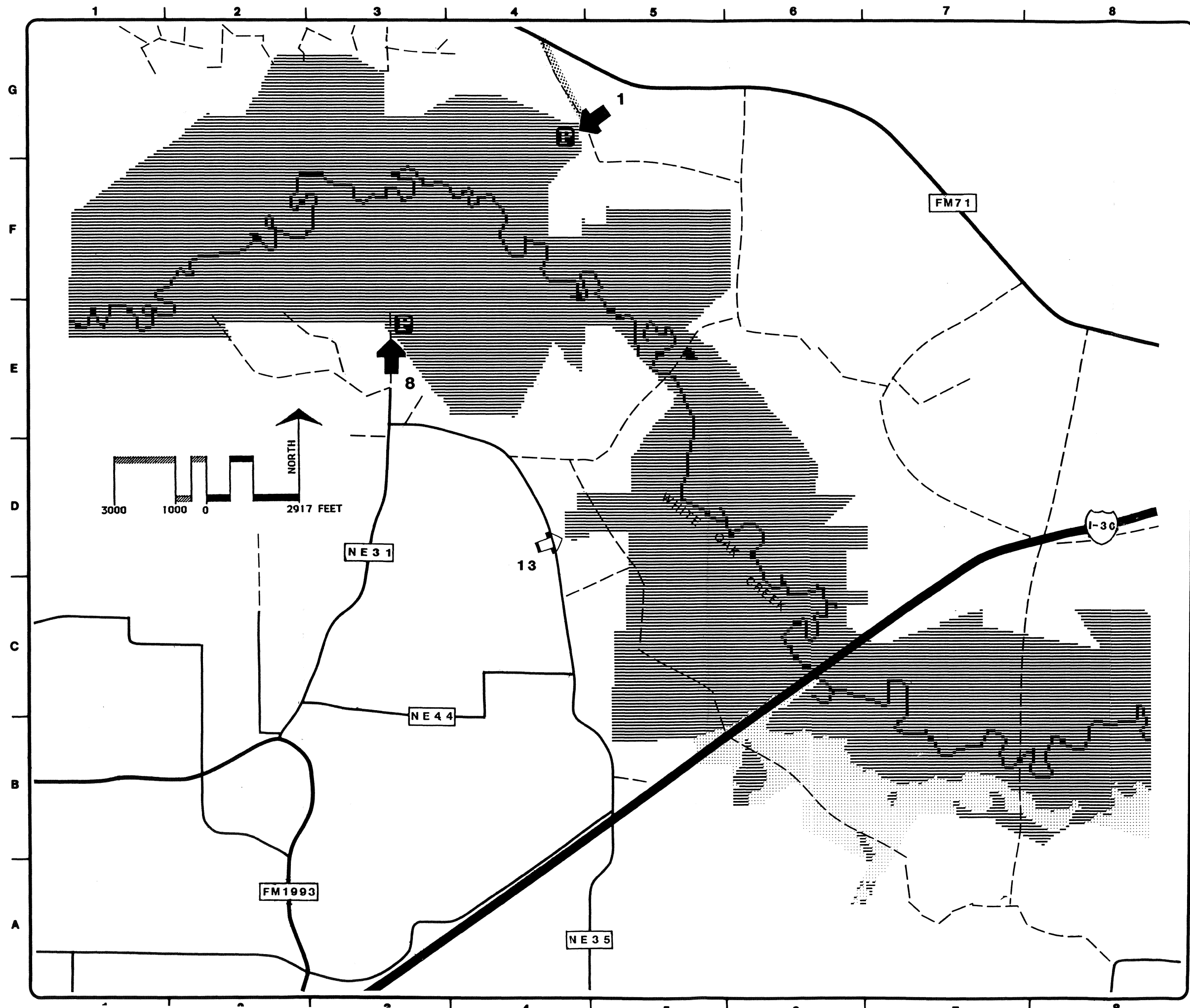
- PINE - HARDWOOD FORESTS
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SUPPLEMENT NO. 1 TO THE MASTER PLAN
WHITE OAK CREEK MITIGATION AREA
VEGETATIVE COVER MAP

INVITATION NO.	DATE: APRIL, 88
CONTRACT NO.	SHEET NO. SEQUENCE
DRAWING NUMBER	4 of 4 2 of 4



LEGEND

EXISTING ROADS

- INTERSTATE HIGHWAY
- U.S. HIGHWAY
- STATE HIGHWAY
- FARM TO MARKET
- COUNTY (SURFACED)
- COUNTY (UNSURFACED)
- PRIVATE (SURFACED)
- PRIVATE (UNSURFACED)
- RAILROAD

DEVELOPMENT PROPOSALS

- ROADS TO BE CLOSED
- NEW EASEMENTS
- NEW ROADS
- MAJOR PARKING AREA
- MINOR PARKING AREA
- BOAT LAUNCH
- FENCE EXISTING T.P.W.D. BOAT RAMP FOR CONTROLLED ACCESS

MANAGEMENT CATEGORIES

- CONVERTED BOTTOM LAND
- UPLAND PASTURE
- RIVER/AQUATIC HABITAT
- FORESTED LAND

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SUPPLEMENT NO. 1 TO THE MASTER PLAN
WHITE OAK CREEK MITIGATION AREA
WILDLIFE MANAGEMENT PLAN

INVITATION NO.	DATE: APRIL, 88
CONTRACT NO.	SHEET NO. SEQUENCE
DRAWING NUMBER	1 of 4 5 ¹² 1

Row Crop Agricultural Lands - Most of the row crop agriculture now occurring within the White Oak Creek Mitigation Area takes place on Gladewater clay or similar soils (Charles Snowden, U.S. Soil Conservation Service, pers. commun.). Gladewater is poorly drained, very slowly permeable clayey soil that is frequently flooded. In its undisturbed state, this soil supports bottomland hardwood forests on nearly level floodplains. Row crop agricultural lands constitute a relatively small part (964 acres, or about 4 percent) of the White Oak Creek Mitigation Area. The large row crop agricultural site shown on Plate 2-4, near the east end of the area, was cleared of bottomland hardwoods for planting soybeans (Photograph 1). Much of the area has remained in a fallow condition over the last 5 years. Common plants noted during several site visits include those listed in Table 2-3.

TABLE 2-3

Common Plants on Row Crop Agricultural Lands in the White Oak Creek Mitigation Area. May 5, 1987, June 22-26 and August 23-24, 1988

<u>Common Name</u>	<u>Botanical Name</u>
GRAMINOIDS	
Bahia	<u>Paspalum notatum</u>
Barnyard grass	<u>Echinochloa crusgalli</u>
Bermudagrass	<u>Cynodon dactylon</u>
Broomsedge bluestem	<u>Andropogon virginicus</u>
Cattail	<u>Typha sp.</u>
Dallis grass	<u>Paspalum dilatatum</u>
Crabgrass	<u>Digitaria sp.</u>
Giant cane	<u>Arundinaria gigantea</u>

Table 2-3 (Continued)

<u>Common Name</u>	<u>Botanical Name</u>
Johnson grass	<u>Sorghum halepense</u>
Little barley	<u>Hordeum pusillum</u>
Rush	<u>Juncus spp.</u>
Sandbur	<u>Cenchrus sp.</u>
Sedges	<u>Cyperus spp.</u>
Tridens	<u>Tridens strictus</u>
FORBS	
Bindweed	<u>Convolvulus arvensis</u>
Butterfly-weed	<u>Aesclepias tuberosa</u>
Camphor weed	<u>Heterotheca sp.</u>
Common balloon-vine	<u>Cardiospermum halicacabum</u>
Dodder	<u>Cuscuta sp.</u>
Dock	<u>Rumex crispus</u>
Doveweed	<u>Croton capitatus</u>
Giant ragweed	<u>Ambrosia trifida</u>
Nightshade	<u>Solanum spp.</u>
Partridge pea	<u>Cassia fasciculata</u>
Plantain	<u>Plantago sp.</u>
Passion-flower	<u>Passiflora sp.</u>
Poorjoe	<u>Diodia terres</u>
Rattlesnake weed	<u>Daucus pusillus</u>
Rose vervain	<u>Verbena canadensis</u>
Sensitive briar	<u>Schrankia sp.</u>
Sesbania	<u>Sesbania vesicaria</u>

Table 2-3 (Continued)

<u>Common Name</u>	<u>Botanical Name</u>
Short ragweed	<u>Ambrosia artemisiifolia</u>
Smartweed	<u>Polygonum spp.</u>
Sneezeweed	<u>Helenium sp.</u>
Sumac	<u>Rhus sp.</u>
Texas vervain	<u>Verbena halei</u>
WOODY PLANTS	
Blackjack oak	<u>Quercus marilandica</u>
Blackberry	<u>Rubus arvensis</u>
Dewberry	<u>Rubus trivialis</u>
Greenbriar	<u>Smilax bona-nox</u>
Japanese honeysuckle	<u>Lonicera japonica</u>
Pepper-vine	<u>Ampelopsis arborea</u>
Persimmon	<u>Diospyros virginiana</u>
Prickly ash	<u>Zanthoxylum clava-herculis</u>
Redbud	<u>Cercis canadensis</u>
Southern red oak	<u>Quercus falcata</u>
Sweetgum	<u>Liquidambar styraciflua</u>
Willow oak	<u>Quercus phellos</u>

Cultivated crops and vegetation growing in fallow fields often provide forage for numerous species of wildlife, many of which are particularly significant due to recreational use. Some such species which use agricultural croplands and old fields at the White Oak Creek Mitigation Area include white-tailed deer, cottontail, raccoon, mourning dove, and bobwhite. Several duck species feed in flooded cropland fields (often in large numbers) during fall and winter months.

Bottomland Hardwood Forests - Bottomland hardwood forests (Photograph 2) constitute the primary habitat of concern at the White Oak Creek Mitigation Area, and encompass 16,703 acres, or about 68 percent of the total area. They occur in conjunction with Gladewater clay soils. Table 2-4 lists some common plants encountered in White Oak Creek bottomland hardwood forests during field trips in May and June, 1987. The U.S. Fish and Wildlife Service (1985) listed 273 species of birds, 45 species of mammals, 54 species of reptiles, 31 species of amphibians, and 116 species of fish known to occur in rivers, bottomland hardwoods, and associated wetland habitats in East Texas. Among the birds which occur at the White Oak Creek Mitigation Area are the mallard and wood duck, which were recognized in the U.S. Fish and Wildlife report as species of primary concern in East Texas.

The distribution of flora in bottomland hardwood forests depends on a complex set of factors, the most important being the anaerobic gradient in the soil. This gradient varies through space and time due to microelevational relief, the soil mosaic, and hydroperiod (Wharton et al. 1982). Very slight changes in elevation result in different forest types (Birch and Cooley 1983). Thus, the floodplain community in the White Oak Creek Mitigation Area varies such that the dominant vegetation ranges from species adapted to extremely wet conditions such as buttonbush, planer tree, and overcup oak, to

species less tolerant of frequent, long duration flooding such as sweetgum, cherrybark oak, and American beautyberry.

Table 2-4

**Common Plants in Bottomland Hardwood Forests at the White Oak
Creek Mitigation Area. Compiled May 5, 1987
and June 22-26, 1987.**

<u>Common Name</u>	<u>Botanical Name</u>
American beautyberry	<u>Callicarpa americana</u>
American elm	<u>Ulmus americana</u>
Black gum	<u>Nyssa sylvatica</u>
Black willow	<u>Salix nigra</u>
Buttonbush	<u>Cephalanthus occidentalis</u>
Carex	<u>Carex spp.</u>
Cedar elm	<u>Ulmus crassifolia</u>
Cherrybark oak	<u>Quercus falcata var. pagodaefolia</u>
Cross-vine	<u>Bignonia capreolata</u>
Deciduous holly	<u>Ilex decidua</u>
Flowering dogwood	<u>Cornus florida</u>
Grape	<u>Vitis spp.</u>
Giant cane	<u>Arundinaria gigantea</u>
Greenbriar	<u>Smilax spp.</u>
Green ash	<u>Fraxinus pennsylvanica</u>
Green hawthorn	<u>Crataegus viridus</u>
Hackberry	<u>Celtis laevigata</u>
Ironwood	<u>Carpinus caroliniana</u>
Nut-rush	<u>Scleria sp.</u>
Overcup oak	<u>Quercus lyrata</u>

Table 2-4 (Continued)

Common Name	Botanical Name
Palmetto	<u>Sabal minor</u>
Persimmon	<u>Diospyros virginiana</u>
Planer tree	<u>Planera aquatica</u>
Poison ivy	<u>Toxicodendron radicans</u>
Rattan	<u>Berchemia scandens</u>
Red maple	<u>Acer rubrum</u>
Rough-leaf dogwood	<u>Cornus drummondii</u>
Sage	<u>Salvia sp.</u>
Sedge	<u>Cyperus spp.</u>
Swamp chestnut oak	<u>Quercus michauxii</u>
Swamp privet	<u>Forestiera acuminata</u>
Sweetgum	<u>Liquidambar styraciflua</u>
Trumper creeper	<u>Campsis radicans</u>
Two-wing silverbell	<u>Halesia diptera</u>
Missouri violet	<u>Viola missouriensis</u>
Virginia creeper	<u>Parthenocissus quinquefolia</u>
Water hickory	<u>Carya aquatica</u>
Willow oak	<u>Quercus phellos</u>
White avens	<u>Geum canadense</u>
Woodsgrass	<u>Chasmanthium sessiliflorum</u>

Pine-Hardwood Forests - Pine-hardwood forests occur at the White Oak Creek Mitigation Area in places where Gladewater clay soils of bottomlands give way to well-drained silt loam soils on upland terraces or slopes. Approximately 2,863 acres of pine-hardwood forests occur in the area (Photo

graph 3). Pine-hardwood forests provide food and cover for numerous wildlife species. Some that have particular recreational and aesthetic significance include bobcat, coyote, Eastern cottontail, gray squirrel, fox squirrel, raccoon, white-tailed deer, American woodcock, barred owl, and three-toed box turtle. Plants which are common in the pine-hardwood forests at the White Oak Creek Mitigation Area include those listed in Table 2-5.

PHOTO NO. 1
Fallow Row Crop
(Agricultural Field)



PHOTO NO. 2
Bottomland Hardwood

PHOTO NO. 3
Pine - Hardwood Forest



Table 2-5

Common Plants in Pine-Hardwood Forests at the White Oak Creek
Mitigation Area. Compiled May 5, 1987, June 22-26, 1987
and August 23-24, 1988.

<u>Common Name</u>	<u>Botanical Name</u>
<u>White Oak-Elm-Hackberry Forest</u>	
Bois d'arc	<u>Maclura pomifera</u>
Cottonwood	<u>Populus deltoides</u>
Flowering dogwood	<u>Cornus florida</u>
Pecan	<u>Carya illinoensis</u>
Southern red oak	<u>Quercus falcata</u>
Water oak	<u>Q. nigra</u>
White oak	<u>Q. alba</u>
Green Ash	<u>Fraxinus americana</u>
Yaupon	<u>Ilex vomitoria</u>
Coralberry	<u>Symphoricarpos orbiculatus</u>
Dewberry	<u>Rubus trivialis</u>
Greenbriar	<u>Smilax spp.</u>
Hawthorne	<u>Crataegus spp.</u>
Virginia Creeper	<u>Parthnocissus quinquefolia</u>
Farkleberry	<u>Vaccinium arboreum</u>
Panicum	<u>Panicum spp.</u>
Ratan	<u>Berchemin scandens</u>
Nutgrass	<u>Scheria sp.</u>
Woodsgrass	<u>Chasmanthium siliflorum</u>

Table 2-5 (Continued)

<u>Common Name</u>	<u>Botanical Name</u>
<u>Post Oak Woods, Forest and Grassland Mosaic</u>	
Black hickory	<u>Carya texana</u>
Mockernut hickory	<u>C. tomentosa</u>
Pignut hickory	<u>C. glabra</u>
Blackjack oak	<u>Quercus marilandica</u>
Post oak	<u>Q. stellata</u>
Eastern red cedar	<u>Juniperus virginiana</u>
Persimmon	<u>Diospyros virginiana</u>
Sweetgum	<u>Liquidambar styraciflua</u>
Winged elm	<u>Ulmus alata</u>
American beautyberry	<u>Callicarpa americana</u>
Poison ivy	<u>Toxicodendron radicans</u>
<u>Shortleaf Pine-Post Oak-Southern Red Oak</u>	
Loblolly pine	<u>Pinus taeda</u>
Shortleaf pine	<u>P. echinata</u>
Sassafras	<u>Sassafras albidum</u>

Herbaceous Wetlands - Herbaceous wetlands at the White Oak Creek Mitigation Area (Photograph 4) are relatively small and widely dispersed compared with the other major wetland type, bottomland hardwood forests. Like bottomland forests, they occur on nearly level, clay soils, and vegetated by plants which tolerate flooding (Table 2-6). Some wildlife species that use herbaceous wetlands at the White Oak Creek Mitigation Area for food and

cover include beaver, muskrat, raccoon, American kestrel, belted kingfisher, common snipe, great blue heron, green heron, mallard, red-winged blackbird, wood duck, alligator snapping turtle, red-eared slider, and bullfrog.

Table 2-6

Common Plants in Herbaceous Wetlands at the White Oak Creek Mitigation Area, May 5, 1987, June 22-26, 1987 and August 23-24, 1988.

<u>Common Name</u>	<u>Botanical Name</u>
Carex	<u>Carex spp.</u>
Cattail	<u>Typha sp.</u>
Creeping buttercup	<u>Ranunculus repens</u>
Curly dock	<u>Rumex crispus</u>
Rush	<u>Juncus sp.</u>
Sedge	<u>Cyperus spp.</u>
Water primrose	<u>Ludwigia peploides</u>

Upland Pastures - The well drained silt loam soils on upland terraces or slopes that support pine-hardwood forests in some parts of the White Oak Creek Mitigation Area, support grasslands vegetation (herein called upland pastures) in others (Photograph 5). This has occurred where landowners have cleared previously existing forests, or prevented trees from becoming established on native prairies by grazing, mechanical removal of saplings, application of herbicides, or burning. Because of the broad range of land uses and management programs implemented by landowners on upland pastures, dominant plant species vary greatly (Photograph 6). Bahia and bermudagrass

are introduced and maintained to varying degrees on numerous pastures.
Common native (or escaped) plants are listed in Table 2-7.

PHOTO NO. 4
Herbaceous Wetland



PHOTO NO. 5
Upland Pasture

PHOTO NO. 6
Typical Pasture Management
(Bahia Pasture on Left, and
Native Grasses on Right)



Table 2-7

Common Plants on Upland Pastures in the White Oak Creek
Mitigation Area, May 5, 1987, June 22-26, 1987 and August 23-24, 1988.

<u>Common Name</u>	<u>Botanical Name</u>
Beaked panicum	<u>Panicum anceps</u>
Big bluestem	<u>Andropogon gerardii</u>
Bitterweed	<u>Helenium sp.</u>
Honey locust	<u>Gleditsia triacanthus</u>
Broomsedge bluestem	<u>Andropogon virginicus</u>
Brown-eyed Susan	<u>Rudbeckia hirta</u>
Crimson clover	<u>Trifolium incarnatum</u>
Common sunflower	<u>Helianthus annuus</u>
Dewberry	<u>Rubus trivialis</u>
Doveweed	<u>Croton capitatus</u>
Eastern red cedar	<u>Juniperus virginiana</u>
Goatweed	<u>Croton monanthogynus</u>
Indiangrass	<u>Sorghastrum nutans</u>
Johnsongrass	<u>Sorghum halepense</u>
Eryngo	<u>Eryngium leavenworthii</u>
Mesquite	<u>Prosopis glandulosa</u>
Post oak	<u>Quercus stellata</u>
Rescuegrass	<u>Bromus unioloides</u>
Silver bluestem	<u>Bothriochloa saccharoides</u>
Silverleaf nightshade	<u>Solanum elaeagnifolium</u>

Table 2-7 (Continued)

<u>Common Name</u>	<u>Botanical Name</u>
Splitbeard bluestem	<u>Andropogon ternarius</u>
Switchgrass	<u>Panicum virginicus</u>
Vervain	<u>Verbena spp.</u>
Winged elm	<u>Ulmus alata</u>
Virginia wildrye	<u>Elymus virginicus</u>

Aquatic Habitats - Aquatic habitats at the White Oak Creek Mitigation Area include the Sulphur River (Photograph 7), White Oak Creek (Photograph 8), several oxbow sloughs and beaver ponds (Photographs 9 and 10), and numerous stock ponds (Photograph 11). With the exception of some of the stock ponds, which are severely limited in their ability to sustain viable populations of plants and animals, the aquatic habitats support a diverse variety of wildlife, including beaver, muskrat, alligator snapping turtle, blotched water snake, black bullhead, black crappie, blue catfish, bluegill, carp, channel catfish, green sunfish, longear sunfish, longnose gar, and warmouth.

2.07 ACCESS

The White Oak Creek Mitigation Area is located between the cities of Mount Pleasant and New Boston, within the flowage easement of Wright Patman Lake. Interstate Highway 30, U.S. Highway 259, and U.S. Highway 67 are the major highways which provide regional access to the Mitigation Area (see Plates 2-1 and 2-2). State Highway 77, Farm to Market Roads 71 and 1766, and two county roads also bisect or parallel the site. The St. Louis Southwestern Railroad crosses the eastern third of the Mitigation Area.

PHOTO NO. 7
Sulphur River at
White Oak Creek
Mitigation Area



PHOTO NO. 8
White Oak Creek at
White Oak Creek Mitigation
Area

PHOTO NO. 9
Twin Lakes - White Oak Creek
Mitigation Area

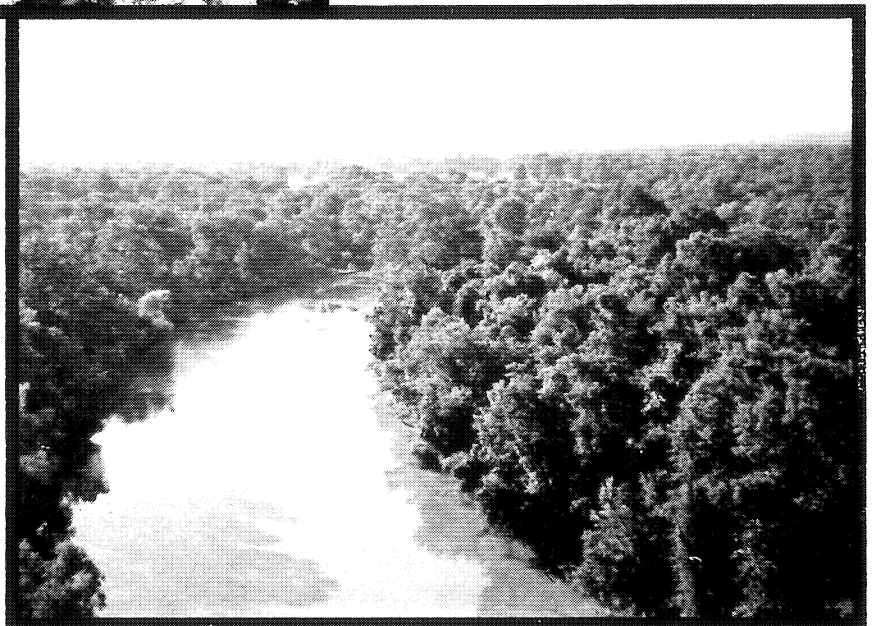




PHOTO NO. 10

Beaver Pond, White Oak Creek
Mitigation Area

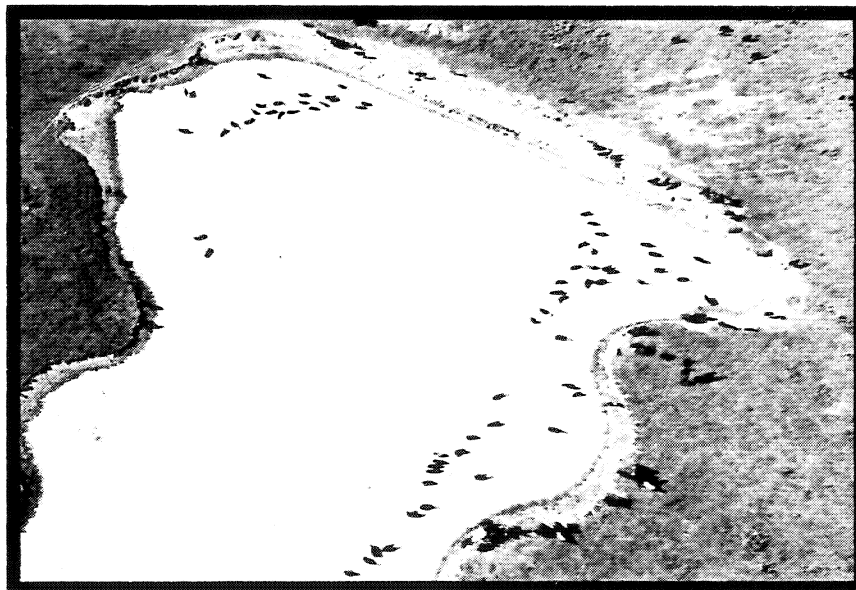


PHOTO NO. 11

Typical Stock Pond, White Oak Creek
Mitigation Area

Chapter III - Cultural Resources

CHAPTER III

CULTURAL RESOURCES

3.01 INTRODUCTION

Cultural resources can be defined as the material record of man's past and present activities. Under Federal law, cultural resources are usually represented by historic homes and buildings, prehistoric Indian sites, and areas of specific association with famous people or events. They can be as unspectacular as the ill-repaired remains of a 1930s tenant farm or a scatter of a few flint flakes, or as spectacular as prehistoric mound sites and historic forts from America's frontier heritage. Cultural resources represent the irreplaceable legacy of historic and prehistoric events, peoples, and places, which shape the lives and the views of all Americans.

3.02 AUTHORITIES

The uniqueness and fragility of cultural resources has been recognized by the Federal government with protective legislation dating to the Antiquities Act of 1906. The Archeological Resources Protection Act (Public Law 96-95), passed in 1979, strengthened the commitment of the Federal government to preserve and protect cultural resources on Federal property. The Archeological Resources Protection Act (ARPA) is the primary jurisdictional tool to protect cultural resources, and includes civil and criminal penalties for violators. Section 110 of the National Historic Preservation Act (NHPA), as amended (Public Law 95-515), established a program by which Federal agencies must inventory and assess cultural resources under their jurisdiction.

The goal of this section of NHPA is to locate and nominate sites to the National Register of Historic Places (NRHP). These laws, as well as other supporting laws and regulations, have recently been combined into a single document for Corps of Engineers' operating lakes. It is entitled *Project Construction and Operation, Historic Preservation Program* (ER 1130-2-438) and details guidance for fulfilling legal obligations for cultural resources. Specific legislation is detailed in Appendix A to this supplement.

3.03 CULTURAL RESOURCES BACKGROUND

Results of archeological research throughout East Texas provide information from which to evaluate the potential of the Mitigation Area to contain significant cultural resources, both historic and prehistoric. Limited archeological investigations were performed during construction of Wright Patman Dam and Lake, formerly known as Texarkana Reservoir. This research will be pertinent to the Mitigation Area because of its adjacent location and is summarized as follows.

Cultural resources reconnaissance studies of the Wright Patman Lake area were undertaken in two phases of study. An archeological survey performed by Robert Stephenson, currently professor emeritus at University of South Carolina, entitled *River Basin Surveys*, Smithsonian Institution (1949) was limited to Bowie and Cass Counties, Texas. Fifty archeological sites were located and examined. Of these, sixteen were recommended for extensive excavations and seven for additional testing. No historic sites were recorded during this survey and the prehistoric sites included early lithic sites and Late Prehistoric sites. Edward Jelks, formerly associated with the Smithsonian Institution River Basins Survey, and professor of Anthropology at Illinois State University (retired), carried out testing and excavations based upon Stephenson's recommendations at three occupation sites affiliated with

the Mississippian culture. An archeological survey of the Texarkana Reservoir enlargement area was completed by the Texas Historical Survey Committee and the Texas Water Development Board in early 1970. One hundred and forty sites were recorded and recommendations were made for excavation of 29 significant sites. The results of this survey reported that the area studied lies within a much larger area rich in remains of the Caddo culture.

An accumulation of data from studies throughout East Texas have provided a well-defined cultural chronology that is directly relevant to these specific resources. Summaries of each are provided below.

Extensive research by University of Texas at Austin graduate student, J.P. Thurmond (Masters Thesis 1981) of the Cypress Creek drainage area provides a solid contribution to knowledge of the East Texas region. Dr. Dee Ann Story's work at the George Davis site in Cherokee County and other sites in the East Texas area have led to a synthesis of the archeology of East Texas (1981) and has provided a culture chronology as follows.

Dr. Story, recently retired as professor of Anthropology at the University of Texas at Austin and Director of the Texas Archeology Research Laboratory, summarized the cultural periods present in East Texas and noted that these delineations mark technological and subsistence changes are necessarily arbitrary in duration:

Paleoindian	10,000-6,000 B.C
Archaic	6,000-200 B.C.
Early Ceramic	200.B.C.-700 A.D.
Late Prehistoric	700-1700 A.D.
Historic	1700 A.D.-present

Paleoindian. This phase represents the initial radiation of people into the East Texas area. Once widely characterized as a "big game hunting" (mammoths, giant buffalo, etc.) type of existence, recent work indicates Paleoindian peoples actually exploited a wide range of plants and animals for subsistence. Generally, this phase represents the transition from Pleistocene age animals and climate, to the establishment of more modern flora, fauna, and weather.

Archaic. During the Archaic, populations expanded throughout East Texas and began to more fully utilize the resources available. This time period precedes the bow and arrow and pottery. People at this time were very mobile, moving frequently in response to available resources. Dart points, more familiar to most people as arrowheads, were used on short spears and propelled by an "atlatl", or spear thrower. The diet was predominantly plant foods, however. Research on Archaic sites is a current priority in East Texas prehistoric archeology.

Early Ceramic. Story (1981) describes this period as the introduction of ceramic vessels into East Texas. Though direct evidence is lacking for the introduction of agriculture, some domestic plants (such as the sunflowers and squash) may have been utilized. This is probably the earliest time in which people began to inhabit semi-permanent or permanent settlements. Story characterizes this phase as one of transitions, with the present evidence still indicating great continuity with the late Archaic subsistence patterns.

Late Prehistoric. Sites of this period are the most visible and most widely investigated of the types represented in East Texas. Mound sites are the most spectacular of these Late Prehistoric manifestations. These large village sites represent the large-scale use of ceramics, the introduction of the bow and arrow (represented by "bird points", actually true arrow points),

permanent settlements, and the use of domestic cultigens such as maize. Many sites of this age are attributed to the Caddo Indians. Numerous descendants of the Caddo still live in Texas and Oklahoma, with the tribal headquarters based in Binger, Oklahoma.

Historic. European settlement in the area was not widespread until the middle and late 19th century. Refinement of a good historic chronology of East Texas is lacking and needs to be addressed in future research.

3.04 CULTURAL RESOURCES INVESTIGATION

The White Oak Creek Mitigation Area will need to be considered for the effect that surveying, boundary fencing and clearing, and the development of the features described in this supplement will have on cultural resources in the area, both known and unknown.

Compliance with Federal laws and regulations concerning cultural resources at the White Oak Creek Mitigation Area will be provided through a planned program for protection of cultural resources. This program will consist of a survey, followed by mitigative action, should resources that are eligible for the National Register of Historic Places be potentially impacted. Actions that can adversely impact cultural resources include actual construction measures (building of structures, roads, etc.) in addition to land modification measures (borrow areas, disc areas, levees, pits, inundated areas, fencing, forestry management, etc.). Such a survey and subsequent assessment of the resources will be prioritized to begin with defined areas of known adverse impacts. It is not possible to predict total costs of these archeological investigations since testing and mitigation needs will not be defined until initial assessments are completed. A proposed cost of \$24 an acre is estimated for the survey phase which will include preliminary testing. Only those areas which will be disturbed during development will be sur-

veyed initially. Certain portions of the White Oak Creek Mitigation Area may be eliminated from the survey area due to existing disturbance or inundation.

Following initial development of the White Oak Creek Mitigation Area, parties other than the U.S. Army Corps of Engineers, including TPWD, may have an interest in additional development or enhancement for wildlife. TPWD shall be responsible for any costs for further testing or mitigative investigations necessitated by additional development or enhancement. The Corps of Engineers will retain responsibility for compliance with historic preservation laws, including coordination with the State Historic Preservation Officer and the Advisory Council on Historic Preservation. The Corps has review and approval responsibilities before any additional development or enhancement is undertaken by TPWD.

Chapter IV - Resource Analysis

CHAPTER IV

RESOURCE ANALYSIS

4.01 MITIGATION OPPORTUNITIES AND CONSTRAINTS

Opportunities - High quality bottomland hardwood forests comprise much of the White Oak Creek Mitigation Area. The U.S. Fish and Wildlife Service (1985) included much of the White Oak Creek Mitigation Area as a Priority 1 site (i.e., "Excellent quality bottom of high value to key waterfowl species") among the sites they identified as vital for maintaining populations of mallards and wood ducks. All of the White Oak Creek Mitigation Area lies within or adjacent to an area described by the U.S. Fish and Wildlife Service Waterfowl Habitat Strategy Team (1984) as Lower Mississippi River alluvial plain, or the Lower Mississippi River Delta and Red River Basin Priority Area. This area is the nation's most important wintering area and a top production area for wood ducks. It also provides winter habitat for 30 percent of the Nation's mallards. The importance of East Texas bottomland hardwood forests to waterfowl has been acknowledged internationally (U.S. Department of the Interior, Fish and Wildlife Service and Environment Canada, Canadian Wildlife Service, 1986). The North American Waterfowl Management Plan ranks the Lower Mississippi River Delta region (including East Texas) as a waterfowl habitat area of major concern in North America. In Texas, eastern bottomland forests rank with the Gulf Coast as the most important habitats for migrating and wintering waterfowl. Simply preserving this habitat from development contributes greatly toward mitigation for losses at Cooper Lake. Such preservation is the single most important feature of wildlife mitigation which will be accomplished as a result of Federal involvement in the development of Cooper Lake.

The North American Waterfowl Management Plan is the product of a cooperative effort between Canada and the United States, which establishes broad goals and objectives to guide waterfowl conservation through the year 2000. By including waterfowl habitat needs in decisions relating to acquisition, development, and management of the White Oak Creek Mitigation Area, the U. S. Army Corps of Engineers is contributing toward realization of the goals of the North American Waterfowl Management Plan.

Constraints - The primary purpose of acquisition of the White Oak Creek Mitigation Area is to achieve at least partial compensation for losses to bottomland hardwood forests which will be inundated by Cooper Lake. Therefore, most development and management will be consistent with the ecological functions of bottomland hardwoods and the habitat needs of species associated with the bottomland ecosystem. While the initial developments at the White Oak Creek Mitigation Area present a substantial opportunity for enhancement of wildlife resources and for public access and enjoyment of the area, other potential development features must be eliminated or given relatively low priority due to limited funding and anticipated limitations in management resources.

4.02 HABITAT SUITABILITY ANALYSIS

Existing resources are evaluated in order to identify limiting factors. This, in turn, facilitates the development of management strategies. *Habitat Evaluation Procedures*, developed by the U.S. Fish and Wildlife Service, were utilized to determine the quality of wildlife habitat for selected species. These procedures express habitat quality in terms of Habitat Units. Habitat Units are the product of habitat suitability and the habitat quantity acreage. Habitat suitability is described by a Habitat Suitability Index determined for each of the wildlife evaluation species selected for the project area.

Table 4-1 provides the results of an analysis of habitat suitability for several key species of wildlife, based on the U.S. Fish and Wildlife Service (1980) *Habitat Evaluation Procedures*. Data for Habitat Suitability Index determination was collected June 22-26, 1987.

Table 4-1

**Habitat Evaluation Procedure Habitat Suitability Analysis.
White Oak Creek Mitigation Area ¹**

<u>Species</u>	<u>Habitat Type</u> ²				
	BLH	UP	PHU	HW	RCA
White-tailed deer	0.46	0.19	0.55	-	0.0
Grey squirrel	0.63	-	0.80	-	-
Mink	0.42	-	-	-	-
Barred owl	0.74	-	0.73	-	-
Wood duck	0.60	-	0.25	1.00	-
Green Heron	0.93	-	-	1.00	-
Hairy woodpecker	0.85	-	0.52	-	-

1/ Numbers given are lowest life requisite values calculated within the habitat type on a scale of 0 to 1. All species were not evaluated in each habitat type.

2/ BLH = bottomland hardwood forest, UP = upland pasture, PHU = pine-hardwood upland, RCA = row crop agriculture land, HW = herbaceous wetland.

The Habitat Suitability Index for each species is based on models designed to facilitate estimation of the ability of habitat to meet the life requisites of the species. The models were designed by teams of species experts who analyzed the effects each component of a series of limiting factors is likely to have on habitat suitability for the species in question. The limiting factor(s) which appeared to most significantly affect habitat quality were used in the development of management plans for the White Oak Creek Mitigation Area.

Six feeding guilds representative of the project area were selected for evaluation. Feeding guilds are ecological niches that exist in any ecosystem. They allow distinctions among species based on feeding (or cover) location and feeding mode. The guilds selected were arboreal herbivore, represented by gray squirrel; terrestrial herbivore, represented by white-tailed deer; avian insectivore, represented by hairy woodpecker; avian carnivore, represented by barred owl; aquatic herbivore, represented by wood duck; and aquatic carnivore, represented by mink and green heron. Table 4-2 provides the results of an analysis of limiting factors for several key species of wildlife based on the Habitat Evaluation Procedures.

Table 4-2

Habitat Evaluation Procedure Limiting Factor Analysis
White Oak Creek Mitigation Area

<u>Species/Habitat</u> ¹	<u>Limiting Factors</u>	<u>Management Options</u>
WTD/BLH	food	small forest clearings, release mast producers, ² control grazing
WTD/UP	fall & winter food, cover	woody plantings, prevent grazing if seedlings planted, otherwise control grazing
WTD/PHU	spring & summer food	small forest clearings, control grazing, burn
WTD/RCA	fall & winter food, cover	woody plantings prevent grazing
GS/BLH	food/cavities	release mast producers
GS/UP	food/cavities	release mast producers
M/BLH	water cover & reproduction	brush piles, wetland development
GH/BLH	N/A ³	
GH/HW	N/A ³	
WD/BLH	nest sites brood rearing habitat	provide nest boxes in proximity to available water

Table 4-2 (Continued)

<u>Species/Habitat</u> ¹	<u>Limiting Factors</u>	<u>Management Options</u>
WD/PHU	nest cavities in proximity to available water	provide nest boxes in proximity to available water
WD/HW	N/A ⁴	
BO/BLH	food cover & reproduction habitat	allow overstory height to increase, retain den trees, create small openings
BO/PHU	cover & reproduction habitat	create small openings, thinning reduction of pine, allow overstory height and canopy to increase
HW/BLH	cover & reproductive habitat	allow hardwood diameter to increase
HW/PHU	cover & reproductive habitat	allow hardwood diameter to increase

1/ Species - WTD = white-tailed deer, GS = gray squirrel, M = mink, GH = green heron, WD = wood duck, BO = barred owl, HW = hairy woodpecker.

Habitat - BLH = bottomland hardwood forest, UP = upland pasture, PHU = pine-hardwood upland, RCA = row crop agriculture land, HW = herbaceous wetland.

- 2/ Mast producers (oaks, pecan, and hickory) can be "released" by cutting other trees competing for sunlight around those mast producers with the healthiest crowns.
- 3/ Habitat Evaluation Procedures analysis indicated wetlands at White Oak Creek Mitigation Area are nearly optimal for green herons in their present state.
- 4/ Habitat Evaluation Procedures analysis indicated herbaceous wetlands at the White Oak Creek Mitigation Area are nearly optimal for wood ducks in their present state.

4.03 ACCESSIBILITY FOR MANAGEMENT AND PUBLIC USE

The White Oak Creek Mitigation Area is well served, regionally, by the major highways intersecting the property. These existing roads provide access to the general area from the surrounding communities and other parts of the state (see Plate 2-1). There is, however, limited public access from these roads directly into the Mitigation Area. This is advantageous from a preservation and management perspective, since restricted access allows management to control and monitor the number and location of people entering the property. The situation does, however, present some problems in providing access to areas which are desirable and appropriate for public use.

U.S. Highway 67 is the only major highway that has an existing constructed public access point, the Texas Parks and Wildlife Department boat ramp site. A section of abandoned state highway, which parallels U.S. Highway 67 to the south, also offers some potential for a public entry location. Interstate 30 and U.S. Highway 259 both are elevated where they cross the Mitigation Area, making access at these points impractical. State Highway 77 crosses the southern tip of the Mitigation Area at grade, and could provide another possible access point.

Several roads bisect or approach the Mitigation Area. Farm to Market Road 1766, where it crosses the southeastern tip of the Mitigation Area, could provide access to Sciara Farms bottomland fields, an important site feature. Cass County Road 2596 passes through a small portion of the site along the southern edge, but it is too far away from the Sciara Farms bottomland fields to provide viable public access to this area. Cass County Road 2513 ends near the boundary of the property, and could, with the acquisition of a short easement and some road construction, provide a public entry to the west side of the Sciara Farms area. Twin Lakes, another important feature within the

Mitigation Area, is not currently accessible by a public road. The county road, between Interstate 30 and U.S. Highway 67, which runs along the Mitigation Area boundary, has three existing gated access points that could provide direct access to the property. Potential pedestrian entry points from public roads where parking can be accommodated also are limited.

Because the boundaries do not always follow existing fence lines, additional perimeter fencing will be necessary to control off-road vehicular access into the Mitigation Area. Additional cross-fencing will be required along the highways and roads that traverse the site.

4.04 POTENTIAL RECREATIONAL OPPORTUNITIES

General - The White Oak Creek Mitigation Area offers tremendous habitat potential for fish and wildlife, while providing many consumptive and non-consumptive recreational opportunities for the general public. If managed appropriately, this area could support boating, fishing, hunting, camping, nature study, photography, hiking and equestrian activities while enhancing and increasing fish and wildlife potential. The Texas Parks and Wildlife Department will be encouraged to provide for as many recreational opportunities as possible, consistent with the primary purpose of wildlife mitigation.

Hunting - During the migrating and wintering season (September - March) this area will attract waterfowl for hunting. While hunting seasons change each year, the area will generally attract archery deer hunters in October, deer hunters with rifles November through January, quail hunters November through February, dove hunters September through November, and squirrel hunters during May and again October through January. Wild trapped eastern turkeys have been stocked on at least one site within the

White Oak Creek Mitigation Area in Morris County, with two other release sites occurring adjacent to the Mitigation Area in Red River and Titus Counties. An additional White Oak Creek site is scheduled for stocking during the 1988-89 season. Existing and proposed vehicular and boat entry points to the Mitigation Area should provide sufficient access for all hunting activities.

Hiking - Since the Mitigation Area is largely wooded, it is desirable to provide trail access for general public hiking, pleasure walking, bird watching, nature study, and photography. Short hiking trails originating from various parking areas and adjacent roads would provide opportunities for hikers to travel into densely wooded areas. It may be desirable to provide self guided nature trails into some of the more accessible and unique portions of the area.

Equestrian - Horseback riding is very popular in east Texas, and equestrian groups have repeatedly expressed interest in riding and camping on public lands at Cooper Lake, Wright Patman Lake, and Lake O'the Pines. The majority of the existing flowage easement lands which will be acquired for mitigation are below elevation 265. Wright Patman Lake has reached elevation 250 only twice since impoundment in 1953. An equestrian trail system between elevation 240 and 265 rarely would be affected by floodwaters and debris deposited by floods, and would provide opportunities for riding in some of the less densely vegetated and more scenic areas. A few cattle trails exist within the Mitigation Area which may be utilized as designated equestrian trails. Equestrian use of trails would serve to keep them from overgrowing with woody vegetation and could provide trail access for general hiking. Equestrian trails in the Mitigation Area would be more easily managed if limited to non-hunting related day riding. A single equestrian

staging area/trail head and a 20-mile trail would allow valuable use of Mitigation Area lands with limited pressure on wildlife.

Fishing and Boating - The Mitigation Area will provide bank and boat fishing opportunities when water depth and flow are adequate. Increased boat access to the Sulphur River and White Oak Creek is desirable due to the nature of these streams. Snags and log jams are common along these streams making down river travel from Cooper Lake or up-river travel from Wright Patman Lake difficult. Two boat access points within the White Oak Creek Mitigation Area would improve public utilization of the rivers and creeks within the Mitigation Area.

Chapter V - Initial Development and Habitat Improvements

CHAPTER V

INITIAL DEVELOPMENT AND HABITAT IMPROVEMENTS

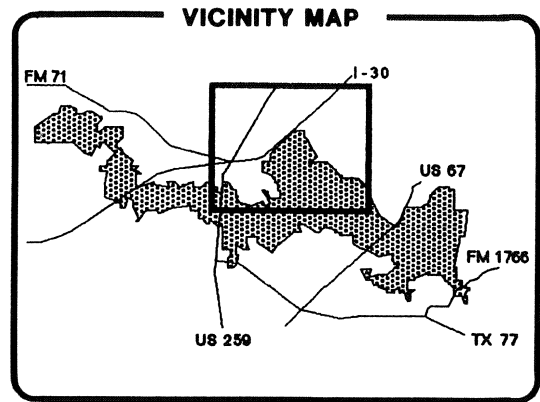
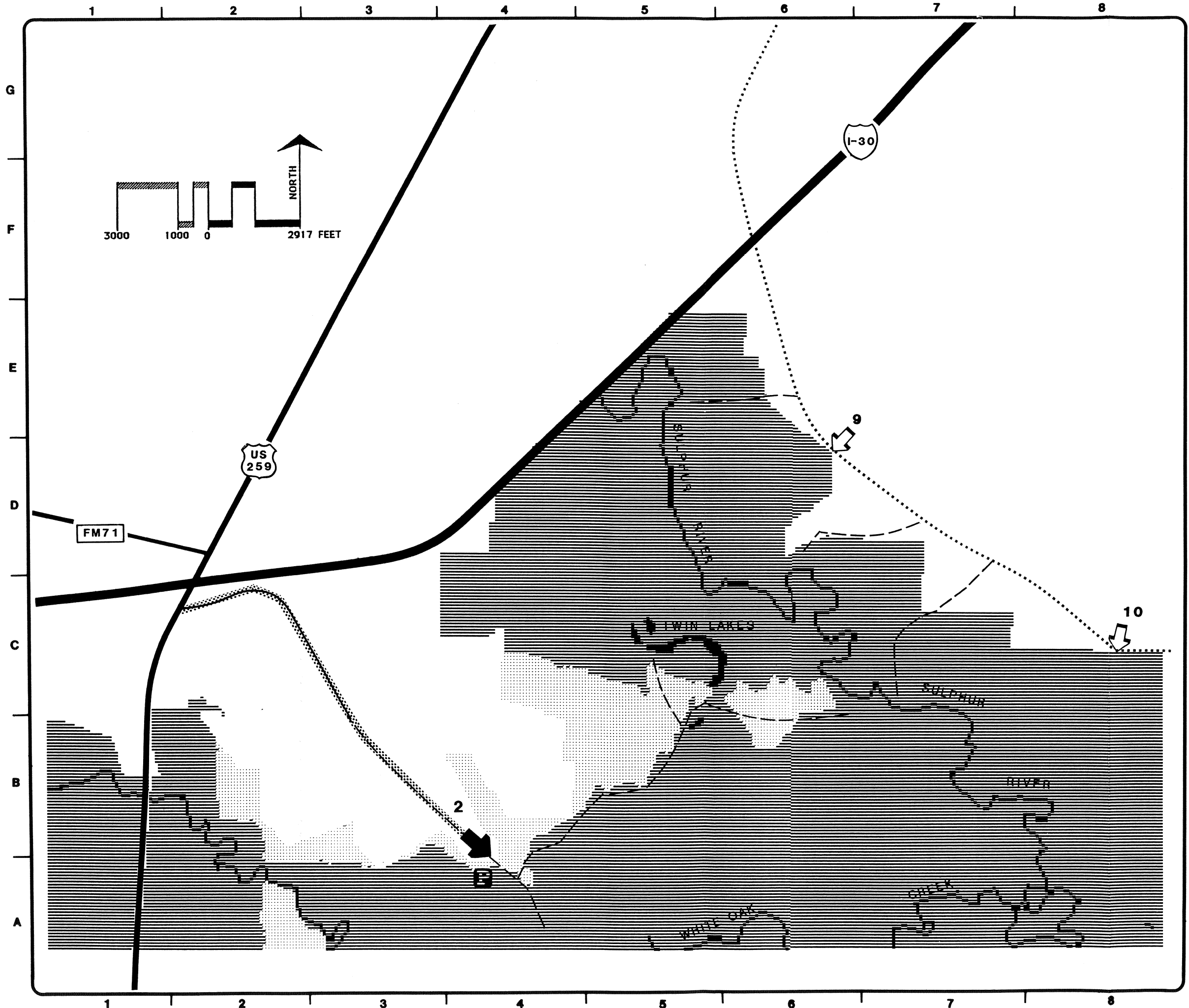
5.01 GENERAL

The Fort Worth District of the Corps of Engineers will have responsibility for all initial development and habitat improvements at the White Oak Creek Mitigation Area. Initial development is a project joint cost, and will be shared by the Federal Government and the project sponsors. Upon completion of the project, the Mitigation Area will be managed by the Texas Parks and Wildlife Department (reference TPWD letter in Appendix C). The operations and maintenance of the Mitigation Area will be addressed in Chapter VI.

The fish and wildlife management plan presented in this chapter has been developed with the participation of the U.S. Fish and Wildlife Service, the Texas Parks and Wildlife Department, and the U.S. Army Corps of Engineers (see Plate 5-1).

5.02 WILDLIFE MITIGATION

Fish and wildlife resource management at the White Oak Creek Mitigation Area will involve a broad range of traditional and innovative measures. The following management strategies are presented primarily according to the habitat types which may be improved by these measures.



LEGEND

EXISTING ROADS

- INTERSTATE HIGHWAY
- U.S. HIGHWAY
- STATE HIGHWAY
- FARM TO MARKET
- COUNTY (SURFACED)
- COUNTY (UNSURFACED)
- PRIVATE (SURFACED)
- PRIVATE (UNSURFACED)
- RAILROAD

DEVELOPMENT PROPOSALS

- ROADS TO BE CLOSED
- NEW EASEMENTS
- NEW ROADS
- MAJOR PARKING AREA
- MINOR PARKING AREA
- BOAT LAUNCH
- FENCE EXISTING T.P.W.D. BOAT RAMP FOR CONTROLLED ACCESS

MANAGEMENT CATEGORIES

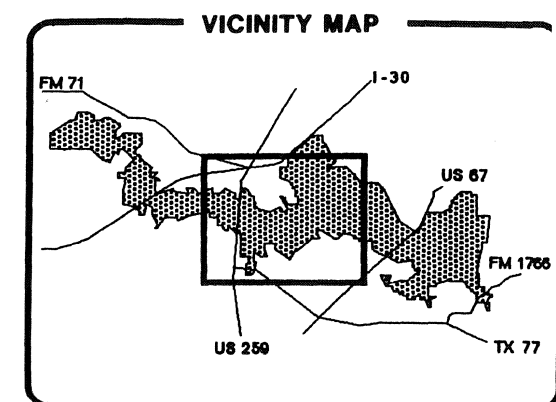
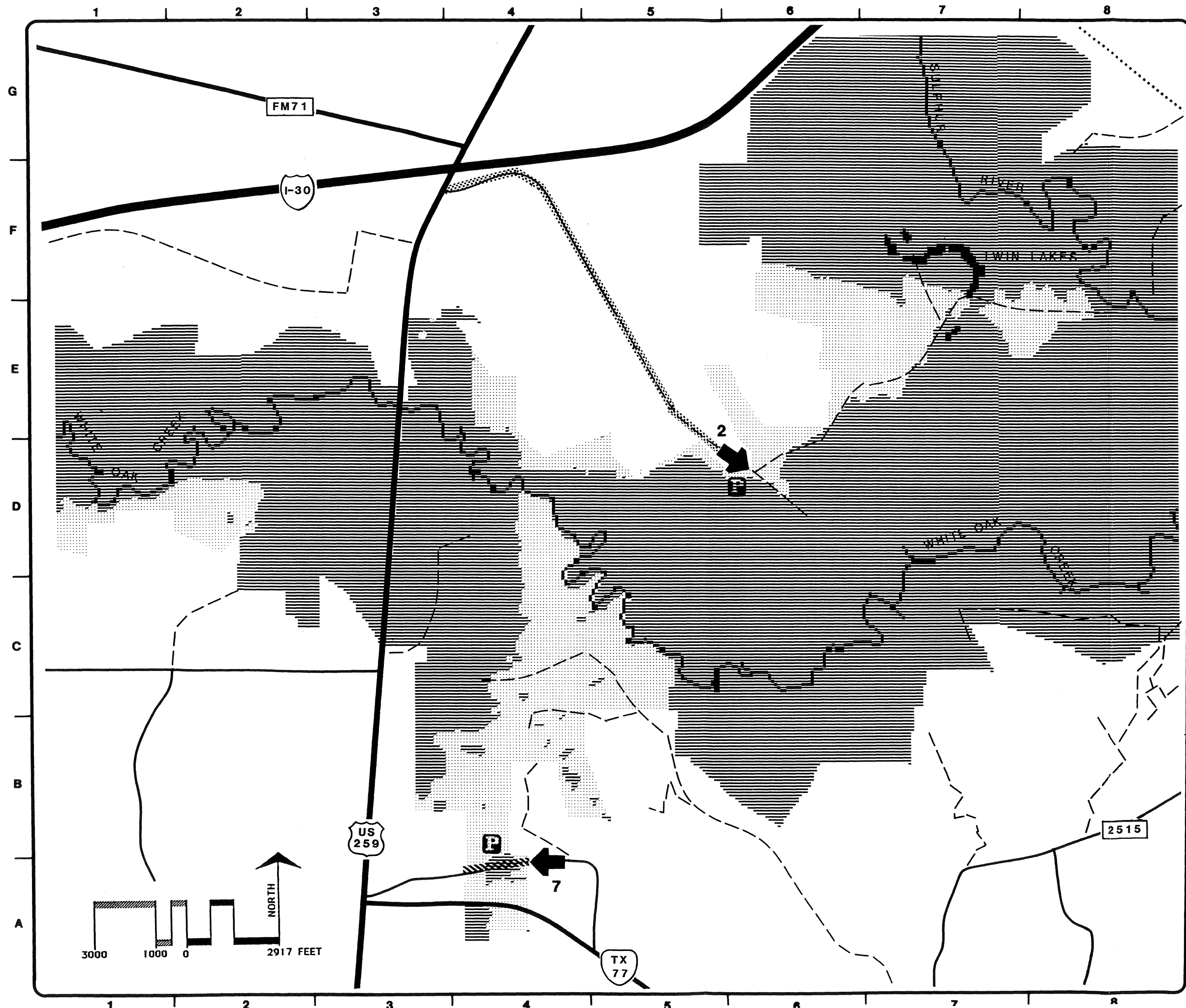
- CONVERTED BOTTOM LAND
- UPLAND PASTURE
- RIVER/AQUATIC HABITAT
- FORESTED LAND

U. S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

COOPER LAKES AND CHANNELS
SULPHUR RIVER, TEXAS

SUPPLEMENT NO. 1 TO THE MASTER PLAN
WHITE OAK CREEK MITIGATION AREA
WILDLIFE MANAGEMENT PLAN

INVITATION NO.	DATE: APRIL, 88
CONTRACT NO.	SHEET NO. SEQUENCE
DRAWING NUMBER	2 of 4 5-1



LEGEND

EXISTING ROADS

- INTERSTATE HIGHWAY
- U.S. HIGHWAY
- STATE HIGHWAY
- FARM TO MARKET
- COUNTY (SURFACED)
- COUNTY (UNSURFACED)
- PRIVATE (SURFACED)
- PRIVATE (UNSURFACED)
- RAILROAD

DEVELOPMENT PROPOSALS

- ROADS TO BE CLOSED
- NEW EASEMENTS
- NEW ROADS
- MAJOR PARKING AREA
- MINOR PARKING AREA
- BOAT LAUNCH
- FENCE EXISTING T.P.W.D. BOAT RAMP FOR CONTROLLED ACCESS

MANAGEMENT CATEGORIES

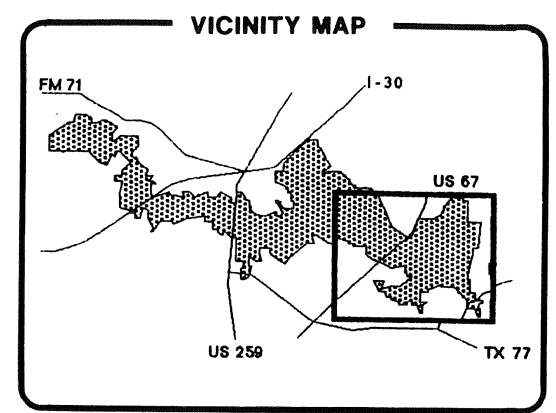
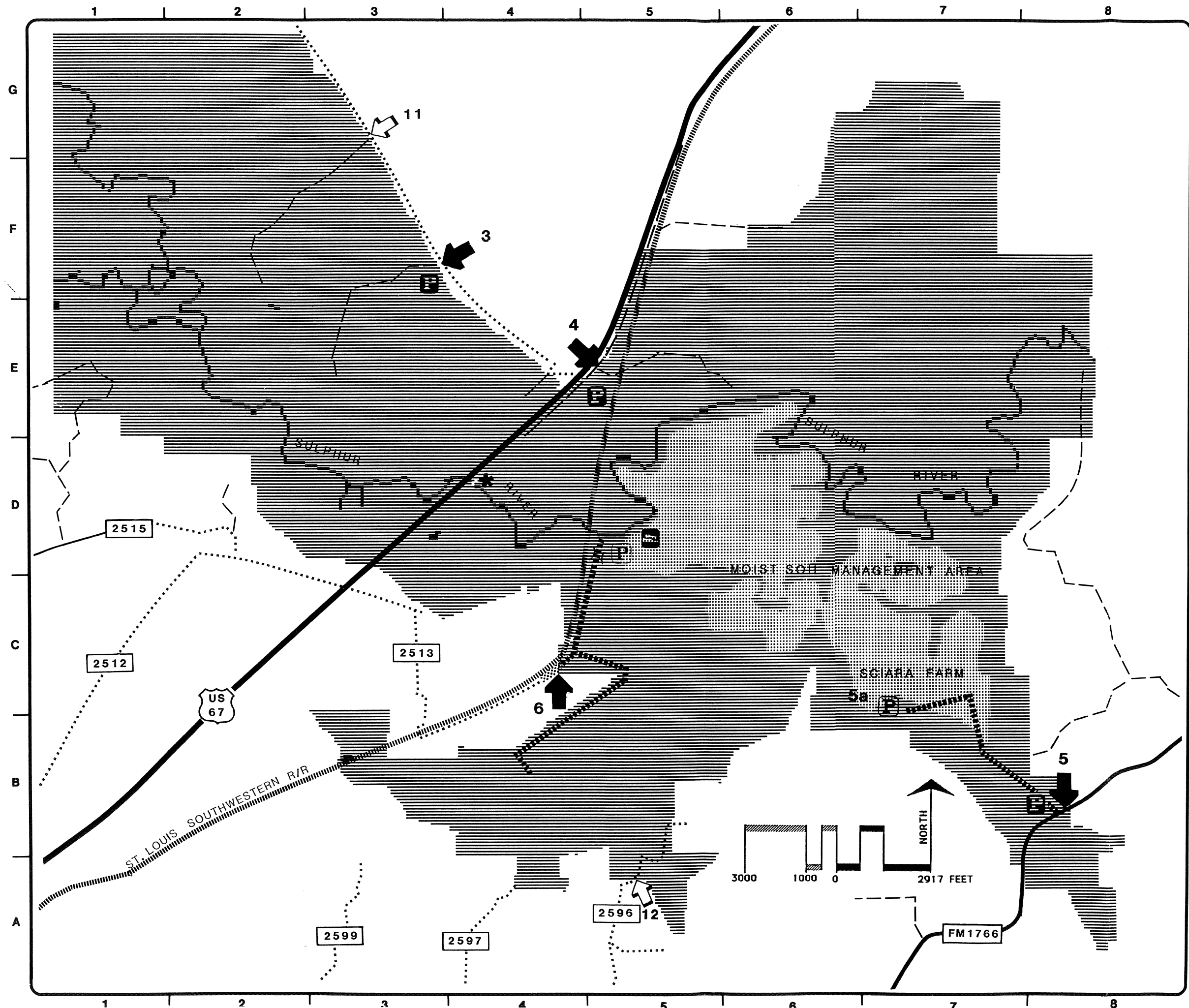
- CONVERTED BOTTOM LAND
- UPLAND PASTURE
- RIVER/AQUATIC HABITAT
- FORESTED LAND

U. S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

COOPER LAKES AND CHANNELS
SULPHUR RIVER, TEXAS

SUPPLEMENT NO. 1 TO THE MASTER PLAN
WHITE OAK CREEK MITIGATION AREA
WILDLIFE MANAGEMENT PLAN

INVITATION NO.	DATE: APRIL, 88
CONTRACT NO.	SHEET NO. SEQUENCE
DRAWING NUMBER	3 OF 4 5 th 1



LEGEND

EXISTING ROADS

- INTERSTATE HIGHWAY
- U.S. HIGHWAY
- STATE HIGHWAY
- FARM TO MARKET
- COUNTY (SURFACED)
- COUNTY (UNSURFACED)
- PRIVATE (SURFACED)
- PRIVATE (UNSURFACED)
- RAILROAD

DEVELOPMENT PROPOSALS

- ROADS TO BE CLOSED
- NEW EASEMENTS
- NEW ROADS
- MAJOR PARKING AREA (P)
- MINOR PARKING AREA (P)
- BOAT LAUNCH (B)
- FENCE EXISTING T.P.W.D. BOAT RAMP FOR CONTROLLED ACCESS (F)

MANAGEMENT CATEGORIES

- CONVERTED BOTTOMLAND
- UPLAND PASTURE
- RIVER/AQUATIC HABITAT
- FORESTED LAND

U. S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

COOPER LAKES AND CHANNELS
SULPHUR RIVER, TEXAS

**SUPPLEMENT NO. 1 TO THE MASTER PLAN
WHITE OAK CREEK MITIGATION AREA
WILDLIFE MANAGEMENT PLAN**

INVESTIGATION NO.	DATE: APRIL 88
CONTRACT NO.	SHEET NO. SEQUENCE
DRAWING NUMBER	4 of 4 5 of 1

5.03 GENERAL MANAGEMENT STRATEGIES

A series of management strategies have been planned for the Mitigation Area lands. Some of these will require initial development by the Corps and others will involve management practices by TPWD. Chapter V will describe both initial development and habitat improvements; and will discuss management practices needed for wildlife enhancement purposes. Chapter VI will address proposed operation and maintenance items which will be performed by TPWD as a part of the overall management plan. Table 5-1 summarizes the acreages of the intended mix of habitats reflected in this management plan and compares them with existing acreages from Table 2-2.

TABLE 5-1
Wildlife Management Acreages

<u>Cover Type</u>	<u>Proposed</u>		<u>Existing</u>	
	<u>Acres</u>	<u>Percent</u>	<u>Acres</u>	<u>Percent</u>
Converted Bottomland Forests				
Moist Soil Management Area	500	2.1	0	0
Reestablished Forests	170	0.7	144	0.6
Row Crop Agriculture	300	1.2	964	4.0
Upland Pastures	1838	7.5	3208	13.0
Bottomland Hardwood and Pine-Hardwood Upland Forests	21,191	86.2	19677	80.3
Aquatic Habitats	528	2.1	528	2.1
Roads	<u>53</u>	<u>0.2</u>	<u>53</u>	<u>0.2</u>
	24,574 ¹	100.0	24574	100.0

1/ Exact Acreage is not yet known. See page 5, last paragraph.

Bottomland Hardwood Forests and Pine-Hardwood Uplands - An

initial measure which will benefit many wildlife species in the White Oak Creek Mitigation Area will be the removal of cattle from bottomland hardwood forests and pine-hardwood upland areas currently being grazed (Photograph 12). This will allow the regrowth of herbaceous and shrubby vegetation, presently being removed or adversely affected by grazing and trampling, thereby providing additional forage and cover for native wildlife. Future use of grazing as a management tool to control undesirable vegetative growth may be permitted by mutual agreement between the Corps and TPWD, if specific sites prove feasible.

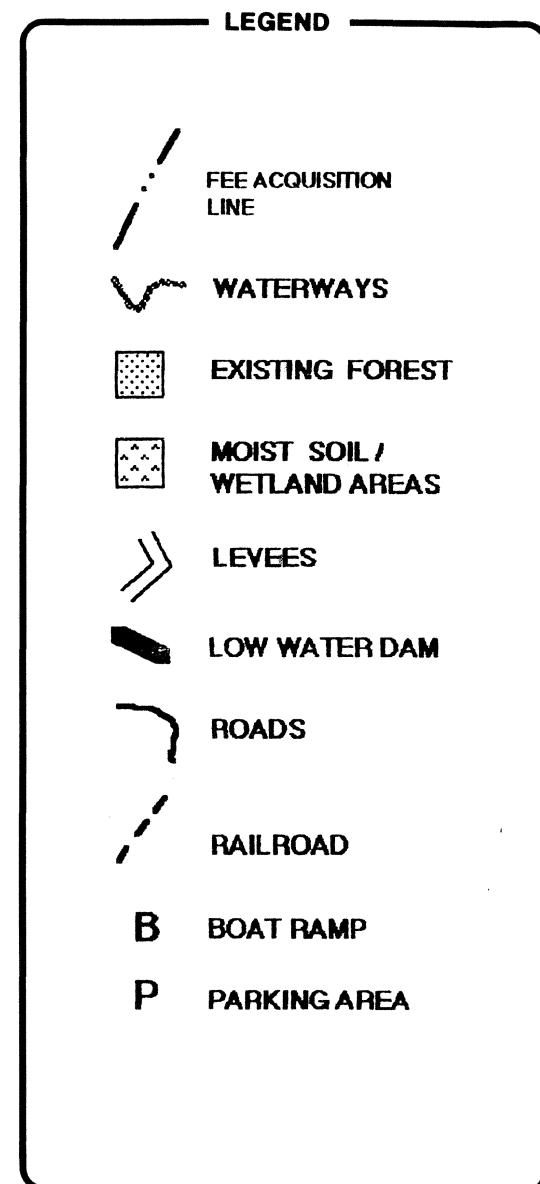
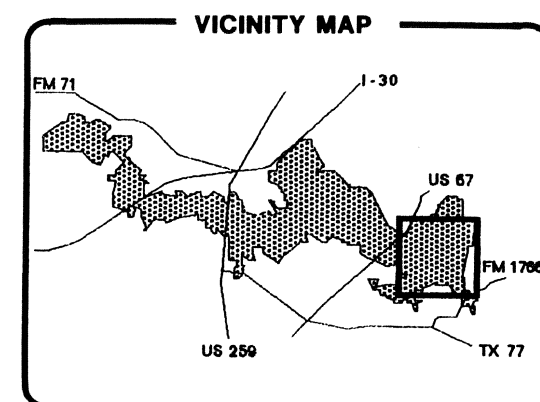
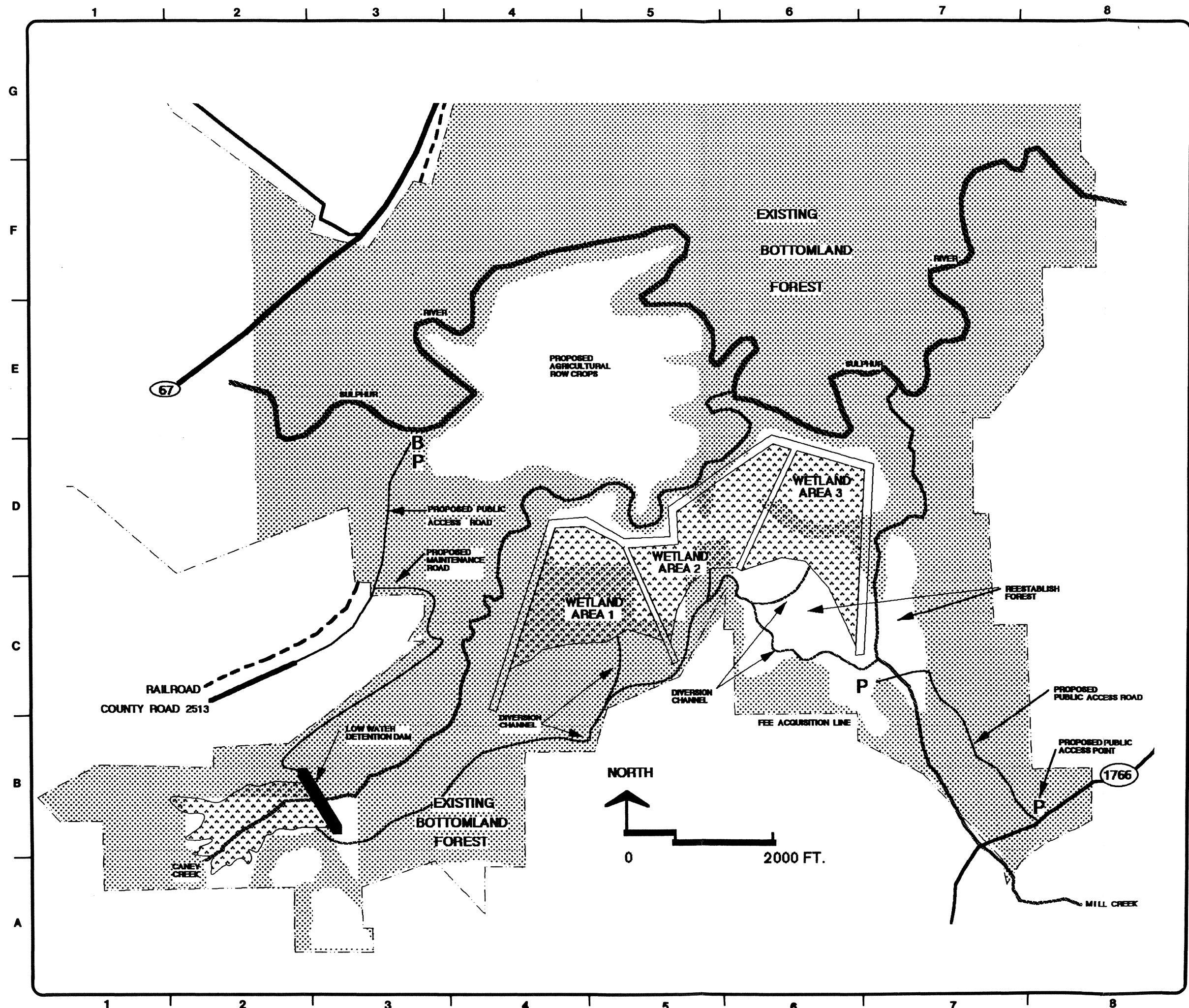
Converted Bottomland Forests - Approximately 500 acres, in the Sciara

Farms area, will be developed as a moist soil management area (Plate 5-2). Moist soil management offers opportunities to attract and provide food and cover for a wide variety of wildlife on man-made impoundments. The initial development of the site includes construction of levees, a small detention dam and reservoir, a diversion channel and control structures for precisely scheduled water manipulations, and public access and parking facilities to provide for recreational use of the area. The detention structure will impound approximately 800 acre-feet of water on Caney Creek for delivery to the moist soil compartments during periods of low rainfall. The detention of this water will require a state water rights permit. The Texas Parks and Wildlife Department is currently laying the ground work with the Texas Water Commission in anticipation of the acquisition of this permit. TPWD will have the lead action on this issue, with the Corps of Engineers providing assistance as needed.



PHOTO NO. 12

**Intensive Cattle Grazing Has A Negative Impact
On Wildlife Resource Values At White Oak
Creek Mitigation Area**



U. S. ARMY ENGINEER DISTRICT, FORT WORTH
CORPS OF ENGINEERS
FORT WORTH, TEXAS

COOPER LAKES AND CHANNELS
SULPHUR RIVER, TEXAS

SUPPLEMENT NO. 1 TO THE MASTER PLAN
WHITE OAK CREEK MITIGATION AREA
MOIST SOIL MANGEMENT AREA

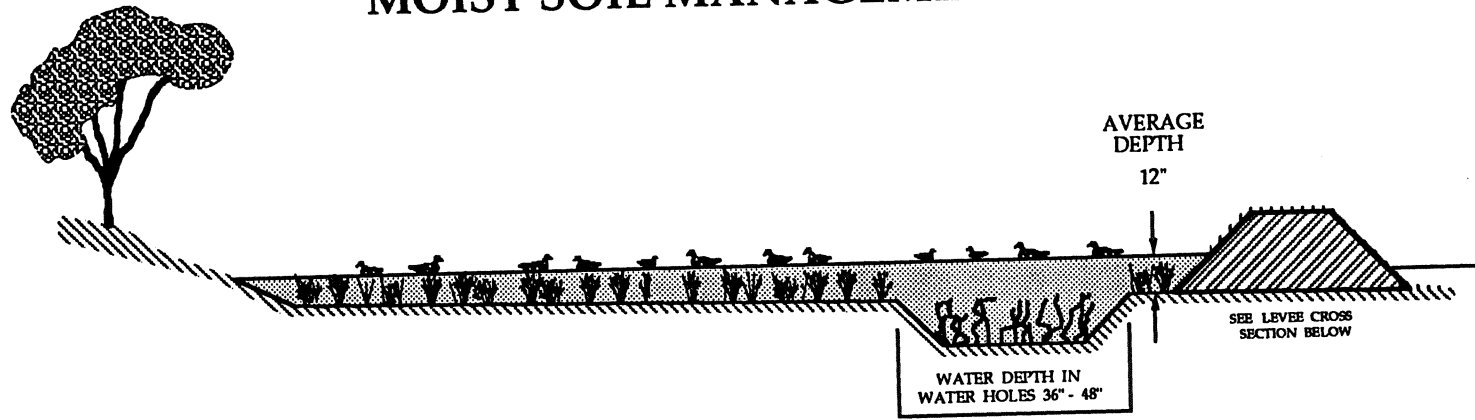
INVITATION NO.	DATE: APRIL, 89
CONTRACT NO.	SHEET NO. SEQUENCE NO.
DRAWING NUMBER	1 of 1 522

Levees - Initial construction and future maintenance and alterations to levees will require authorization under Section 404 of the Clean Water Act. Such authorization will cover activities of the project operator on the moist soil management area for the life of the project. Inner levees will be located parallel to 1-ft. elevation contours and will be spaced to allow water retention on areas which will be entirely flooded to a maximum depth of 18 inches, except in deeper, constructed water holes. Outside levees will be designed to support vehicles for maintenance access; and all levees will be designed to withstand frequent inundation. The levees will surround separate moist soil management units ranging in size from 125 to 180 acres (Figure 5-1). A series of interrupted ditches (approximately 50 ft. wide by 36-42 inches deep, maximum 1/4 mile in length, with 5:1 side slopes) will be created along the inside of the levees. Scattered 1 to 2-acre pits of similar depth within each, moist soil management unit, also will be created (Figure 5-2). Material for the levees will be obtained from the creation of ditches and water holes inside the impounded areas when soils are suitable for this purpose. Creation of these areas, which will be flooded significantly longer than most of the moist soil management unit, will provide greater habitat diversity than would otherwise be realized. Plantings will be necessary to establish flood tolerant grasses and forbs on the levees and other flood tolerant species on disturbed areas within the levees.

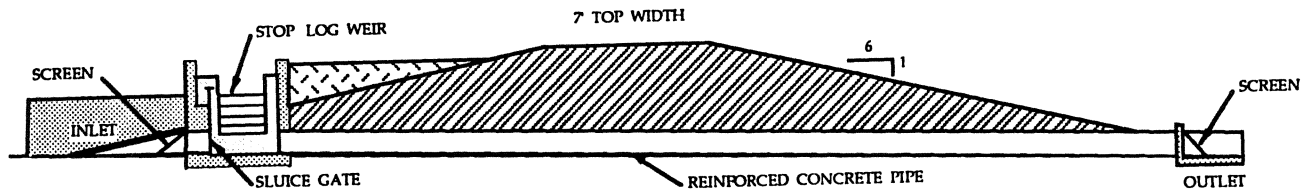
Nest boxes for cavity-nesters, particularly wood ducks, will be placed on posts over the excavation for each water hole at a rate of 3 boxes per acre (see Figure 5-3 and U.S. Fish and Wildlife Service. 1976, for specifications of nest boxes.) Boxes will be positioned approximately 5 feet above the mean spring-summer water level in each excavation. Galvanized steel or fiberglass support posts will be equipped with predator guards consisting of inverted

Figure 5-1

MOIST SOIL MANAGEMENT AREA DETAILS



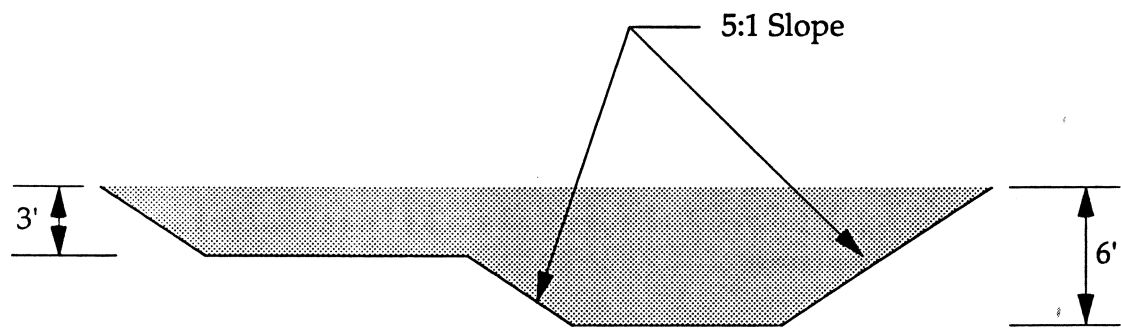
CROSS SECTION OF WETLAND AREA
NOT TO SCALE



CROSS SECTION OF LEVEE AND CONTROL STRUCTURE
NOT TO SCALE

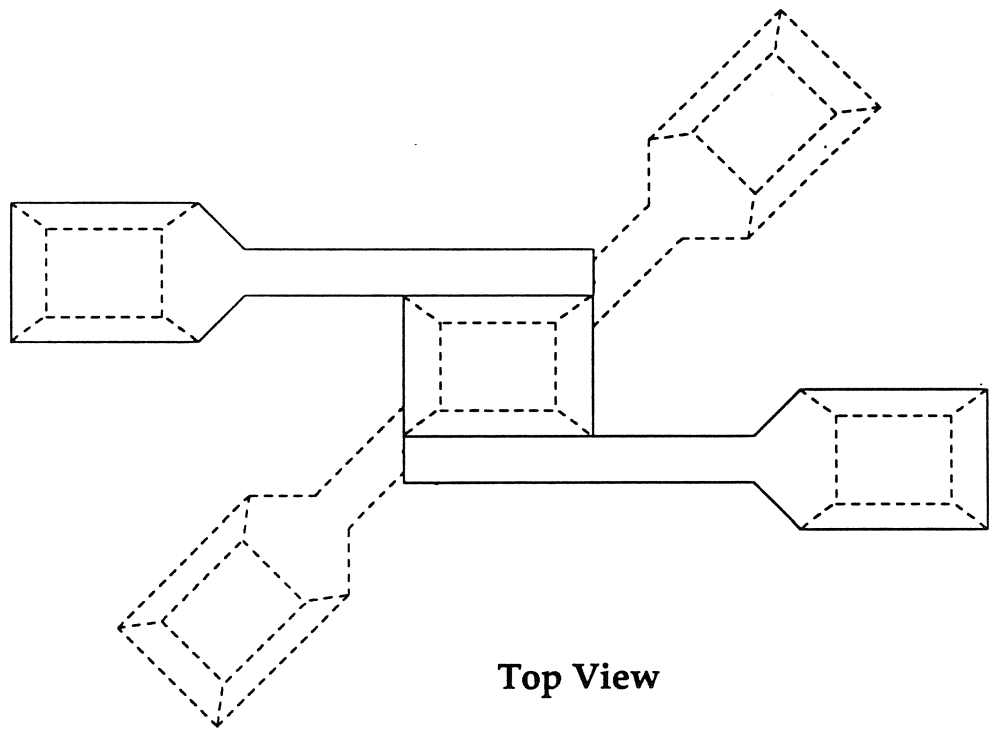
Figure 5-2

CONCEPTUAL WETLAND PIT DESIGN



Pit Size = 1 Acre or Larger

Side View



Top View

Figure 5-3

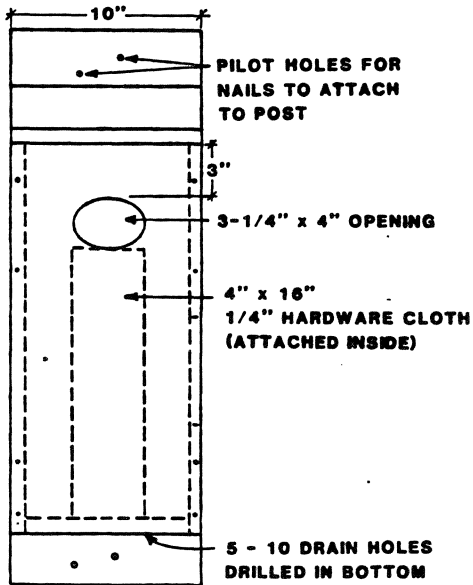
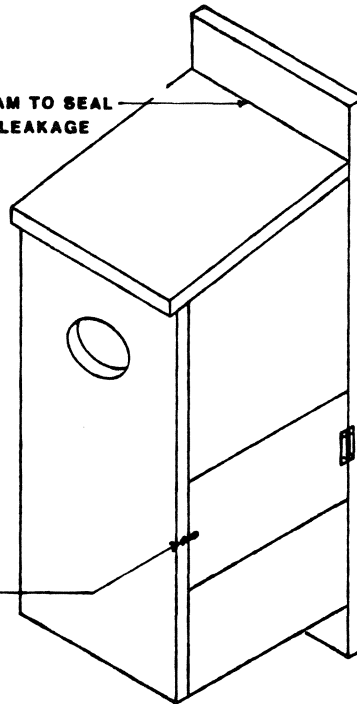


**CONSTRUCTION PLAN FOR
WOOD DUCK NEST BOX**

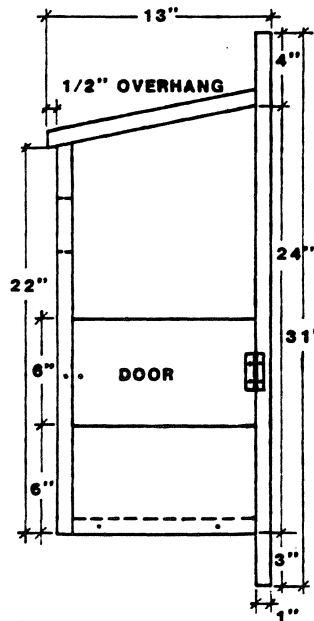
USE 1" x 10" OR 1" x 12"
UNTREATED SOFTWOOD LUMBER

WRAP WIRE AROUND NAILS
TO SECURE DOOR
IN CLOSED POSITION

CAULK THIS SEAM TO SEAL
THE TOP FROM LEAKAGE



FRONT VIEW



SIDE VIEW

sheet metal cones 3 feet in diameter (Figure 5-4). Nesting materials should include coarse sawdust, wood chips, or wood shavings, all from untreated wood.

Water Control Structures - Box-type, stop-log, water control structures, fitted with reinforced concrete pipes, will be constructed at each levee to allow complete de-watering of each moist soil management unit (Figure 5-1). See Fredrickson and Taylor (1982) for guidelines and suggestions on design of water-control structures). These structures are essential to the precisely scheduled water level manipulations needed for management of wetland food crops for waterfowl.

Detention Dam and Reservoir - A small earthen dam structure will be placed across Caney Creek to detain water during periods of low rainfall (see Plate 5-2 and Figure 5-5). The dam will be approximately 1200 feet in length, and will rise approximately 15 feet above the bottom of the creek. The upstream side of the dam will be grass covered and the downstream will be lined with concrete. The reservoir will have a surface area of approximately 160 acres at elevation 255.

Diversion Channel - The water detained by the Caney Creek structure will be delivered to the moist soil compartments by a diversion channel (see Plate 5-2). The grass lined, trapezoidal channel will be approximately 3.5 miles long, with 3:1 side slopes, a 5 foot bottom width, and an average depth of 2 feet. The invert elevation of the channel at the reservoir will be 247. Water will be diverted to each compartment using small sluice gate/stop log structures (see Figure 5-6).

Figure 5-4

PREDATOR GUARD

Cone-shaped, sheet-metal guard for protecting nest structures from predators. At right is layout for cutting 3 predator guards from a 3' x 8' sheet of 26-gauge galvanized metal. When installing the guard, overlap the cut edge to the dotted line. To facilitate cutting (on solid lines only) follow the sequence of numbers. Make circular cuts in counterclockwise direction. To make initial cut on line A-B, make a slot at A with a cold chisel. Use tinsnips and wear leather gloves.

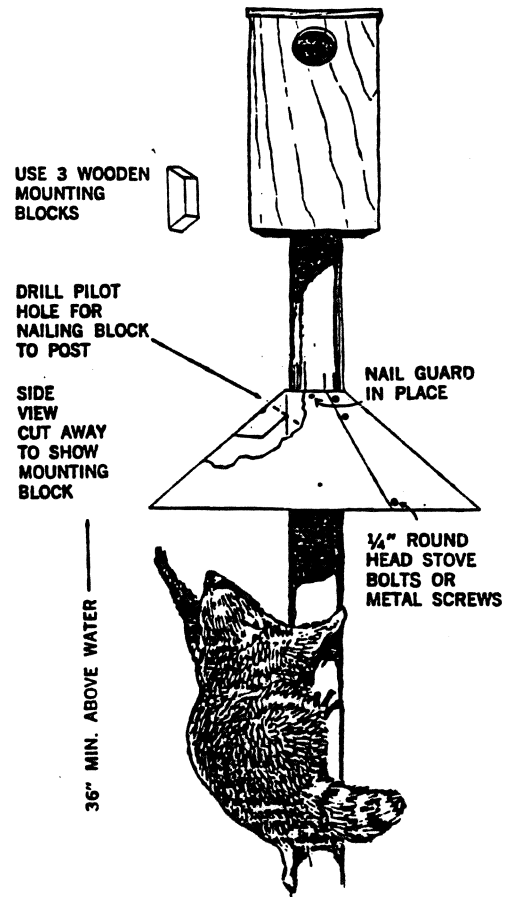
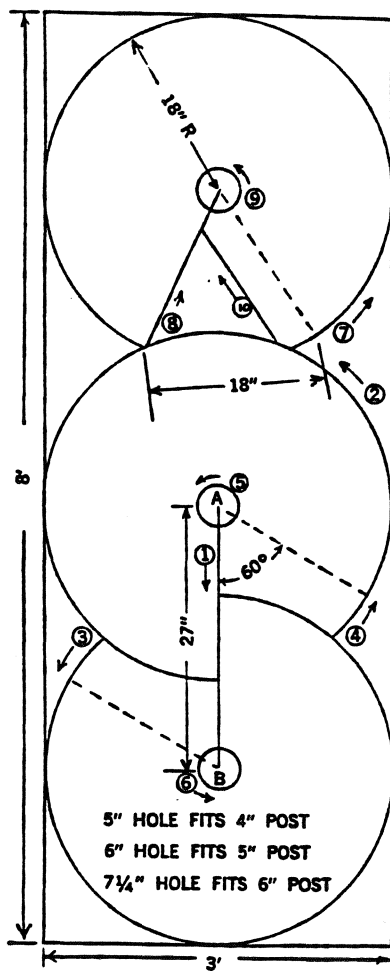
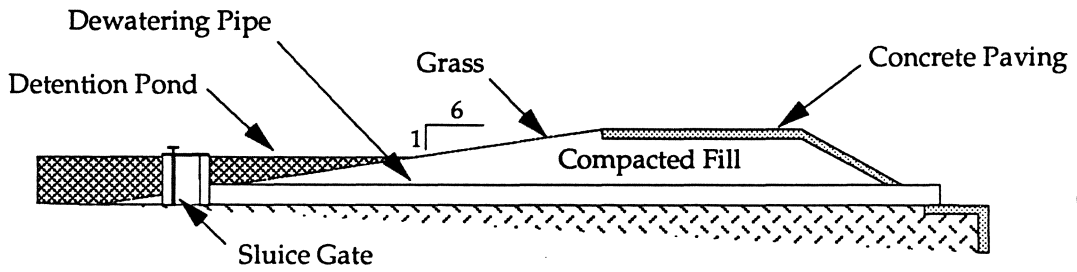


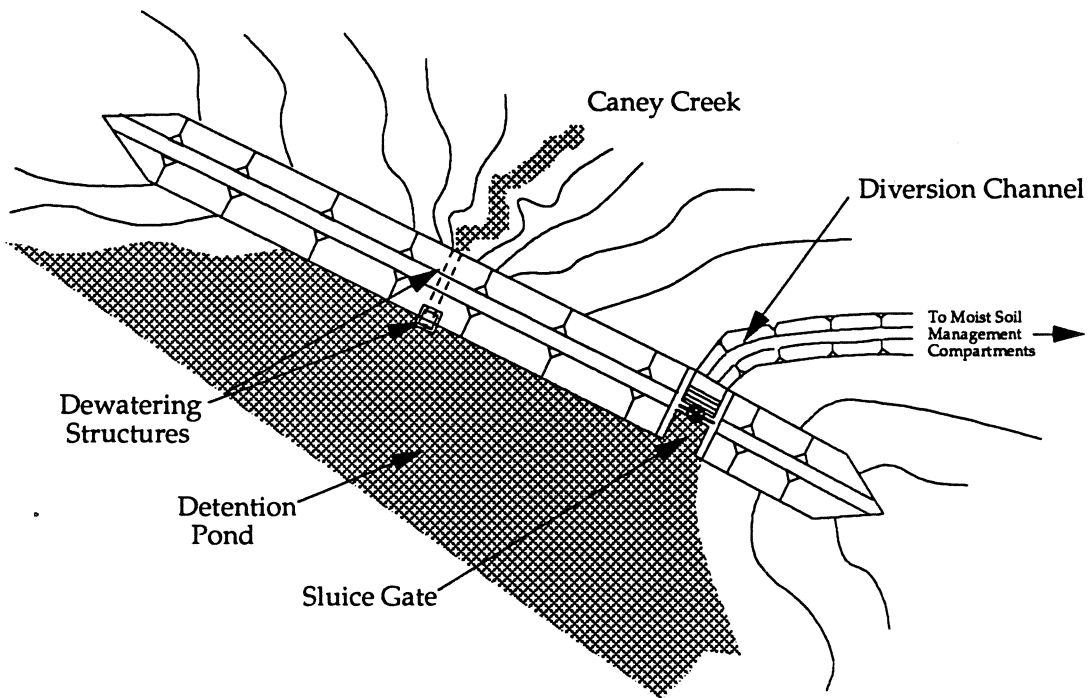
Figure 5-5

DETENTION DAM DETAILS



CROSS SECTION THROUGH DEWATERING STRUCTURE

NOT TO SCALE

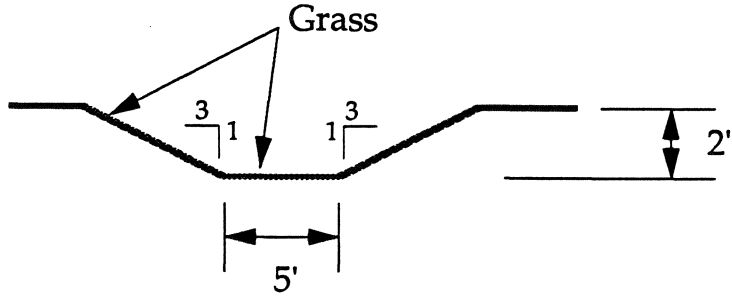


PLAN VIEW

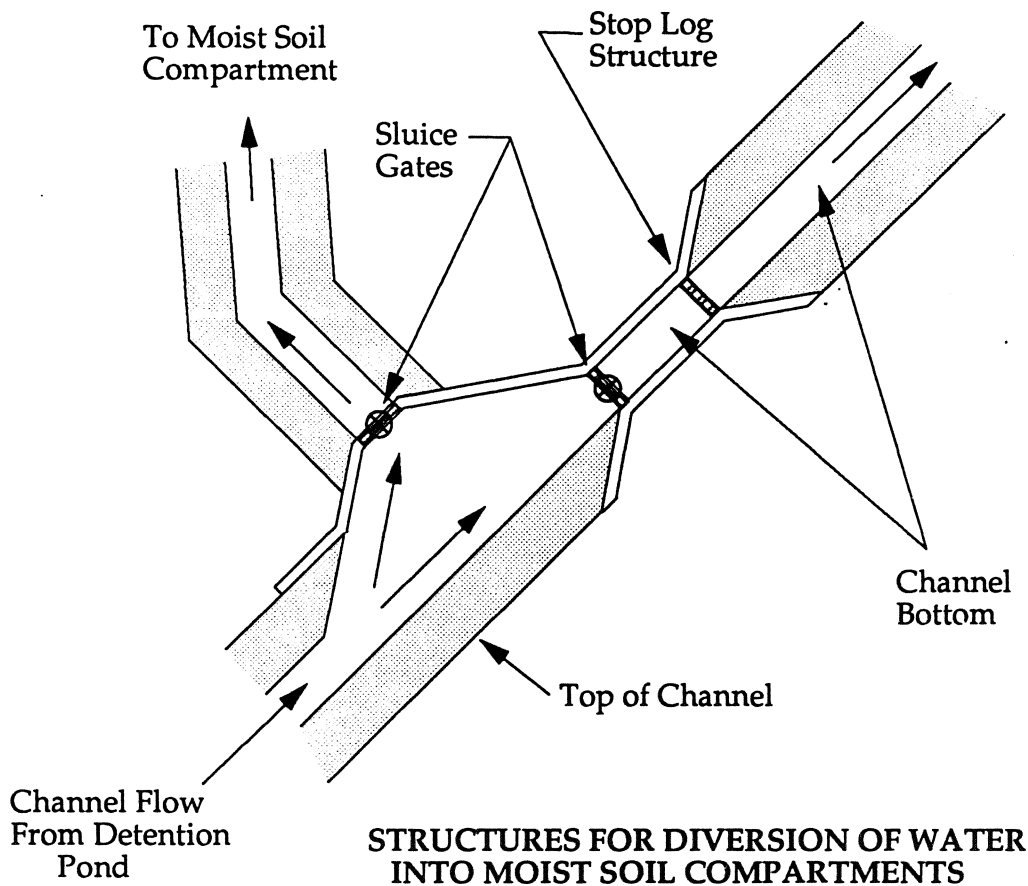
NOT TO SCALE

Figure 5-6

DIVERSION CHANNEL DETAILS



TYPICAL CROSS SECTION Not to Scale



STRUCTURES FOR DIVERSION OF WATER INTO MOIST SOIL COMPARTMENTS

PLAN VIEW NOT TO SCALE

Row Crop Agriculture - Three hundred acres of previously cleared land in the Sciara Farms area will be disked and planted in cereal grain crops such as corn, grain sorghum, millet, or combinations thereof. It may be necessary to brush-hog or burn the area prior to disking to remove existing vegetation.

Herbaceous Wetlands - Nest boxes, meeting the specifications previously described, will be placed at selected herbaceous wetlands at a rate of 3 boxes per acre. TPWD, in consultation with the U.S. Fish and Wildlife Service, will select sites for nest boxes prior to the Corps of Engineers installation or advertisement of the work contract.

Upland Pastures - Plate 5-1 delineates 1838 acres where woody plantings will be utilized to increase the wildlife carrying capacity of selected upland pastures at the White Oak Creek Mitigation Area by providing food and cover for bobwhites, mourning doves, cottontails, raccoons, white-tailed deer, and numerous other species. Shrubs will be planted in 200 foot wide, north-to-south strips at intervals of approximately 300 yards, and in 200 foot wide, east-to-west strips at intervals of approximately 600 yards, so that a crosshatch pattern of woody vegetation is established. At intersections of the shrubby areas, trees will be planted in lieu of shrubs to establish interspersed woody motts. Planting will not occur on slopes which exceed 20 percent, and plantings will be made between December and March. Planting contracts, to be completed during initial development, will be written to insure the survival of not less than 30 trees per acre after the first two growing seasons. A list of trees, shrubs, and woody plants for upland pasture plantings appears in Table 5-2.

Table 5-2

Woody Plantings for Upland Pastures

<u>Common Name</u>	<u>Botanical Name</u>
<u>Trees</u>	
Post oak	<u>Quercus stellata</u>
Southern red oak	<u>Q. falcata</u>
White oak	<u>Q. alba</u>
Water oak	<u>Q. nigra</u>
Red mulberry	<u>Morus rubra</u>
Common Persimmon	<u>Diospyros virginiana</u>
Pecan	<u>Carya illinoensis</u>
Mockernut hickory	<u>Carya tomentosa</u>
Black hickory	<u>C. texana</u>
Black walnut	<u>Juglans nigra</u>
<u>Shrubs and Vines</u>	
Flame leaf sumac	<u>Rhus coccinea</u>
Skunkbush sumac	<u>R. aromatica</u>
Smooth sumac	<u>R. glabra</u>
Yaupon	<u>Ilex vomitoria</u>
Parsley hawthorn	<u>Crataegus spathulata</u>
Mustang grape	<u>Vitis mustangensis</u>
Dewberry	<u>Rubus trivialis</u>
Blackberry	<u>Rubus spp.</u>
Huckleberry	<u>Vaccinium arboreum</u>
Plums	<u>Prunus spp.</u>

Cavity nesting passerine birds (song birds) have suffered population declines in many regions of the United States over the past 2 to 3 decades. In some areas (for example, the Appalachian Mountains region of the eastern United States) artificial nest boxes play an important role in providing appropriate cavities for use by these birds. Several cavity nesting species, notably the eastern bluebird, are commonly seen in pasture uplands at the White Oak Creek Mitigation Area. To increase nesting opportunities for these species, nest boxes (Figure 5-7) will be installed on fence posts and trees in pasture uplands at a rate of approximately one per acre.

Reestablishment of native vegetation will be actively encouraged in approximately 30 percent of the upland pastures and in open fields between woody plantings. Practices developed in consultation with the Texas Parks and Wildlife Department and the U.S. Fish and Wildlife Service will be used to accomplish this. Utilization of disking and/or controlled burning will be determined according to the scope and objectives of a Wildlife Management Plan, to be submitted by TPWD after future study. Disking will be restricted to areas with deep soils and not more than five percent slopes to avoid erosion.

Aquatic Habitats - Wood duck nest boxes, meeting the specifications previously described, will be placed at selected stock ponds, oxbow sloughs, riparian areas, and beaver ponds at a rate of 3 boxes per acre. TPWD, in consultation with the U.S. Fish and Wildlife Service, will select sites for nest boxes prior to Corps of Engineers installation or advertisement of the work contract.

Figure 5-7

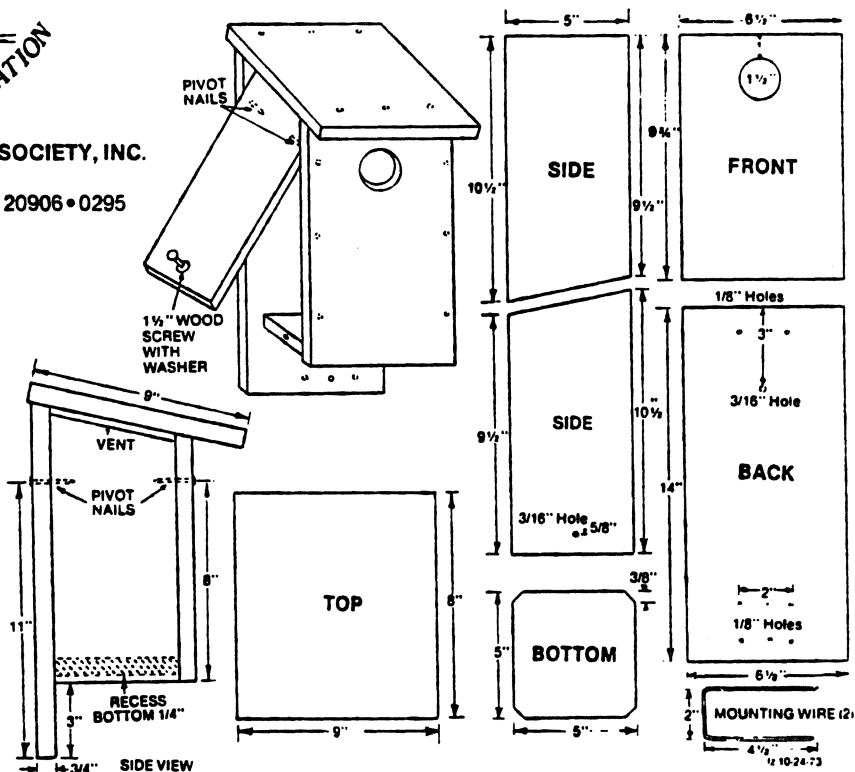


BLUEBIRD NESTING BOX PLANS AND INSTRUCTIONS

Plan for Side-opening Nesting Box with 5" x 5" Floor

NORTH AMERICAN BLUEBIRD SOCIETY, INC.
 P.O. Box 6295
 SILVER SPRING, MARYLAND 20906 • 0295
 (301) 384-2798

Dimensions shown are for boards 3/4" thick.
 Use 1 1/4" galvanized siding nails or aluminum nails.
 Pivotal nails must be located exactly opposite each other as shown for proper opening of side board.
 Cut top edges of front and back boards at slight angle to fit flush with top board.
 Cut 3/8" off each corner of bottom board as shown.
 Insert bottom board so that the grain of the wood runs from front to rear of box.



Side-opening nesting box. For greater ease in cleaning and monitoring, a side-opening box is sometimes used. Opening the side of the box for inspection while birds are nesting in it is somewhat more disturbing to the birds than in a top-opening box. For this reason it is recommended that a side-opening box containing nestlings more than 13 days old be opened with extreme care, if at all, to avoid the possibility of premature fledging of the nestlings.

Larger nesting box. The 4" x 4" box is large enough for practically all broods of Eastern Bluebirds and most broods of Mountain and Western Bluebirds, but the 5" x 5" box may have some advantage for the latter two species and may also be safer for Tree Swallows which often occupy bluebird nesting boxes in the northern states and Canada.

Above is a detailed plan for a side-opening bluebird nesting box with a 5" x 5" floor. This plan can also be used for a side-opening box with a 4" x 4" floor simply by making all boards one inch narrower and the top and bottom boards one inch shorter

than shown. Similarly, a top-opening box with a 5" x 5" floor is easily made from the plan on the other side of this sheet by making all boards one inch wider and the top and bottom boards as well as the dowel and cleat one inch longer than shown in the plan.

There is some evidence that a slightly larger hole may be more suitable for Mountain Bluebirds. A hole size measuring *no larger* than 1-9/16" may be used in these instances. If the hole is even 1/16" bigger, starlings will not be excluded, so great care must be taken to be precise.

The side-opening nesting box may be mounted in ways similar to those described for the top-opening box (see other side of this sheet). When mounting wires (see plan) are used to mount the box on the side of a metal post the two ends of the upper wire are inserted through the 1/8" holes near the top of the backboard. This must be done with the side wide open. If the box is

mounted on the side of a wooden post or tree trunk a round-headed screw may be used in the 3/16" hole in the backboard. A long-handled screw driver is inserted through the entrance hole of the box. A metal washer should be used on the screw.

Raccoon guards as described on the other side of this sheet are recommended for all types of nesting boxes in areas where these animals are troublesome, unless other means are used to prevent them from reaching the boxes.

Chickadees, titmouse and nuthatch nesting boxes. Both of the above-described 4" x 4" floor nesting boxes are suitable for and often used by chickadees or titmice, especially when they are located close to wooded areas. Nuthatches will also occasionally use the boxes in these locations. If the entrance hole is made only 1-1/8" in diameter, chickadees, Brown-headed Nuthatches, and Pygmy Nuthatches can enter the box readily but House Sparrows are excluded. A raccoon guard with a 1-1/8" hole can be attached to a bluebird nesting box to accomplish the same purpose.

To mitigate for losses to riverine habitat, the *Final Supplemental Environmental Statement, Cooper Lake and Channels, Texas* (U.S. Army Corps of Engineers, 1981) stated:

The operating plan for Cooper Lake will provide for the retention of the lower 5 percent (1/3 foot) of the flood pool whenever the reservoir is at or above this stage. Higher release rates to preserve the flood control storage purpose will be maintained above the 5 percent pool, or storage may be evacuated when flood conditions are forecast. Releases will be made from this retained flood storage at the rate recommended by USFWS (45 cfs in September through February, 50 cfs for March and April, and 30 cfs for other months) until the lake is again at conservation pool. A 5 cfs constant low flow will be maintained downstream whenever the lake elevation is below 440 feet msl. These release rates and periods may be modified in the future to optimize beneficial downstream effects, after conduction of appropriate hydraulic studies, coordination with the USFWS and TPWD, and when such modifications would not adversely affect the flood control function of the project.

After reviewing opportunities to modify the U.S. Fish and Wildlife Service's recommended release schedule to accommodate concerns for the undependable nature of actual releases which will meet this schedule under the guidelines set in the *Final Supplemental Environmental Statement*, the Corps of Engineers, the U.S. Fish and Wildlife Service, and the Texas Parks and Wildlife Department agreed that overall provisions for reservoir releases will be consistent with the releases initially recommended in the *Final Supplemental Environmental Statement*, previously quoted. Generally, reservoir releases may be managed to accommodate fish and wildlife needs whenever such management would not have an adverse effect on flood control or water supply functions. For example, at Kaw Reservoir on the Oklahoma-Arkansas border, Corps personnel have adjusted reservoir releases to accommodate mudbank seeding with food plants for waterfowl. Similar fish and wildlife management measures involving releases from Cooper Lake will be left open for negotiations as deemed necessary and beneficial by the Corps and the project operators.

5.04 ACCESS

Providing access for managers and recreational users at the White Oak Creek Mitigation Area has been a major consideration in the development of this supplement. The proposed entries have been identified numerically one through thirteen on Plate 5-1. The public entries are numbered 1 thru 8 and management entries are 9 thru 13. All parking areas will be established inside the fee boundary. Perimeter fencing will prevent unauthorized vehicles from entering the lands beyond these parking areas but will allow easy pedestrian access. Cross-fencing will be required along roads which provide public vehicular access through or into the interior of the Mitigation Area. Informational and directional signage should be provided at all public access points.

Alignment of all new roads that are to be constructed for public access should strive to avoid excessive cuts and fills, and minimize vegetative clearing. Roads and parking areas should be stabilized and should have adequate cross drainage and compaction. All public roads and parking areas will be constructed to minimum county standards. The counties, within which the White Oak Creek Mitigation Area is located, have indicated their willingness to construct county roads as necessary to reach the public access points and parking areas at sites 1,2,3,5,7 and 8, provided they are reimbursed for all costs in connection therewith. The counties also are willing to obtain any necessary right-of-way across private property for these roads. Easements will be conveyed to the counties for operation and maintenance of the parking areas at these sites. Roads from the boundary line to the interior of the Mitigation Area, including parking areas 4, 5a and 6, will be constructed by the Government and operated and maintained by TPWD. Approval of this report will be considered as authority to contract with the counties for construction of the previously mentioned facilities.

Public Entries - Specifics for the proposed development at each public entry are outlined in the following paragraphs.

Entry 1 is a desirable location for public access to the Mitigation Area north of Interstate 30. The construction of a public road from Farm to Market 71 to the project boundary, and a parking area for 6 to 8 vehicles will be required. This area is heavily vegetated, and substantial clearing will be necessary to accommodate a parking lot.

Entry 2 will provide good public access to Twin Lakes for both consumptive and non-consumptive recreational activities. Access to the Twin Lakes area is important since it offers significant waterfowl and fisheries habitat. A road easement will be acquired and the existing private road will be improved as required. The topography at the parking lot site lends itself to economical development, and minimal clearing will be necessary. Parking should be provided for 6 to 8 vehicles with a turnaround.

Entry 3 will provide good access to the lands east of the Sulphur River. There is an existing gated road off of the county road. The topography is relatively flat and will be a good location for parking for 6 to 8 cars, but some clearing will be required.

Entry 4 will provide a desirable location for public access to the Mitigation Area east of U.S. Highway 67. An abandoned segment of road located within the right-of-way and adjacent to the highway can provide parallel parking for 6 to 8 vehicles at a nominal cost. The State Department of Highways and Public Transportation has indicated that the area can be made available provided that they are indemnified from any damage resulting from the construction, operation, and maintenance thereof. Due to the

problems associated with the Federal Government assuming such a liability, the construction of a parking area at this location is contingent upon TPWD acquiring the necessary agreement from the State.

Entry 5 provides access to the eastern portion of the moist soil management area, directly from FM 1766. A parking area for 6 to 8 vehicles should be provided just inside the fee boundary, adjacent to the existing road. Clearing and minimal grading will be required. Public access to the moist soil management area will be controlled with a lockable gate. TPWD will be able to limit access to pedestrians from this entry point between hunting seasons.

Entry 5a will include a public road from FM 1766 into the moist soil management area and a parking area for 12 to 15 vehicles. Some clearing and minimal grading will be required. This entry road will take advantage of an existing culvert crossing Mill Creek near the moist soil compartments. Public vehicular access to Entry 5a will be controlled by a lockable gate at the parking area adjacent to FM 1766.

Entry 6, from Cass County Road 2513, provides the best location for public access into the western portion of the moist soil management area. The county road ends just short of the Mitigation Area boundary, and a short easement may be required. A stabilized, compacted road should be constructed from the county road to an area near the southwest bank of the Sulphur River, where a parking area for 12 to 15 car/trailers and a turnaround will be needed. Moderate grading and clearing will be necessary. A sloped, gravel boat ramp should be constructed for canoe and flat-bottom boat access into the river at this point.

Entry 7 takes advantage of an existing county road traversing the Mitigation Area. At the first desirable location inside the fee line, a parking area should be constructed. Some cut and fill may be required for proper siting, however no clearing is anticipated. The road beyond the parking area is to be closed, and should be removed and revegetated.

Entry 8, Titus County Road NE 31, offers the best opportunity for public access from a public road north of Interstate 30. A stabilized and compacted road should be constructed from the end of the existing road to the Mitigation Area. Due to steep slopes the road should be surfaced to avoid erosion problems. A parking area to accommodate 6 to 8 vehicles should be constructed immediately inside the fee line.

The TPWD Boat Ramp Site should be fenced to control public vehicular access beyond the immediate area. As with all other access points, a maze or turnstile type pedestrian entry gate should be provided for access into the Mitigation Area.

Management Entries - The remaining entries into the Mitigation Area are designated for use by management. Entries number eleven and twelve are located where abandoned private roads intersect county roads bordering the Federal acquisition line. Management vehicles will enter locations nine and ten at points where the project boundary meets the Bowie County road east of the Sulphur River. From there, they can travel along the fire lane inside the fence to clearings and/or abandoned private roads within the Mitigation Area. Entry thirteen will require the acquisition of an access easement or the extension of the Federal acquisition line to Titus County Road N.E. 35. Lockable gates for management access should be placed in the perimeter fence at each of these locations. No other improvements will be necessary. Similar

gates should be installed for managers beyond the parking areas at public access points where existing roads continue into the Mitigation Area.

5.05 PERIMETER FENCE LINE AND FIRE LANE

The entire perimeter of the White Oak Creek Mitigation Area will be fenced to delineate the boundary, contain and exclude livestock, and prevent vehicular access. A strip of land 10 to 15 feet wide will be cleared around the entire perimeter to serve as a fire lane. This strip will allow easier access during construction of the perimeter fence and will allow TPWD access for operations and maintenance of the boundary fence line.

5.06 PROJECT MAINTENANCE BUILDING

A maintenance compound will be constructed at the White Oak Creek Mitigation Area for use by the operating agent. The compound will include a 1000 sq. ft. pre-engineered metal building, with two drive in garage bays, a small office space, and storage areas. The building will be sited within a 5000 sq. ft. heavy equipment storage area with a stabilized base and crushed stone surface. The compound will have a 7 ft. chain-link security fence with a drive through gate. Necessary amenities will include electrical power, potable water, vault toilet, security lighting, and fuel storage/pumping facilities. The maintenance compound will be located near the project boundary at State Hwy 77.

Chapter VI - Operations and Maintenance

CHAPTER VI

OPERATIONS AND MAINTENANCE

6.01 GENERAL

Federal Government and Project Sponsor Obligations - Because the mitigation for wildlife habitat losses is a Cooper Lake and Channels Project joint cost, the acquisition and development costs will be shared proportionately between the Federal Government and the project sponsors. The *Corps Recommended Plan* included an annual cost for Operations and Maintenance (O&M) currently estimated at approximately \$167,000. This cost is also shared jointly between the Federal Government and the project sponsors.

Texas Parks and Wildlife Department Involvement - During the development of the *Supplemental Environmental Impact Statement*, coordination was made with the Texas Parks and Wildlife Department (TPWD). At that time, TPWD expressed an interest in taking an active role in the operation of lands which might be acquired as part of the mitigation plan. In January 1982, Mr. Charles Travis, TPWD Executive Director, stated in a letter to the District Engineer, CESWF, that the Texas Parks and Wildlife Commission "has approved acceptance of mitigation lands associated with the Cooper Lake and Channels Project" (Appendix C). This offer includes O&M responsibilities for the perimeter lands at Cooper Lake and the White Oak Creek Mitigation Area. TPWD has agreed to incur an annual O&M cost equal to 24.14 percent of the total O&M budget. Based upon the letter from TPWD, and the commitment from the Texas Parks and Wildlife Commission, the master plan and this supplement refer to TPWD as the project

operator. Prior to the assumption of these responsibilities, the Corps of Engineers and TPWD will execute a management contract under which TPWD will receive O&M funds on a cost-reimbursable basis.

6.02 MANAGEMENT DOCUMENTS

General Plan - Upon the approval of this supplement, the U.S Fish and Wildlife Service will prepare a *General Plan for Fish and Wildlife*, which will include a statement of finding by the Secretary of the Interior and the Executive Director of the Texas Parks and Wildlife Department that it is in the public interest for the land to be managed by TPWD for fish and wildlife purposes.

Soil Conservation Plan - TPWD will work with the USDA Soil Conservation Service in the development of a Conservation Plan for the White Oak Creek Mitigation Area and will obtain detailed soil information when available. The *Soil Conservation Plan* should identify wildlife considerations (see Appendix B), erosion problems and recommend beneficial plant species and solutions to erosion problems. TPWD will be responsible for reducing soil losses to tolerable levels throughout the entire White Oak Creek Mitigation Area.

Leases - Following the approval of this supplement, the Corps of Engineers and the Texas Parks and Wildlife Department will execute a 50-year lease agreement for the perimeter lands designated for wildlife management at Cooper Lake, and a separate 50-year lease agreement for the lands to be acquired in the White Oak Creek Mitigation Area.

Operations and Maintenance Plans - Each lease agreement will include an initial *Wildlife Management Plan*, and a five-year *Strategic Plan* prepared

by TPWD. Each year, during the term of the leases, TPWD will submit an annual statement of O&M expenses and a one-year *Wildlife Management Plan* and an updated *Strategic Plan* for approval by the Corps of Engineers. TPWD management strategies will be consistent with the operations and maintenance plan presented in this chapter. This plan has been developed with the participation of the U.S. Fish and Wildlife Service, the Texas Parks and Wildlife Department, and the U.S. Army Corps of Engineers based on the development plan presented in Chapter V. Two major features which will be an integral part of the management scenario throughout much of the life of the project (100 year economic period of analysis) are habitat preservation discussed previously, and outdoor recreational use, including regulated hunting. TPWD has expressed interest in managing portions of the Mitigation Area for hunting, in addition to a broader spectrum of resource activities. A fee program for hunting would generate additional revenue which would be reinvested in the Mitigation Area for wildlife enhancement measures agreed upon by TPWD and the Corps. Hunting will allow TPWD to control population densities of selected species as a means of management for those and other species.

6.03 OPERATIONS STRATEGIES BY HABITAT TYPE

The operations and maintenance of the Mitigation Area will be discussed primarily by habitat type.

Bottomland Hardwood Forests and Pine-Hardwood Uplands - Due to the natural, historical occurrence of numerous wetland plants within the boundaries of the moist soil management area (Table 6-1), an adequate seed bank is available in the soil. One hundred seventy acres of previously converted bottomlands adjacent to the moist soil management area are specified for reestablishment of bottomland hardwood forests and plantings

of high volume herbaceous food producing plants to benefit deer, turkey, waterfowl, and non-game wildlife. Forests should be allowed to revegetate with desirable mast and berry-producing trees and shrubs. This will require periodic thinning of black willow, cedar elm, cottonwood, green ash, hackberry, and similar undesirable saplings to reduce these species' competition with oaks, hickories, hawthorns, pecans, and other large mast and berry producers. In the event that adequate reestablishment of desirable woody plants does not occur as a result of these species' natural regenerative capabilities, TPWD will develop a program of planting and maintenance of saplings and/or seeds.

Table 6-1

Wetland Plants Appropriate for and/or Occurring at White Oak Creek Moist Soil Management Area ¹

<u>Common Name</u>	<u>Botanical Name</u>
Crowfoot sedge	<u>Carex crus-corvi</u>
"Hummock" sedge	<u>C. jorii</u>
Buttonbush	<u>Cephalanthus occidentalis</u>
Chufa	<u>Cyperus esulentus</u>
Jungle-vice	<u>Echinochloa colona</u>
Barnyard grass	<u>E. crusgalli</u>
Wild millet	<u>E. muvicata</u>
Walter millet	<u>E. walteri</u>
Creeping burhead	<u>Echinodorus. cordifolius</u>
Dwarf burhead	<u>E. parvulus</u>
Upright burhead	<u>E. rostratus</u>
Creeping spikerush	<u>Eleocharis macrostachya</u>

Table 6-1 (Continued)

<u>Common Name</u>	<u>Botanical Name</u>
Squarestem spikerush	<u>E. quadrangulata</u>
Teal lovegrass	<u>Eragrostis hypnoides</u>
Slender fimbristylis	<u>Fimbristylis autumnalis</u>
Rice cutgrass	<u>Leersia oryzoides</u>
Duckweek	<u>Lemna sp.</u>
Sprangle top	<u>Leptochloa sp</u>
Water primrose	<u>Ludwigia sp.</u>
Southern naiad	<u>Najas guadalupensis</u>
American lotus	<u>Nelumbo lutea</u>
Spatterdock	<u>Nubher luteum</u>
White water lily	<u>Nymphaea odovata</u>
Water tupelo	<u>Nyssa aquatica</u>
Black gum	<u>N. sylvatica</u>
Fall panicum	<u>Panicum dichotomiflorum</u>
Switchgrass	<u>P. virgatum</u>
Arro arum	<u>Peltandra virginica</u>
Smartweed	<u>Polygonum sp.</u>
Pondweed	<u>Potamogeton sp.</u>
Water oak	<u>Quercus nigra</u>
Nuttall oak	<u>Q. nuttalli</u>
Willow oak	<u>Q. phellos</u>
Shumark oak	<u>Q. shumardii</u>
Laurel oak	<u>Q. laurifolia</u>
Beaked rush	<u>Rhynchospora sp.</u>
Curly dock	<u>Rumex crispus</u>
Arrowhead	<u>Sagitaria sp.</u>

Table 6-1 (Continued)

<u>Common Name</u>	<u>Botanical Name</u>
Olney bulrush	<u>Scirpus americanus</u>
Alkali bulrush	<u>S. robustus</u>
American burweed	<u>Sparganium americanum</u>
Bald cypress	<u>Taxodium distichum</u>
Wild celery	<u>Vallisneria americana</u>

1/ Compiled by Carl Frentress, Texas Parks and Wildlife Department

Within portions of the moist soil management area not designated for reestablishment of bottomland hardwoods, growth of woody and undesirable herbaceous plants will require regular inspections and corrective measures. As deemed appropriate by TPWD, annual plantings and partial harvest of crops of value as wildlife food will be carried out by local citizens under sharecrop or agricultural agreements, and/or introduced wildlife food crops will be planted by TPWD, subject to approval by the Corps of Engineers. Long term management of bottomland hardwood forests and pine-hardwood uplands may involve controlled grazing in some circumstances where species of special management concern would benefit. In some cases, controlled burns on upland forests and periodic flooding will accomplish needed habitat manipulations without the need of grazing.

Periodically in selected areas, TPWD may conduct light thinnings of certain, less desirable overstory trees, such as ash and elm, to promote crown vigor and improve mast production. Generally, no mature trees (>20 inches diameter at breast height), live or dead, will be cut because of their significant value to wildlife. In some few situations, specific removal of diseased or

decadent trees may be permitted. Thinning proposals will be submitted to the Fort Worth District Office, U.S. Army Corps of Engineers, for approval prior to initiation. Timber harvest sales resulting from these thinnings will be converted to management funds to be used exclusively on the project. Annual maintenance of nest boxes, involving removal of branches from near the nest boxes and changing nest materials will be carried out prior to the nesting season each year by the project operator.

Converted Bottomland Forests - Within the area shown as converted bottomland forests on Plate 5-2 (sheet 4 of 4), moist soil management areas will be developed and bottomland hardwood forests will be allowed to reestablish. Trees that are reestablished will require periodic thinning and elimination of undesirable saplings to reduce competition with more desirable mast and berry producers. The Texas Parks and Wildlife Department will maintain and operate the moist soil management area (Plate 5-1) in a manner which will maximize attraction of waterfowl and a wide spectrum of other breeding and migrating waterbirds. TPWD will obtain all necessary state water rights permits to use stream water or overland flow for the regulation of water levels in the moist soil management compartments.

TPWD will be responsible for maintenance of the moist soil management structures, including the levees, water level control structures, embankments, channels, and all appurtenances. TPWD will fluctuate the water level within the levees in order to maintain vegetation species beneficial to waterbirds. As deemed appropriate, annual plantings may be carried out under sharecrop or agricultural agreements with local citizens. Introduced food crops also may be planted by TPWD.

TPWD will maintain nest boxes placed on poles within the moist soil management area. Nesting materials will be changed out seasonally and replaced with coarse sawdust, wood chips, or wood shavings from untreated wood prior to each nesting season.

Herbaceous Wetlands - To retard ecological succession and maintain optimum value to fish and wildlife, emergent vegetation at herbaceous wetlands (Plate 5-1) will be disked or burned by TPWD as needed and when conditions allow. This should be done at least once every 10 years, but no more frequently than every 3 years. Burning should reduce undesirable, coarse marsh plants and create conditions favorable for annual food producing plants.

Upland Pastures - Initial plantings of shrubs and seedling trees previously described in Chapter V will be maintained by TPWD. Reestablishment of native prairie vegetation will be actively encouraged in old field areas not disked during initial development. Practices developed in consultation with the Texas Parks and Wildlife Department Natural Heritage Program and the U.S. Fish and Wildlife Service will be used to accomplish this. Disking will be restricted to areas with deep soils and not more than 5 percent slopes to avoid erosion. Strips at least 15 feet wide and following the contours will be disked by TPWD according to need. To maintain grass vigor and check overgrowth by shrubby vegetation, a controlled grazing or haying program may be initiated with local citizens. Also, a regular schedule of prescribed burning within firebreaks may be conducted by TPWD, subject to approval by the Corps of Engineers. These practices will benefit numerous species directly (e.g. bobwhites, mourning doves, cottontails) and their predators (e.g. red foxes, red-tailed hawks). TPWD will also monitor and maintain nest boxes for passerine birds in this area.

Aquatic Habitats - TPWD, in consultation with the U.S. Fish and Wildlife Service, will select sites for nest boxes prior to Corps of Engineers installation, or before advertisement of a work contract. Nest boxes will be maintained as previously described.

Stock ponds, oxbow sloughs, and beaver ponds will be managed by TPWD according to available funding and potential benefits to fish and wildlife. TPWD may remove fish populations in these habitats through the use of rotenone or an equivalent chemical treatment, and these areas may then be stocked with game fish.

Fence, Fire Lane and Road Maintenance - TPWD will be responsible for maintaining all perimeter fences, gates, roads and boat ramps within the Mitigation Area. TPWD will maintain a cleared strip 10 to 15 feet wide around the entire perimeter of the White Oak Creek Mitigation Area. This cleared strip will serve as a fire lane, allow TPWD to adequately maintain the perimeter fence and boundary delineation and provide better management access to the White Oak Creek Mitigation Area.

Chapter VII - Cost Estimates

CHAPTER VII

COST ESTIMATES

7.01 CURRENT ESTIMATE OF COSTS

This chapter addresses costs of initial development features for the White Oak Creek Mitigation Area associated with the Cooper Lakes and Channels Project. Current cost estimates for the White Oak Creek Mitigation Area are compared with mitigation estimates in the latest PB-3 for the project (Table 7-1). The cost estimate for initial development features at the White Oak Creek Mitigation Area, presented in Table 7-2, are drawn from a more detailed, itemized estimate prepared by the Fort Worth District in accordance with EC 1110-2-538. A summary of that document is included in Appendix D.

Mitigation at Cooper Lake - Approximately 9,500 acres of project lands at Cooper Lake which have been designated for development as wildlife management areas were so identified in the *SEIS* to partially offset habitat losses due to inundation. The implementation of mitigation measures on project lands is within the authority of the Chief of Engineers, and is consistent with Corps policy requiring early identification of project related mitigation opportunities. Mitigation costs associated with the perimeter lands are not included in estimated mitigation costs in the post authorization change report, (*Report on Acquisition of Wildlife Mitigation Lands*), or in the Report of the Chief of Engineers. Further, costs associated with the perimeter lands are not included in the authorizing legislation for the White Oak Creek Mitigation Area or in this supplement. The detailed cost estimate for mitigation features at the Cooper Lake perimeter lands has previously been addressed in the approved *Cooper Lake Master Plan*.

Funding Limitations - Authorization and funding required for the acquisition and development of lands in the White Oak Creek area, is addressed in Section 601 of P.L. 99-662, the Water Resources and Development Act of 1986. Funds appropriated under P.L. 99-662 are subject to provisions of Section 902 of the Act, which states that the maximum cost of the project may not exceed 20 percent of the appropriated amount (after inflation) without separate authorization. Total funding authorized in P.L. 99-662 is \$14,800,000 which, when adjusted to January 1990 dollars is equivalent to \$17,133,000. The currently estimated cost of acquisition and development for the White Oak Creek Mitigation Area is \$19,746,000. The current estimate exceeds the authorized amount by 15 percent, however, the final costs of real estate acquisition and cultural resources may vary considerably. Because the total mitigation costs may exceed the Section 902 limitation, a post authorization change report will be prepared, requesting additional funding to complete the project.

Cultural Resources Costs - Cultural resources costs for the White Oak Creek Mitigation Area were not addressed in the *Report on Acquisition of Wildlife Mitigation Lands*, and were not considered in previous cost estimates for the project. Estimates for cultural resources are included in Table 7-1 as part of the total cost of fish and wildlife mitigation for the Cooper Lakes and Channels Project. The \$1 million estimated for cultural resources is based on projected costs of \$612,000 for survey and preliminary testing for National Register eligibility (25,500 acres @ \$24/acre) and \$388,000 for testing/evaluation. These estimates are based on limited information and will be adjusted as work progresses. Adverse impacts to significant cultural resources sites which might be caused by development activities at the

Mitigation Area will be avoided if possible. Should adverse impacts to significant cultural resources be unavoidable, mitigation of such sites may be necessary. Costs for mitigation of possible impacts cannot be determined, however, until cultural resources survey and testing is completed.

Operations and Maintenance Costs - Estimated annual operations and maintenance costs for the White Oak Creek Mitigation Area are presented in Table 7-3. Operations and Maintenance will be the responsibility of the Texas Parks and Wildlife Department, and a portion of the O&M costs will be paid by TPWD, as discussed in Chapter VI. The O&M contract with TPWD will cover both the White Oak Creek Mitigation Area and the wildlife management areas at the Cooper Lake perimeter lands. The annual cost of O&M, currently estimated at \$167,000 includes operations and maintenance costs for the perimeter lands.

Table 7-1

**Comparison of Current Cost Estimate With
October 1989 PB-3 for Cooper Mitigation**

<u>Account Number</u>	<u>Item</u>	<u>Current Estimate</u>	<u>Latest PB-3</u>	<u>Difference</u>
01	Lands and Damages	\$14,132,000	\$14,132,000	\$0
03	Fish and Wildlife Development	\$3,750,000	\$5,316,000	(\$1,566,000)
30	Engineering and Design	\$562,000	\$489,000	\$73,000
30	Cultural Resources Survey and Testing	\$1,000,000	\$1,082,000	(\$82,000)
31	Supervision and Administration	\$302,000	\$312,000	(\$10,000)
	TOTALS	\$19,746,000	\$21,331,000	(\$1,585,000)

Notes: Acct. No. 03 in the PB-3 includes costs for development of Cooper Lake perimeter lands. The current estimate does not.

Acct. No. 18, Cultural Resource Preservation, is not compared in this table. Costs for mitigation of possible impacts cannot be determined until cultural resources survey and testing is completed.

Table 7-2

**INITIAL DEVELOPMENT COST ESTIMATE
WHITE OAK CREEK MITIGATION AREA**

	<u>Unit</u>	<u>Quant.</u>	<u>Unit Price</u>	<u>Total</u>
HABITAT IMPROVEMENTS				
Wood Duck Nest Boxes	Ea	287	\$35.72	\$10,200
Passerine Bird Nest Boxes	Ea	100	\$20.41	\$2,000
Upland Woody Plantings	Ac	368	\$328.84	\$121,000
Upland Grass Plantings	Ac	440	\$459.33	\$202,100
Bottomland Row Crop Plantings	Ac	300	\$127.27	\$38,200
Reestablish Bottomland Forest	Ac	170	\$323.75	\$55,000
			SUBTOTAL	\$428,500
MOIST SOIL MANAGEMENT AREA		Lump Sum		\$912,900
			SUBTOTAL	\$912,900
PUBLIC ACCESS				
Entry No.1		Lump Sum		\$92,600
Entry No. 2		Lump Sum		\$181,100
Entry No. 3		Lump Sum		\$78,000
Entry No. 4		Lump Sum		\$114,400
Entry No. 5		Lump Sum		\$9,600
Entry No. 5a		Lump Sum		\$83,600
Entry No. 6 (including Boat Ramp)		Lump Sum		\$372,400
Entry No. 7		Lump Sum		\$10,300
Entry No. 8		Lump Sum		\$46,800
			SUBTOTAL	\$988,800
PROJECT OPERATIONS COMPOUND		Lump Sum		\$220,200
			SUBTOTAL	\$220,200
PERIMETER FENCING	Mi	85	\$8,355	\$710,100
			SUBTOTAL	\$710,100
			SUBTOTAL	\$3,260,500
			CONTINGENCY (15%)	\$489,100
			SUBTOTAL	\$3,749,600
			ENGINEERING AND DESIGN (15%)	\$562,400
			SUPERVISION AND ADMINISTRATION (7%)	\$256,900
			TOTAL COST	\$4,568,900

Note:

Table 7-2 Summarizes a detailed cost estimate prepared by the Fort Worth District in accordance with EC 1110-2-538. A summary from that document is included in Appendix D of this supplement. Copies of the complete cost estimate will be made available upon request.

TABLE 7-3

White Oak Creek Mitigation Area and Cooper Perimeter Lands Typical Annual Budget, Area Operations, Maintenance and Replacement

<u>ADMINISTRATION</u>	\$47,800
labor for general administrative duties, maintenance of equipment and facilities, mapping, coordination, travel, supplies, maintenance equipment, and utilities.	
<u>HABITAT MANAGEMENT</u>	\$67,900
conduct vegetative surveys and management strategies, develop wetlands at Cooper Lake, develop and maintain food plots, disking, controlled burning, supplemental plantings, maintain bird boxes, establish native prairies, manage moist soil area at White Oak Creek	
<u>PUBLIC USE MANAGEMENT</u>	\$41,800
install and maintain perimeter signs, maintain property lines and fire lanes, construct and maintain hunting regulation stations, develop and maintain nature trails, routine law enforcement, conduct post-season hunting surveys, construct and maintain information shelters, administer public hunting program	
<u>WILDLIFE AND HABITAT INVENTORIES</u>	\$9,500
perform flora and fauna surveys, conduct timber inventories, develop timber management plans, conduct deer census and range appraisals, evaluate wintering waterfowl use, annual bird breeding survey, monitor bird boxes, evaluate non-game and small game habitat conditions and hunter harvests	
TOTAL	\$167,000

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- 3/ U.S. Fish and Wildlife Service. 1985. Texas bottomland hardwood preservation program - final concept plan. U.S. Fish and Wildlife Service. Albuquerque, N.M. 378 pp.
- 4/ Wharton, C.H., W.M. Kitchens, E.C. Pendleton, and T.W. Sipe. 1982. The ecology of bottomland hardwood swamps of the Southeast: a community profile. U.S. Fish and Wildlife Service, Biological Services Program, Washington, D.C. FWS/OBS - 81/37. 133 pp.
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- 14/ Austin. Story, D.A. 1981 An Overview of the Archeology of East Texas. Plains Anthropologist 26: 139-156.
- 15/ Texas Historical Survey Committee and Texas Water Development Board 1970 Texarkana Reservoir Enlargement Archeological Survey Report Number 7. Austin, Texas
- 16/ Thurmond, J.P. 1981 Archeology of the Cypress Creek Drainage Basin, Northeastern Texas and Northwestern Louisiana. Master's thesis, Department of Anthropology, The University of Texas at Austin.

Appendix A

Appendix A

Legal References

1. Executive Order 11593, Protection and Enhancement of the Cultural Environment.
2. Reservoir Salvage Act of 1960 (P.L. 86-523; 33 U.S.C. 701n, 69 Stat 186), as amended.
3. National Historic Preservation Act of 1966 (P.L. 89-665; 80 Stat. 915) as amended (16 U.S.C. 470 et seq).
4. National Environmental Policy Act of 1969 (P.L. 91-190; 83 Stat. 852; 42 U.S.C. 4321 et seq).
5. American Indian Religious Freedom Act of 1978 (P.L. 95-341; 92 Stat. 469; 42 U.S.C. 1996).
6. Archeological Resources Protection Act of 1979 (P.L. 96-95; 93 Stat. 721; 16 U.S.C. 470 et seq).
7. Advisory Council on Historic Preservation, Protection of Historic Properties (36 CFR 800).
8. Department of Defense, Archeological Resources Protection Act of 1979, Final Uniform Regulations (32 CFR 229).
9. National Register of Historic Places, Nominations by State and Federal Agencies (36 CFR 60).
10. Department of the Interior, National Park Service, Waiver of Federal Agency Responsibility Under Section 110 of the National Historic Preservation Act (36 CFR 78).
11. ER 1130-2-438 Project Construction and Operation, Historic Preservation Program.
12. ER 1130-2-433 Project Operations, Storage and Curation of Archeological and Historical Data.
13. EP 1105-2-55 Planning, Environmental Resources, Chapter 3, Historic Preservation.

Appendix B

USDA - Soil Conservation Service -
White Oak Creek Wildlife Management Area

WOODLAND SUITABILITY GROUP

- A. Symbol: 2w6
- B. Deep, acid to neutral, poorly to somewhat poorly drained bottomland soils with a high potential productivity. These soils have a clayey texture and have a high available water-holding capacity. Slopes are level to nearly level. The clayey texture and seasonal wetness tend to increase seedling mortality. Equipment limitations will become severe during wet seasons. Best suited for hardwoods.
- C. Management Problems:
1. Equipment limitations are severe due to flooding and high water table at certain times of the year. Specialized equipment to overcome the problems of wetness will be needed.
 2. Plant competition is severe because of the growth encouraged by abundant moisture. Site preparation will be needed for planting operations.
 3. Seedling mortality may become a problem in extended periods of wetness. Planting relatively water tolerant trees and at favorable times may reduce losses.
 4. Erosion and windthrow should not be problems.
- D. Site Index and Adapted Species (Overstory):

<u>Species</u>	<u>Site Index 1/</u>	<u>Trees to Plant</u>
Water oak	90	Water oak
Willow oak	90	Sweetgum
Sweetgum	90	

1/ The average height of dominant and codominant trees at 50 years of age.

- E. Wildlife Considerations and Food Value (Overstory):

When improved wildlife habitat is an objective, the following species should be retained or established for the desired wildlife species. Species diversity is important and monocultures should be avoided.

<u>Species</u>	<u>Deer</u>	<u>Turkey</u>	<u>Squirrel</u>	<u>Ducks</u>	<u>Songbirds</u>
Water oak	P	P	P	P	
Willow oak	P	P	P	P	
Sweetgum			S	S	S
Blackgum	P	S	P	S	S

F. Nature of Plant Community (Understory or Native Pasture) and Forage Value for Grazing Animals (Production by Canopy Classes):

Relative Abundance of Forage Species Common to Site 2/	Canopy Class				Forage Value 1/		
	0-20%	21-35%	36-55%	56-70%	Cattle	Deer	Birds
SEDGES							
<i>Carex</i> spp.	0-5	0-5	0-10	0-10	P	P	S
FORBS							
Goldenrod	0-5	-	-	-	LV	S	LV
Lespedeza, common (introduced sp.)	0-5	-	-	-	S	P	P
Palmetto	0-5	0-5	0-5	0-5	LV	LV	LV
Poke	0-5	-	-	-	LV	S	S
Ragweed, western	0-5	0-5	0-5	-	LV	LV	P
Smartweed	0-5	0-5	0-5	-	LV	LV	P
Snakeroot, white (<i>Eupatorium</i>)	0-5	0-5	0-5	-	S	S	LV
St. Andrewscross	0-5	0-5	0-5	-	S	P	S
Sunflower, swamp	0-5	0-5	0-5	-	S	P	P
GRASSES							
Bluestem, big	0-5	0-5	0-5	-	P	LV	LV
Bluestem, broomsedge	0-5	0-5	0-5	0-5	S	LV	LV
Bluestem, bushy	0-5	0-5	0-5	-	LV	LV	LV
Bluestem, pinehill	50+	25-50	0-10	-	P	LV	LV
Bluestem, splitbeard	0-5	0-5	0-5	0-5	S	LV	LV
Cane, switch	10-25	10-25	10-25	25-50	P	S	LV
Carpetgrass	0-5	0-5	0-5	-	S	LV	LV
Gamagrass, eastern	0-10	0-10	0-5	-	P	S	S
Panicum, beaked	0-5	0-5	0-5	-	P	LV	P
Panicum, low	0-5	0-5	0-5	0-5	S	S	P
Panicum, spreading	0-5	0-5	0-5	-	P	LV	P
Paspalum, florida	0-5	0-5	0-5	-	P	LV	P
Rye, virginia or canadian	0-5	0-5	0-5	-	P	S	S
Switchgrass	0-5	0-5	0-5	-	P	LV	P
Threeawn	0-5	0-5	0-5	-	LV	LV	LV
Tridens, longspike	0-10	0-10	0-5	-	S	LV	LV
SHRUBS							
Blackgum	0-5	0-5	0-5	0-5	S	S	S
Coralberry	0-5	0-5	0-5	-	LV	S	S
Cyrilla, swamp	-	0-5	0-5	0-5	LV	S	S

Relative Abundance of Forage Species Common to Site 2/	Canopy Class				Forage Value 1/		
	0-20%	21-35%	36-55%	56-70%	Cattle	Deer	Birds
SHRUBS (Cont.)							
Hawthorn	0-5	0-5	0-5	-	LV	S	S
Holly, american	0-5	0-5	0-5	0-5	LV	S	S
Maple, red	-	0-5	0-5	0-5	LV	S	LV
Waxmyrtle	0-10	0-10	0-10	0-5	LV	LV	S
Yaupon	0-5	0-5	0-5	0-5	S	P	S
VINES							
Blackberry	0-5	0-5	0-5	-	S	P	S
Dewberry	0-5	0-5	0-5	-	S	P	S
Grape, muscadine	-	0-5	0-5	0-5	S	S	P
Greenbrier	0-5	0-5	0-10	0-5	S	P	S
Honeysuckle (introduced sp.)	0-5	0-5	0-5	-	S	P	S
Poisonivy	0-5	0-5	0-5	0-5	LV	S	S
Supplejack, alabama	0-5	0-5	0-5	0-5	S	P	P
RUSHES	0-5	0-5	0-5	-	LV	S	LV
INTRODUCED GRASSES							
Bahiagrass	50+	50+	-	-	P	LV	S
Fescue, tall	50+	50+	-	-	P	S	LV
TOTAL NORMAL PRODUCTION 3/	3300	1800	1200 4/	400			

- 1/ P = primary; S = secondary; LV = low value.
 2/ Abundance is expressed in percentage composition by air-dry weight.
 3/ This represents the normal production, air-dry weight per acre, of "very high" forage value rating for cattle.
 4/ With optimum woodland management, including prescribed burning.

G. Guide to Initial Stocking Rate for Cattle:

Forage Value Rating	Canopy Class			
	0-20%	21-35%	36-55%	56-70%
	Acres/AU	Acres/AU	Acres/AU	Acres/AU
Very high	7	13	20	60
High	9	17	25	80
Moderate	13	24	35	100+
Low	22	65	60	100+

H. Guide for Determining Forage Value Rating for Cattle and Wildlife:
(P = primary; S = secondary)

	<u>Cattle 1/</u>	<u>Deer and Game Birds 2/</u>
Very high	50% P + S = 90%	25% P + S = 50%
High	30% P + S = 60%	20% P + S = 40%
Moderate	10% P + S = 30%	15% P + S = 25%
Low	Less than 10% P	Less than 15% P

1/ When determining forage value rating for cattle, consideration should be given to lowering forage value rating when total forage production is substantially less than that normal for the forage value rating computed.

2/ Primary and secondary plants that provide trace amounts in the plant community composition should be assigned from 1% to 5% when determining forage value rating for deer and game birds.

State Forester

Date

State Range Conservationist

Date

State Biologist

Date

Area Conservationist

Date



DEPARTMENT OF THE AR
BOARD OF ENGINEERS FOR RIVERS AND HARBORS
KINGMAN BUILDING
FORT BELVOIR, VIRGINIA 22060

REPLY TO
ATTENTION OF:

BERH-ENV

19 October 1981

SUBJECT: Cooper Lake and Channels Project, Texas, Report on Fish
and Wildlife Mitigation

Chief of Engineers
Department of the Army
Washington, DC 20314

Summary of Board Action

The Board concurs with the reporting officers' plan for mitigation of terrestrial wildlife resources which will be lost due to construction of the Cooper Lake and Channels project. The Board has carefully considered the views of those responding to the reporting officers' public notice. The wildlife mitigation plan includes measures already authorized under discretionary authority of the Chief of Engineers, and fee acquisition, development, and management of about 25,500 acres of lands (White Oak Bayou area) for wildlife purposes. These lands are currently under a flowage easement at Wright Patman Lake, a Corps of Engineers project. The White Oak Bayou area is located along the Sulphur River and White Oak Creek, upstream of Wright Patman Lake. Acquisition of the lands in the White Oak Bayou area requires Congressional authorization. Total first cost (October 1981 price level) is estimated at \$12,845,000, of which \$7,068,000 would be Federal and \$5,777,000 non-Federal; and total annual cost is estimated at \$619,000 Federal and \$506,000 non-Federal, including operation and maintenance costs of \$80,000 Federal and \$65,000 non-Federal. The costs are shared the same as for the project purposes causing the damages to wildlife resources.

Summary of Report Under Review

1. Authority. This report was prepared pursuant to Section 3(c) of the Fish and Wildlife Coordination Act of 1958 (Public Law 85-624).

2. Description of the study area.

a. The study area is located in the Sulphur River Basin in northeast Texas and southwest Arkansas. The river originates in Hunt County near Granville, Texas, and flows eastward for about 300 miles to its confluence with the Red River in Arkansas. The

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basin includes 11 counties in Texas and one in Arkansas, all within the Gulf Coastal Plain geographic province.

b. Historically, much of the floodplain was covered by riparian woodlands of which much has been cleared for crop and livestock production. Basin floodplains are frequently flooded and the soils are poorly drained. About 62 percent of the area is farmed for improved pasture, hay, cotton, sorghums, and soybeans. Two floodplain forest types are recognized, (1) a riverfront type located on natural levees and (2) ridges, flats, sloughs, and swamps behind the riverfront. Forest dominants consist primarily of species which are characteristic of riparian woodlands. A generally sparse understory is found in the woodlands.

c. Game and nongame species of vertebrates occur in moderate to high populations within the various habitat types. The pastures and croplands which occur primarily within the proposed reservoir site and upper portions of the project channels support huntable populations of bobwhite quail, mourning dove, and cottontail rabbit. Many nongame species of vertebrates are also present. Semi-wooded pastures and bottomland hardwoods associated with the floodplain provide excellent habitat for numerous game and nongame species. White-tailed deer, fox squirrels, raccoons, cottontail rabbits, swamp rabbits, opossums, mink, beaver, and resident wood ducks occur in moderate to high numbers. Waterfowl and American woodcock are benefited by seasonal flooding during the winter and spring months. Flooding and subsequent reductions in water levels during spring and summer provide especially good feeding habitat for wading birds. Consequently, large breeding populations of herons and egrets occur in the floodplain.

3. Existing improvements.

a. Wright Patman Dam and Lake, constructed by the U.S. Army Corps of Engineers, is located about 75 miles downstream from the dam site of Cooper Lake. The lake and project lands are heavily used for outdoor recreation. There were approximately 2,350,000 visitors in 1978. The project has been in operation since 1957.

b. Cooper Lake and Channels Project, Texas, was authorized by Congress in 1955. The site is located on South Sulphur and Middle Sulphur Rivers. Project purposes include flood control, water supply, and recreation. Construction on 47.3 miles of levees and 34.3 miles of channel improvements has been completed. Project features which have not been implemented include: the reservoir, 0.9 miles of downstream levees, and development and management of perimeter lands (about 7,000 acres) and 750 acres of land immediately downstream of Cooper Dam for wildlife purposes.

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4. Problems and needs. Construction of the multiple-purpose reservoir will result in the loss or degradation of about 25,400 acres of terrestrial wildlife habitat, including 2,100 acres of wetlands, and 21 miles of river aquatic habitat. Adversely affected habitat will result in reduced numbers and diversity of the wildlife population. Problems existing in the study area include lack of access to private land suitable for hunting, restrictive leasing practices of private landowners, crowded conditions on public hunting lands, less than optimal distribution of wildlife and lands available for hunting, low harvest rates, and loss of high quality wildlife habitat from competing land uses. There is a need for preservation and management of the wildlife and terrestrial habitats of the area to alleviate the problems listed.
5. Improvements desired. The U.S. Fish and Wildlife Service, the Texas Parks and Wildlife Department, the Wildlife Management Institute, and local wildlife and environmental organizations have expressed a desire for mitigation of losses of wildlife resources due to the Cooper Lake and Channels Project.
6. Alternatives considered. Methods investigated to compensate for identified wildlife losses include restrictive easement acquisition for wildlife management, intensive habitat development of perimeter lands acquired for Cooper Lake, acquisition and conversion of dissimilar habitat types to those needed for in-kind replacement and intensive development of smaller areas of low quality in-kind habitat. Of the alternatives considered, none were deemed as economically efficient or socially acceptable as the recommended mitigation plan.
7. Recommended plan. The recommended plan includes fee acquisition, development, and management for wildlife of approximately 25,500 acres of lands (White Oak Bayou Area) currently under flowage easement at Wright Patman Lake. Acquisition of the White Oak Bayou lands requires authorization by Congress. Development and management of perimeter lands (about 7,000 acres) at Cooper Lake and about 750 acres of land immediately downstream of the service spillway has been authorized by the Chief of Engineers. Most of these lands have been purchased as part of the Cooper Lake and Channels project. Habitat improvements at the White Oak Bayou site include construction of fencing along the boundary line; development of three 0.5-acre water holes per section; clearing and thinning of three 1.0-acre tracts per section in bottomland hardwood habitats; vegetative plantings on 50 acres per section in open lands; and development of two ground denning areas per section in semi-wooded and open land habitats. Project elements already authorized for the Cooper Lake sites include construction of fencing along the boundary line, revegetation of project land where needed to accelerate ecological succession, and land management.

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8. Project costs. Based on October 1981 price levels, the reporting officers' estimate the first cost of the recommended plan to be \$12,845,000, of which the Federal share is \$7,068,000 and the non-Federal share is \$5,777,000. Annual costs reflect a 100-year period for economic analysis and an interest rate of 7-5/8 percent. Annual costs are estimated at \$1,125,000, of which the Federal share is \$619,040, and the non-Federal share is \$505,960. Annual operation and maintenance costs are estimated at \$145,000.

9. Wildlife mitigation plan benefits. Implementation of the recommended plan will fully compensate for expected losses of terrestrial wildlife productivity affected by the Cooper Lake and Channels Project.

10. Recommendations of the reporting officers. The District Engineer recommends that modification of the Cooper Lake and Channels Project, Texas, be authorized to provide for implementation of the wildlife mitigation plan at the White Oak Bayou site, generally in accordance with the plan described in the report. The Division Engineer concurs.

Review by the Board of Engineers for Rivers and Harbors

11. General.

a. The scope of the Board's review encompassed the overall technical, economic, social, environmental, and policy aspects involved in the wildlife mitigation plan proposed by the reporting officers. Review considered conformance of the report with the essential elements of the Water Resource Council's Principles and Standards for Planning Water and Related Land Resources. The Board also considered the views of local interests, as well as Federal, State, and local agencies.

b. The Board was also aware that, in 1971, the U.S. District Court for the Eastern District of Texas enjoined further construction of the Cooper Lake and Channels Project pending completion of the final Environmental Impact Statement (EIS), though planning, land acquisition, and other nonstructural activities, were allowed to continue. A final EIS was filed with the Council on Environmental Quality on 24 June 1977. On 8 December 1978, the Court issued a Memorandum Opinion detailing five inadequacies of the final EIS and permanently enjoined further construction of the project pending correction of the deficiencies, one of which was the lack of an adequate fish and wildlife mitigation plan for the project. A Supplemental EIS addressing the deficiencies was filed with the Environmental Protection Agency, 27 March 1981.

c. Habitats to be impacted by the Cooper Lake and Channels Project were evaluated by a tri-agency team consisting of members from

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the Corps, U.S. Fish and Wildlife Service, and Texas Parks and Wildlife Department. The Fish and Wildlife Habitat Evaluation Procedures (HEP) were used to make the evaluations. Analysis is based on losses and gains which would occur over the 100-year life of the project and indicates that 29,773 acres of bottomland hardwood and semi-wooded habitat in the White Oake Bayou area, in addition to management of authorized lands at Cooper Lake, would be required to fully compensate for losses of terrestrial wildlife resources. Implementation of the recommended plan would result in about 86-percent compensation based on the analysis. Several discrepancies were detected in the HEP analysis conducted by the tri-agency team. Additional data was obtained from the Fort Worth District and the HEP analysis was reevaluated to eliminate the discrepancies. Reevaluation indicated that development and management of about 24,620 acres of bottomland hardwood and semi-wooded habitats would be required to fully compensate for losses of wildlife resources. The HEP analysis, as modified, appears to give a reasonable estimate of acreage required to mitigate for terrestrial wildlife resources lost due to the Cooper Lake and Channels Project.

12. Response to the Division Engineer's Public Notice. The Division Engineer issued a public notice on 15 June 1981 stating the recommendations of the reporting officers and affording interested parties an opportunity to present additional information to the Board. One letter was received in response to the public notice. The Texas Bird Hunters Association expressed strong support for the recommended plan.

13. Findings and conclusions. The Board has carefully considered the recommendation of the reporting officers and response to the public notices. The Board believes that every effort should be made to conserve the increasingly scarce riparian habitats and concludes that the proposed plan would be justified by the resulting conservation of wildlife resources, is technically feasible, and is socially acceptable. The Board concurs with the view of the reporting officers.

a. The Board notes that the U.S. Fish and Wildlife Service and the Texas Parks and Wildlife Department concur with the reporting officers that implementation of the recommended plan will adequately compensate for losses of wildlife habitat productivity due to project implementation.

b. The Board further notes that the quality and acreage of wildlife habitat required to mitigate losses of wildlife resources were determined by a tri-agency team consisting of representatives from the Corps, U.S. Fish and Wildlife Service, and Texas Parks and Wildlife Department. In this case, the Board feels that the modified HEP analysis as described herein appears to be reasonable.

BERH-ENV


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c. Finally, the Board notes that the reporting officers have requested that the Texas Parks and Wildlife Department assume responsibility for operation, maintenance, and management of the White Oak Bayou mitigation area, and that the Director of the Texas Parks and Wildlife Department has stated a particular interest in managing the area pending approval of the Texas Parks and Wildlife Commission.

14. Recommendations. Accordingly, the Board recommends that the existing Cooper Lake and Channels Project be modified to authorize the Corps of Engineers to include fee acquisition of about 25,500 acres of land in the White Oak Bayou area and development and management of these lands for wildlife purposes to fully mitigate for losses of wildlife resources attributable to the project. Total first cost is estimated at \$12,845,000, of which \$7,068,000 is Federal and \$5,777,000 non-Federal. Total annual costs are estimated at \$1,125,000, of which \$619,000 is Federal, and \$506,000 non-Federal. Operation and maintenance costs are estimated at \$145,000 annually (\$80,000 Federal and \$65,000 non-Federal). All costs are apportioned in the same manner as the costs for the basic project purposes which are flood control, water supply, and recreation.

FOR THE BOARD:


WILLIAM R. WRAY
Major General, USA
Chairman

TEXAS
PARKS AND WILDLIFE DEPARTMENT

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Houston

January 6, 1982

Colonel Donald J. Palladino
District Engineer
Fort Worth District
Corps of Engineers
P. O. Box 17300
Fort Worth, Texas 76102

Dear Colonel Palladino:

The Texas Parks and Wildlife Commission has approved acceptance of mitigation lands associated with the Cooper Lake and Channels Project. The motion for accepting the lands included redesignation of Lone Point, Johns Creek, Jernigan Creek, Middle Sulphur Point and Chigger Creek from proposed recreational parks to areas permanently devoted for wildlife management. Annual operation and maintenance costs to be incurred by this Department were projected to be approximately \$35,000. However, significantly higher costs for annual operation and maintenance including federal and nonfederal funds were recommended in a recent draft report by the Chief of Engineers on the proposed mitigation plan. A request for clarification of these costs has been addressed to that office. A copy of this correspondence will be forwarded to you.

My staff has also recommended that while the Cooper Lake perimeter lands may be managed under a 25-year license, a longer period be requested for administration and management of the White Oak Creek mitigation area. Since this tract was acquired specifically as a mitigation area to partially compensate for wildlife losses associated with the Cooper Lake Project, it is strategically important and should be administered separately with an identity and purpose to ensure security of the area throughout the life of the project. In addition, differing geographical locations between the White Oak Creek area and remaining lake perimeter

Colonel Donald J. Palladino

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lands will create different problems and subsequently, different management treatments. Separate agreements would greatly enhance flexibility in management of the perimeter lands and White Oak Creek area. For these reasons, I am requesting that the White Oak Creek mitigation area be separately transferred to this Department for wildlife management under provisions of a license issued for a minimum of 50 years and containing the privilege and option to renew for a similar period.

Recommended and/or proposed management plans, or any other documentation required, will be forwarded on request. Please advise if additional information is needed.

Sincerely,



Charles D. Travis
Executive Director

CDT:RGF:frh

cc: Mr. Jerome Johnson, USFWS, Ft. Worth
Resource Protection Branch, TPWD



DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF ENGINEERS
WASHINGTON, D.C. 20314

REPLY TO
ATTENTION OF:

DAEN-CWP-A

21 May 1982

SUBJECT: Cooper Lake and Channels Project, Texas, Report on Fish and
Wildlife Mitigation

THE SECRETARY OF THE ARMY

1. I submit for transmission to Congress my report on wildlife mitigation for the Cooper Lake and Channels Project, Texas. It is accompanied by the reports of the Board of Engineers for Rivers and Harbors and the District and Division Engineers. This report was prepared pursuant to Section 663(c) of the Fish and Wildlife Coordination Act of 1958 (Public Law 85-624). The Cooper Lake and Channels Project was authorized 3 August 1955, without mitigation measures, by Public Law 84-218. Project purposes include flood control, water supply, and recreation.

a. On 8 December 1978, the U. S. District Court for the Eastern District of Texas issued a Memorandum Opinion detailing five inadequacies of the final EIS. The Court permanently enjoined further construction of the project pending correction of the deficiencies, one of which was the lack of an adequate fish and wildlife mitigation plan for the project.

b. The District and Division Engineers developed a fish and wildlife mitigation plan in cooperation with the U. S. Fish and Wildlife Service and the Texas Parks and Wildlife Department. One part of the mitigation plan includes acquisition of lands for wildlife purposes. Acquisition of land for wildlife purposes requires Congressional authorization.

2. The District and Division Engineers conclude that construction of the Reservoir Only plan of the Cooper Lake and Channels Project will result in the loss or reduction in quality of about 25,400 acres of wildlife habitat. They report that the proposed acquisition, development, and management of about 25,500 acres of land for wildlife purposes will compensate almost fully for losses of wildlife productivity in bottomland hardwood habitat affected by the project. The reporting officers find that their recommended mitigation plan and the Cooper Lake and Channels Project are consistent with national policy, laws, and administrative directives; and that the public interest would best be served by its implementation. They recommend that the authorized Cooper Lake and Channels Project be modified to include, for acquisition, development, and management for wildlife purposes, about 25,500

DAEN-CWP-A

SUBJECT: Cooper Lake and Channels Project, Texas. Report on Fish and
Wildlife Mitigation

acres of lands presently under flowage easements at Wright Patman Lake (White Oak Bayou Area), a Corps of Engineers project. Total first cost (October 1981 price level) is estimated at \$12,945,000, of which \$7,068,000 would be Federal and \$5,777,000 non-Federal. Average annual costs, based on a 3-1/4% interest rate and a 100-year period of analysis, are estimated at \$319,000 Federal and \$261,000 non-Federal, including operation and maintenance costs of \$80,000 Federal and \$65,000 non-Federal. The costs are shared the same as for the project purposes causing the damages to wildlife resources.

3. The Board of Engineers for Rivers and Harbors concurs in general in the views and recommendations of the reporting officers. The Board recommends that the existing Cooper Lake and Channels Project be modified to authorize the Corps of Engineers to include fee acquisition of about 25,500 acres of land in the White Oak Bayou area and development and management of these lands for wildlife purposes. The Board concludes that the recommended plan will fully mitigate for losses of wildlife resources attributable to the project. The State of Texas supports the Cooper Lake and Channels Project and considers the recommended mitigation to be more than adequate.

4. I concur in the views and recommendations of the Board.


J. K. BRATTON
Lieutenant General, USA
Chief of Engineers