US Army Corps of Engineers ®
Fort Worth District

Public Notice

Applicant: Wetlands Management, LP

Project No.: SWF-2012-00406

Date: March 24, 2014

The purpose of this public notice is to inform you of a proposal for work in which you might be interested. It is also to solicit your comments and information to better enable us to make a reasonable decision on factors affecting the public interest. We hope you will participate in this process.

Regulatory Program

Since its early history, the U.S. Army Corps of Engineers has played an important role in the development of the nation's water resources. Originally, this involved construction of harbor fortifications and coastal defenses. Later duties included the improvement of waterways to provide avenues of commerce. An important part of our mission today is the protection of the nation's waterways through the administration of the U.S. Army Corps of Engineers Regulatory Program.

Section 10

The U.S. Army Corps of Engineers is directed by Congress under Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) to regulate *all work or structures in or affecting the course, condition or capacity of navigable waters of the United States.* The intent of this law is to protect the navigable capacity of waters important to interstate commerce.

Section 404

The U.S. Army Corps of Engineers is directed by Congress under Section 404 of the Clean Water Act (33 USC 1344) to regulate the *discharge of dredged and fill material into all waters of the United States, including wetlands.* The intent of the law is to protect the nation's waters from the indiscriminate discharge of material capable of causing pollution and to restore and maintain their chemical, physical and biological integrity.

Contact

Name: Mr. Eric Dephouse, Project Manager

Phone Number: 817-886-1820

PUBLIC NOTICE

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

SUBJECT: This public notice is being issued to provide interested parties an opportunity to comment on a proposal to create the Bill Moore Mitigation Bank (BMMB), located east of the Town of Ennis including unnamed tributaries to the Trinity River in Ellis and Navarro Counties, Texas.

APPLICANT: Wetlands Management, LP
c/o John Dziminski, Director
2101 Cedar Springs Road, Suite 1600
Dallas, Texas 75201

APPLICATION NUMBER: SWF-2012-00406

DATE ISSUED: March 24, 2014

LOCATION: BMMB is located within the Rosewood Ennis, LLC ranch property approximately 10-miles east of Ennis, Texas on the border of Navarro and Ellis Counties off of State Road 85. The center of the Bank is located at UTM coordinates Zone 14, 740407 East and 3577288 North, on the Rosser SW 7.5-minute USGS quadrangle map in the USGS Hydrologic Unit 12030105.

PROJECT DESCRIPTION: The BMMB would restore and place in permanent conservation 32,704 linear feet of ephemeral stream and 20,071 linear feet of intermittent stream with their associated restored riparian buffers within the Upper Trinity watershed HUC 12030105.

The following figures depict the BMMB site. Figure 1: Vicinity; Figure 2: 2010 Aerial Photograph; Figure 3: 1996 Color Infrared Aerial Photograph; Figure 4: USGS Topographic Map (Rosser SW Quadrangle); Figure 5: NRCS Soil Survey (Ellis County, 1964); Figure 6: National Wetlands Inventory Map; Figure 7: Waters of the U.S. Delineation Map; Figure 8: Texas Rapid Assessment Method (TXRAM) Map; Figure 9: Level III Ecoregions of Texas Map; Figure 10: 8-Digit Hydrologic Unit Map; Figure 11: Proposed Service Areas Map; Figure 12: Conceptual Design, Figure 13 and Figure 14: Morphological Data Tables.

The purpose of the BMMB is to provide potential permittees with mitigation credits needed to compensate for unavoidable impacts to waters of the U.S. within the proposed service areas in accordance with the Mitigation Banking Guidelines (CES-10-MIT, dated June 16, 2011) and the Stream Mitigation Method (SWF-2011-00078, dated October 2, 2013). The Sponsor is proposing primary, and secondary service areas for the proposed bank (see Figure 11 – Proposed Service Area). The proposed primary service area consists of the Upper Trinity Watershed, 8-digit Hydrologic Unit Code (HUC) 12030105, which includes parts of Kaufman, Ellis, Navarro, Anderson, Freestone, Henderson, Collin, and Dallas Counties. The proposed secondary service

area consists of the Level III Ecoregion, Blackland Praire (Level III Ecoregion 4) contained within the adjoining HUCs which includes parts of Grayson, Fannin, Kaufman, Ellis, Johnson, Navarro, Hill, Freestone, Hunt, Denton, Collin, Rockwall, Dallas, Tarrant, and Limestone Counties. The tertiary service area includes parts of Montague, Grayson, Cooke, Johnson, Wise, Denton, Parker, Tarrant, Van Zandt, Kaufman, Navarro, Anderson, Freestone, Henderson, Leon, and Houston Counties.

The BMMB Site is 1,113 acres in size and is entirely located within an active cattle ranch. The Site has been historically managed for agriculture (cotton) and cattle. Currently, the Site includes 17.95 acres of emergent wetland, 3.42 acres of forested wetland, 12,077 linear feet (LF) of intermittent stream, 9,277 LF of ephemeral stream, 4.64 acres of impoundments, and approximately 20,857 LF of disconnected (isolated) stream features and/or non-jurisdictional vegetated swales which were likely historically connected jurisdictional stream features. The proposed BMMB project would provide 32,704 LF of ephemeral stream restoration and 20,701 LF of intermittent stream restoration. Total restored/enhanced stream length proposed for mitigation credit is 52,775 LF.

Stream mitigation would be accomplished by restoration through the re-establishment of a stable channel pattern, profile, and dimension that connects to an active floodplain. In addition, a riparian buffer would be established through native riparian plantings, and cattle exclusion. Bank streams and associated riparian buffers would be placed in conservation in perpetuity. The restoration goals of the project (which would correspond to success criteria to be determined in development of the DMBI) are to increase and improve the riparian corridor, reduce sediment supply from bank erosion, and increase bed form diversity.

Specifically, the hydraulic and geomorphic functions of the project site's streams would be evaluated on a reach basis but will specifically include the following:

• Establish 100-foot buffers and improve vegetative buffers by controlling the invasive exotics by pretreatment, removal during construction, and implementing an invasive species control plan.
• Improve buffer density and composition.
• Connect the stream to its floodplain by reducing bank height ratios and increasing the entrenchment ratio.
• Improve meander width ratio.
• Improve bedform diversity, pool-to-pool spacing, and depth variability.
• Introducing woody structures and varying habitat features.

The functions mentioned above specifically relate the reference reach conditions and are limited to the maximum uplift potential that is obtainable.

A mitigation banking instrument (MBI) would be developed in accordance with the Compensatory Mitigation for Losses of Aquatic Resources (CMLR), (Federal Register, Thursday, April 10, 2008, Vol. 73, No. 70, pp. 19594-19705). The MBI would detail the legal and physical characteristics of the bank and how the bank would be established and operated.

Subjects addressed in detail in the MBI would include development of the site, service area, credit determination, short and long-term financial assurances, scope of agreement, purpose and goals of the bank, baseline conditions, performance standards for enhancement activities, accounting procedures, monitoring and reporting, long-term maintenance and protection, and transfer of bank ownership or sponsorship.

The USACE, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service (USFWS), Texas Commission on Environmental Quality, Railroad Commission of Texas, and Texas Parks and Wildlife Department comprise the Interagency Review Team (IRT), and would be involved in developing the MBI and may be signatories to the final document.

Implementation of the proposed mitigation bank would require Department of the Army Authorization under Section 404 of the Clean Water Act. Based on preliminary evaluation by the USACE, it appears that the proposed bank may be authorized by nationwide permit 27 for Aquatic Habitat Restoration, Establishment, and Enhancement Activities.

ENDANGERED AND THREATENED SPECIES: The USACE has reviewed the U.S. Fish and Wildlife Service's latest published version of endangered and threatened species to determine if any may occur in the project area. The proposed project would be located in a county where the whooping crane (*Grus americana*), is known to occur or may occur as a migrant. The whooping crane is an endangered species. Our initial review indicates that the proposed work would have no effect on federally-listed endangered or threatened species.

NATIONAL REGISTER OF HISTORIC PLACES: The USACE has reviewed the latest complete published version of the National Register of Historic Places and found no listed properties to be in the project area. However, presently unknown scientific, archaeological, cultural or architectural data may be lost or destroyed by the proposed work under the requested permit.

FLOODPLAIN MANAGEMENT: The USACE is sending a copy of this public notice to the local floodplain administrator. In accordance with 44 CFR part 60 (Flood Plain Management Regulations Criteria for Land Management and Use), the floodplain administrators of participating communities are required to review all proposed development to determine if a floodplain development permit is required and maintain records of such review.

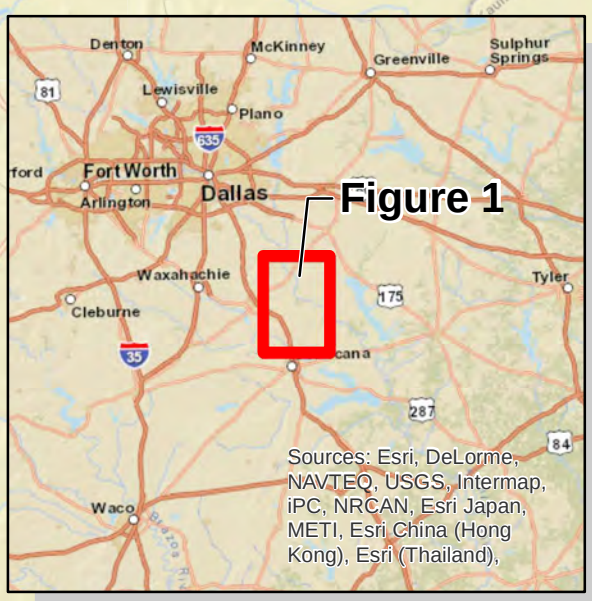
SOLICITATION OF COMMENTS: The public notice is being distributed to all known interested persons in order to assist in developing fact upon which a decision by the USACE may be based. For accuracy and completeness of the record, all data in support of or in opposition to the proposed work should be submitted in writing setting forth sufficient detail to furnish a clear understanding of the reasons for support or opposition.

PUBLIC HEARING: Prior to the close of the comment period any person may make a written request for a public hearing setting forth the particular reasons for the request. The District Engineer will determine whether the issues raised are substantial and should be considered in his

permit decision. If a public hearing is warranted, all known interested persons will be notified of the time, date, and location.

CLOSE OF COMMENT PERIOD: All comments pertaining to this Public Notice must reach this office on or before Wednesday, April 23, 2014, which is the close of the comment period. Extensions of the comment period may be granted for valid reasons provided a written request is received by the limiting date. If no comments are received by that date, it will be considered that there are no objections. Comments and requests for additional information should be submitted to Mr. Eric Dephouse; Regulatory Division, CESWF-DE-R; U. S. Army Corps of Engineers; Post Office Box 17300; Fort Worth, Texas 76102-0300. You may visit the Regulatory Branch in Room 3A37 of the Federal Building at 819 Taylor Street in Fort Worth between 8:00 A.M. and 3:30 P.M., Monday through Friday. Telephone inquiries should be directed to (817) 886-1820. Please note that names and addresses of those who submit comments in response to this public notice may be made publicly available.

DISTRICT ENGINEER
FORT WORTH DISTRICT
CORPS OF ENGINEERS



Rosser
Cottonwood
Grays Prairie
FM-2451
CR-4084
CR-4061
CR-407
CR-4076
FM-148
FM-3094
CR-4074
CR-4064
Indian Oaks Golf Club
CR-4068
CR-4075
CR-4072
CR-4066
FM-3396
Kaufman
County Road 0472
Cottonwood Creek
Old Telico Rd
Cody Rd
Log Cabin Rd
Pecan Grove Rd
Lone Oak Rd
Gin Rd
Walker Creek Rd
FM-1181
Oil Field Rd
Henderson
Ellis
Navarro
County Road 1130
FM-85
Burns Branch
Section House Rd
Znojek Rd
FM-1182
NE County Road 1120
NE County Road 1110
Timothy Rd
Grays Creek
County Road 1090
NE County Road 1070
NE County Road 1060
NE County Road 1100
FM-1603
Alma
FM-1183
Old Alma Rd
Alma Dr
70th Rd
Old Chatfield Rd
Rice
Rice Rd
Chatfield
FM-1129
Hackberry Creek
NE County Road 3200
S Oak Grove Rd
NW County Road 150
NE County Road 1050
NE County Road 1030
NE County Road 1010
NE County Road 240
FM-636
FM-1126
Chambers Creek
NW County Road 140
Cummins Creek
NE County Road 1040
NE County Road 1045
NE County Road 180
NE County Road 0220
NE County Road 0200
NE County Road 2050
NW County Road 110
NE County Road 170
Chatfield Rd
FM-3041
NE County Road 120
Lillie Rush Creek
Emhouse
NW County Road 30
NW County Road 10
NW County Road 20
Briar Creek
Miles
0 0.5 1 2
Legend
Study Area
Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013

FIGURE 1	DATE: 01/30/2014 DESIGN: CMT DRAWN: CMT CHECKED: JCD	Vicinity Map	Bill Moore Mitigation Bank Ellis and Navarro Counties, Texas	N	Wetlands MANAGEMENT SWF-2012-00406

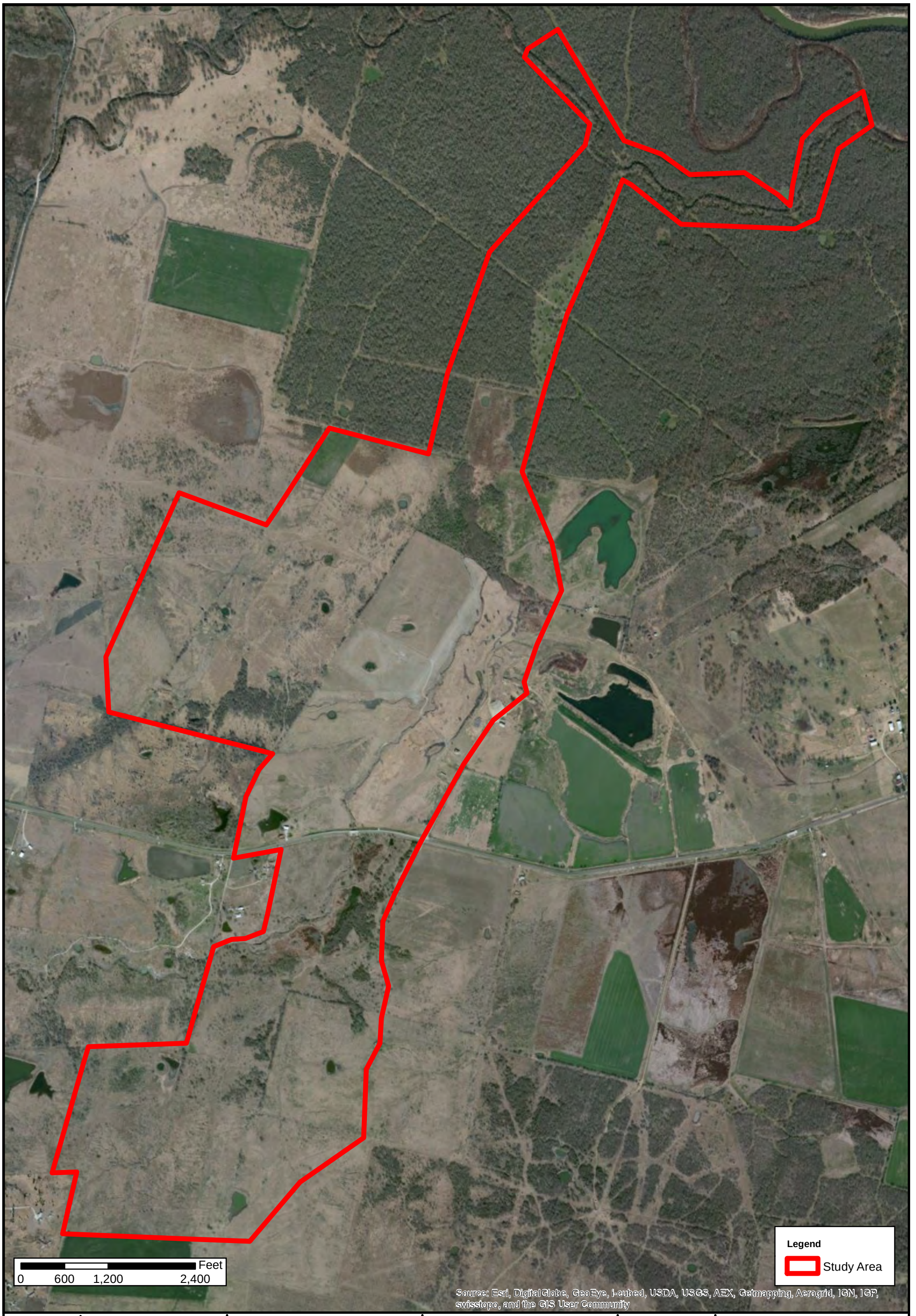


FIGURE **2**	DATE: 01/30/2014 DESIGN: CMT DRAWN: CMT CHECKED: JCD	2010 Aerial Photograph	Bill Moore Mitigation Bank Ellis and Navarro Counties, Texas	N	Wetlands MANAGEMENT SWF-2012-00406

FIGURE					
3	DATE: 01/30/2014 DESIGN: CMT DRAWN: CMT CHECKED: JCD	1996 Color Infrared Aerial Photograph	Bill Moore Mitigation Bank Ellis and Navarro Counties, Texas	N	Wetlands MANAGEMENT SWF-2012-00406

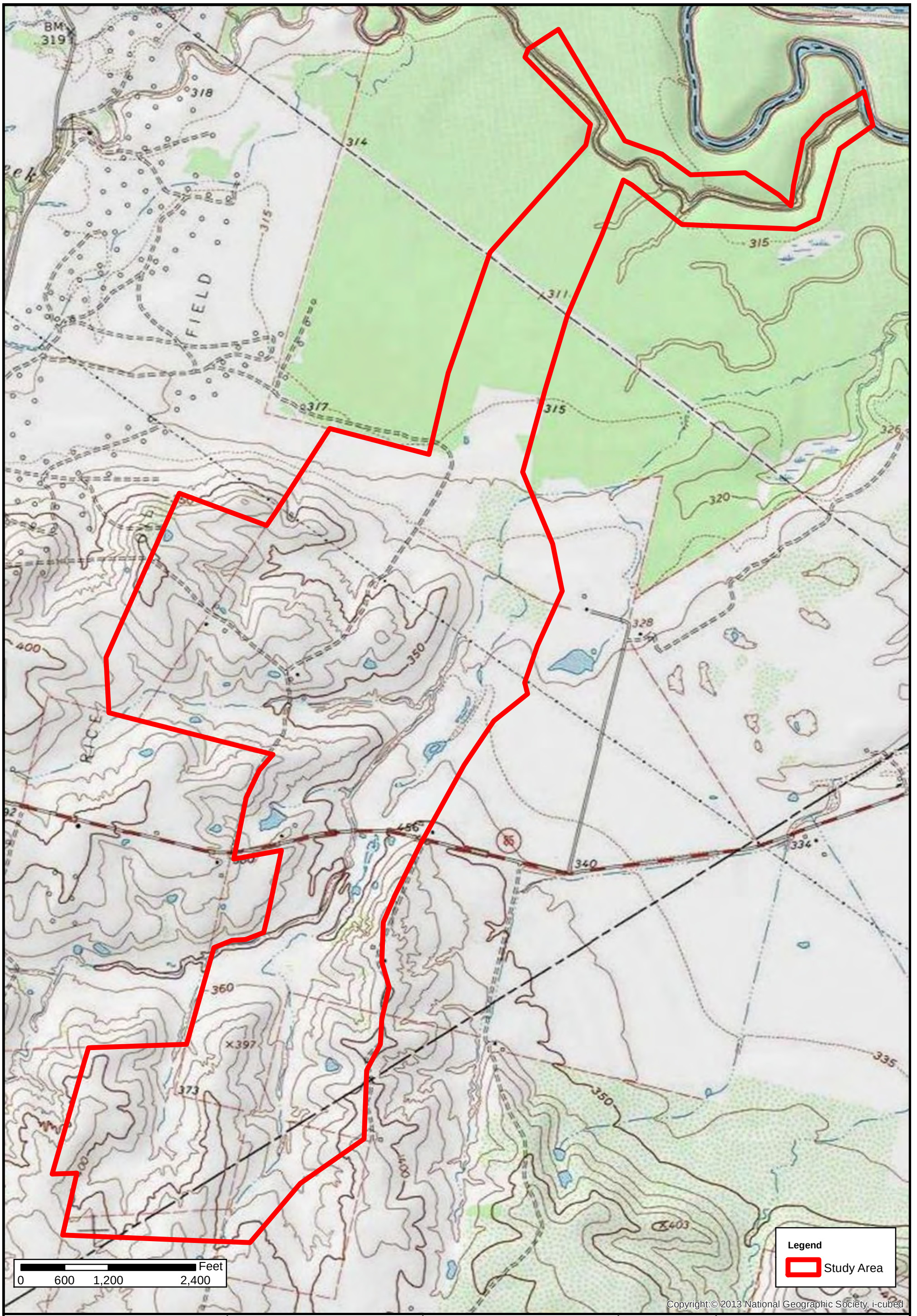


FIGURE				
4	DATE: 01/30/2014 DESIGN: CMT DRAWN: CMT CHECKED: JCD	USGS Topographic Map Rosser SW Quadrangle (1976)	Bill Moore Mitigation Bank Ellis and Navarro Counties, Texas	N	Wetlands MANAGEMENT SWF-2012-00406

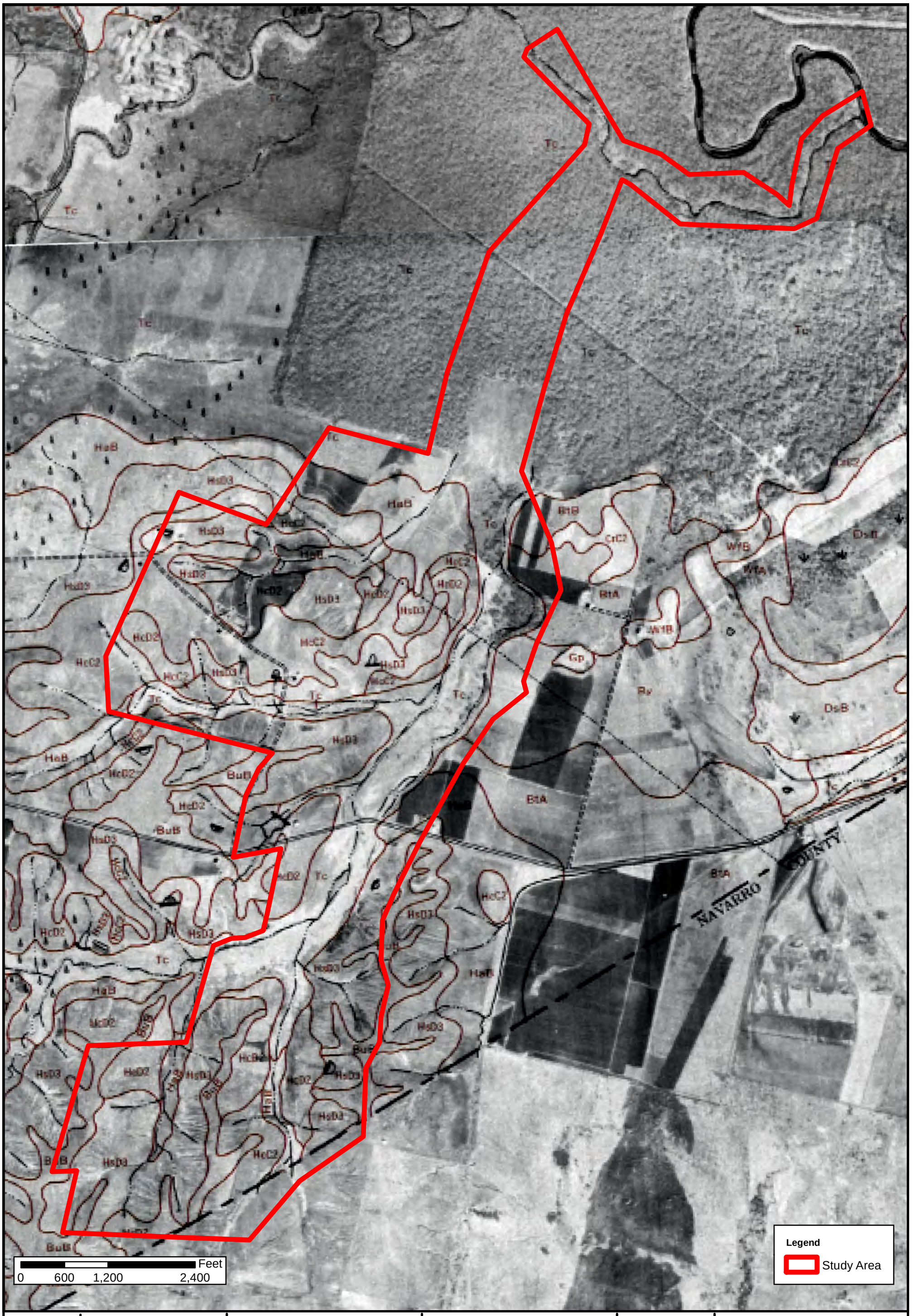


FIGURE				
5	DATE: 01/30/2014 DESIGN: CMT DRAWN: CMT CHECKED: JCD KHA NO.: 064419501	NRCS Soil Survey (Ellis Co., 1964)	Bill Moore Mitigation Bank Ellis and Navarro Counties, Texas	N Wetlands MANAGEMENT SWF-2012-00406

FIGURE **6**	DATE: 01/30/2014 DESIGN: CMT DRAWN: CMT CHECKED: JCD	National Wetlands Inventory Map	Bill Moore Mitigation Bank Ellis and Navarro Counties, Texas	N	Wetlands MANAGEMENT SWF-2012-00406

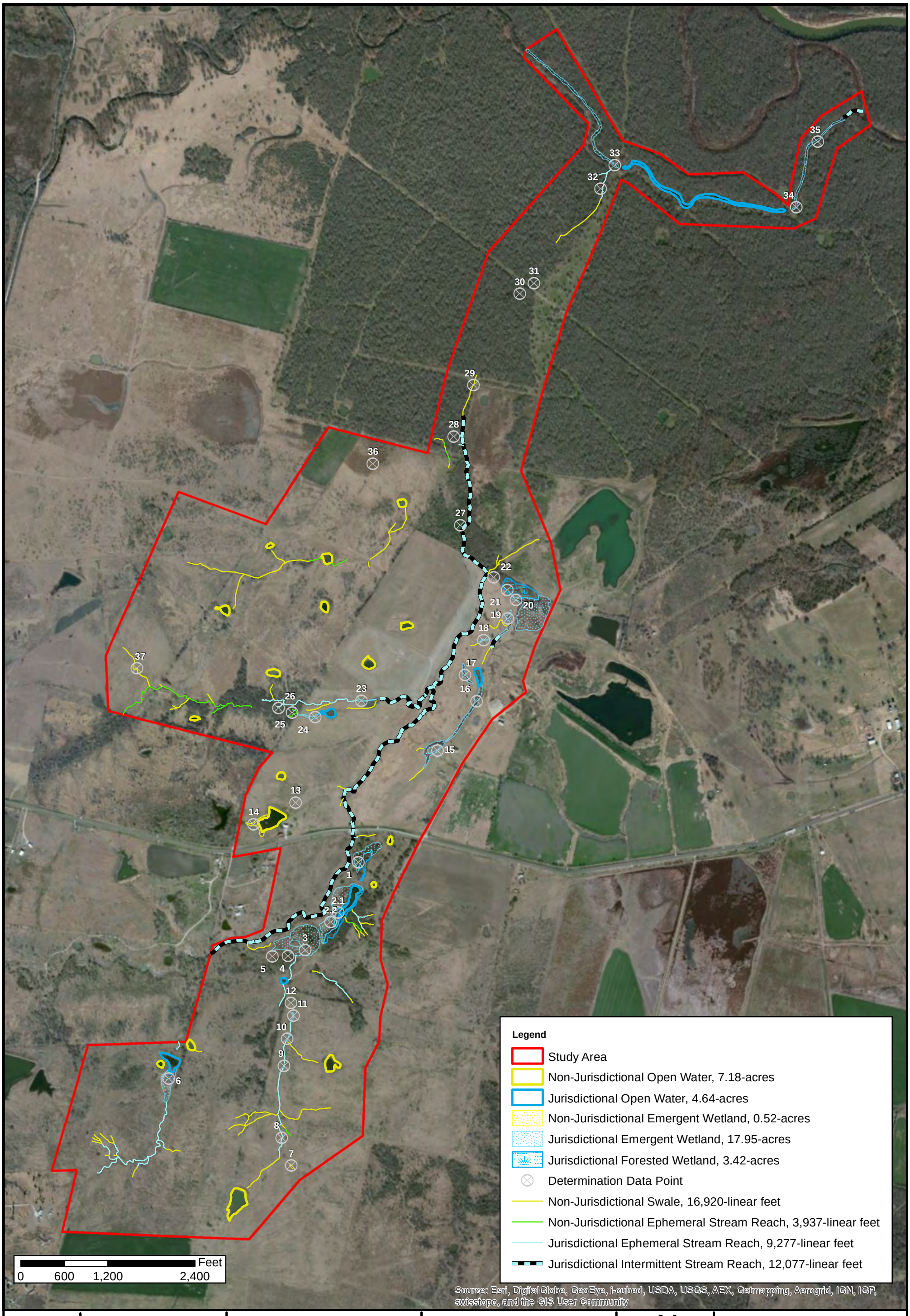


FIGURE				
7	DATE: 01/30/2014	Waters of the U.S. Delineation Map	Bill Moore Mitigation Bank Ellis and Navarro Counties, Texas	N
	DESIGN: CMT			Wetlands MANAGEMENT
	DRAWN: CMT			SWF-2012-00406
	CHECKED: JCD			

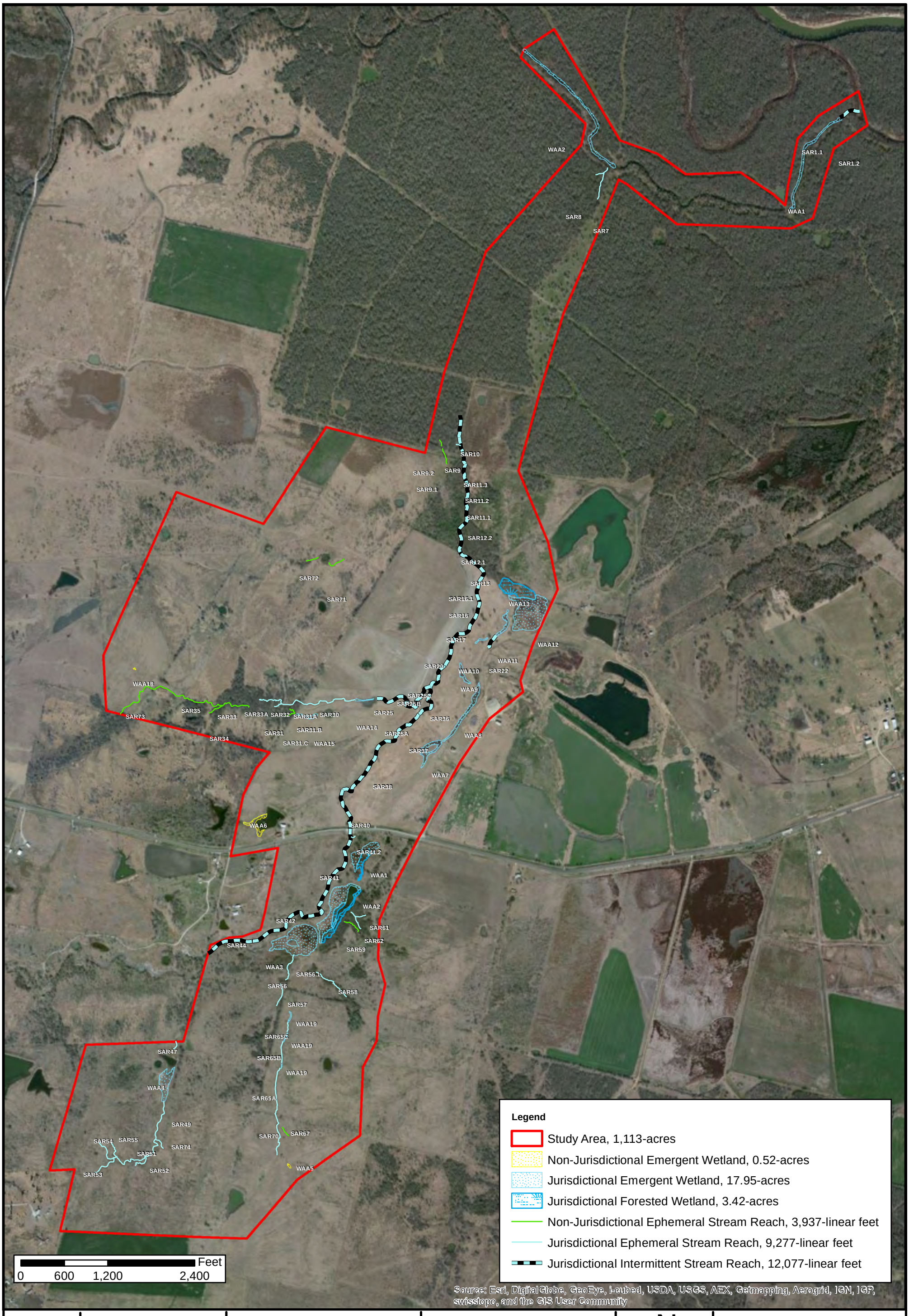


FIGURE **8**	DATE: 01/30/2014 DESIGN: CMT DRAWN: CMT CHECKED: JCD	Texas Rapid Assessment Method (TXRAM) Map	Bill Moore Mitigation Bank Ellis and Navarro Counties, Texas	N	Wetlands MANAGEMENT SWF-2012-00406

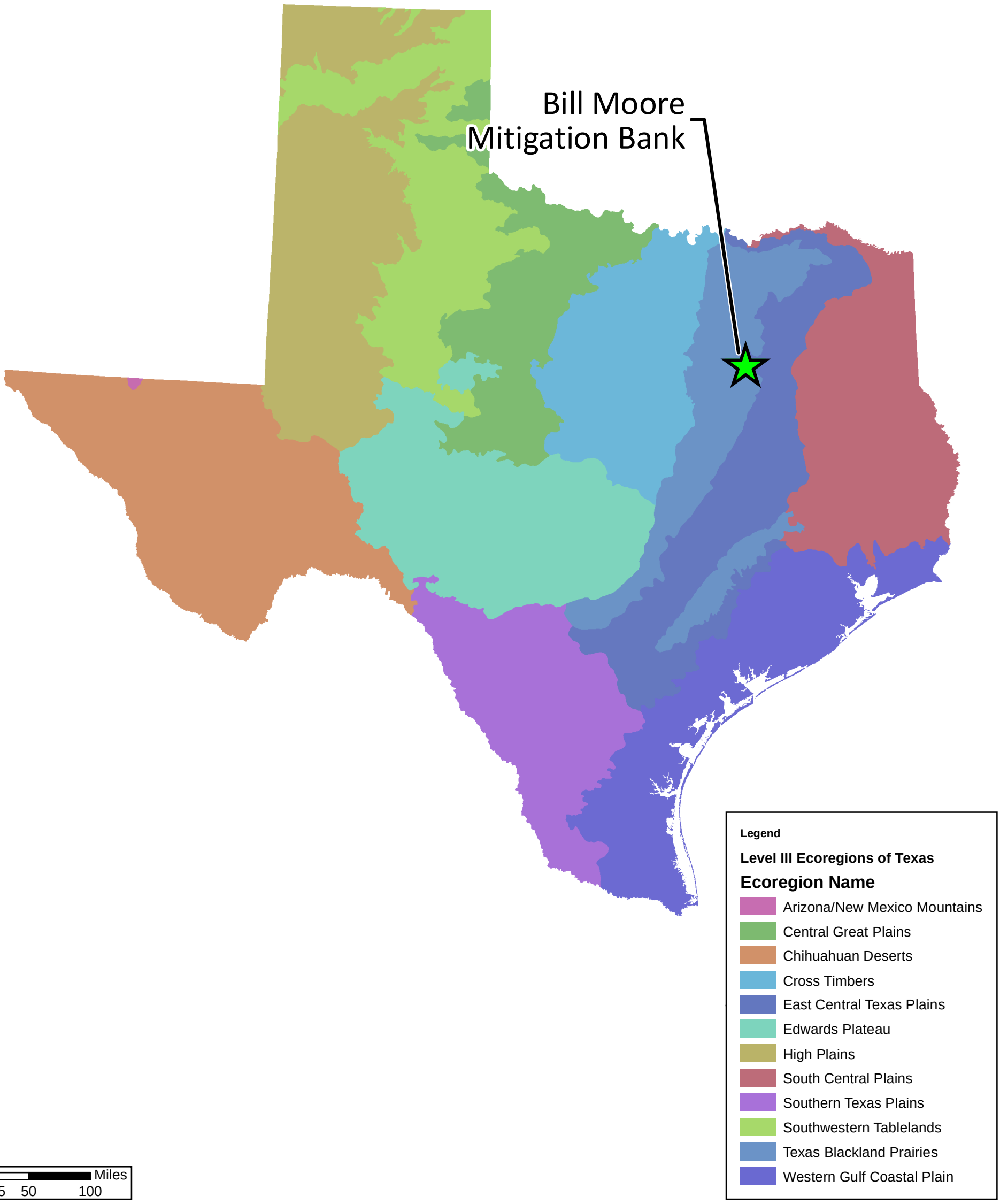


FIGURE **9**	DATE: 01/30/2014 DESIGN: CMT DRAWN: CMT CHECKED: JCD	Level III Ecoregions of Texas U.S. EPA 2004	Bill Moore Mitigation Bank Ellis and Navarro Counties, Texas	N	Wetlands MANAGEMENT SWF-2012-00406

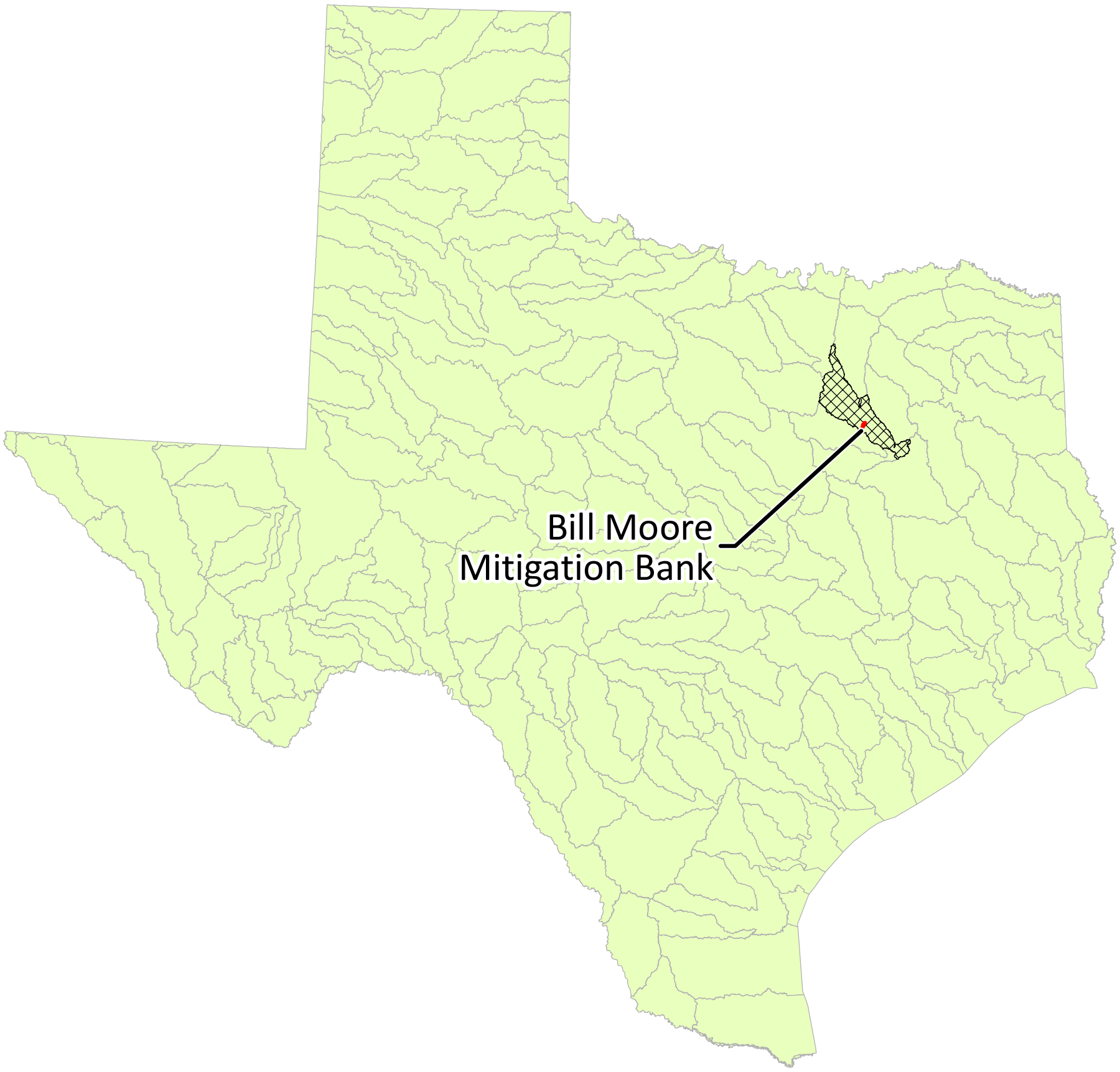


FIGURE **10**	DATE: 01/30/2014 DESIGN: CMT DRAWN: CMT CHECKED: JCD	8-Digit Hydrologic Unit Codes U.S. EPA	Bill Moore Mitigation Bank Ellis and Navarro Counties, Texas	N	Wetlands MANAGEMENT SWF-2012-00406

Clay
Montague
Cooke
Grayson
Fannin
Lamar
Red River
Delta
Jack
Wise
Denton
Collin
Hunt
Hopkins
Franklin
Camp
Rockwall
Rains
Wood
Parker
Tarrant
Dallas
Kaufman
Van Zandt
Hood
Johnson
Ellis
Smith
Erath
Somervell
Henderson
Hill
Navarro
Bosque
Cherokee
Anderson
Hamilton
Bill Moore
Mitigation Bank
Freestone
Limestone
McLennan
Coryell
Falls
Leon
Houston
Lampasas
Bell
Robertson
Madis
Burnet
Milam
Williamson
Brazos
Grimes
Burleson
Lee
Bastrop
Washington

Legend
- Texas Counties
- 8-digit HUC
- Primary Service Area
- Secondary Service Area
- Tertiary Service Area

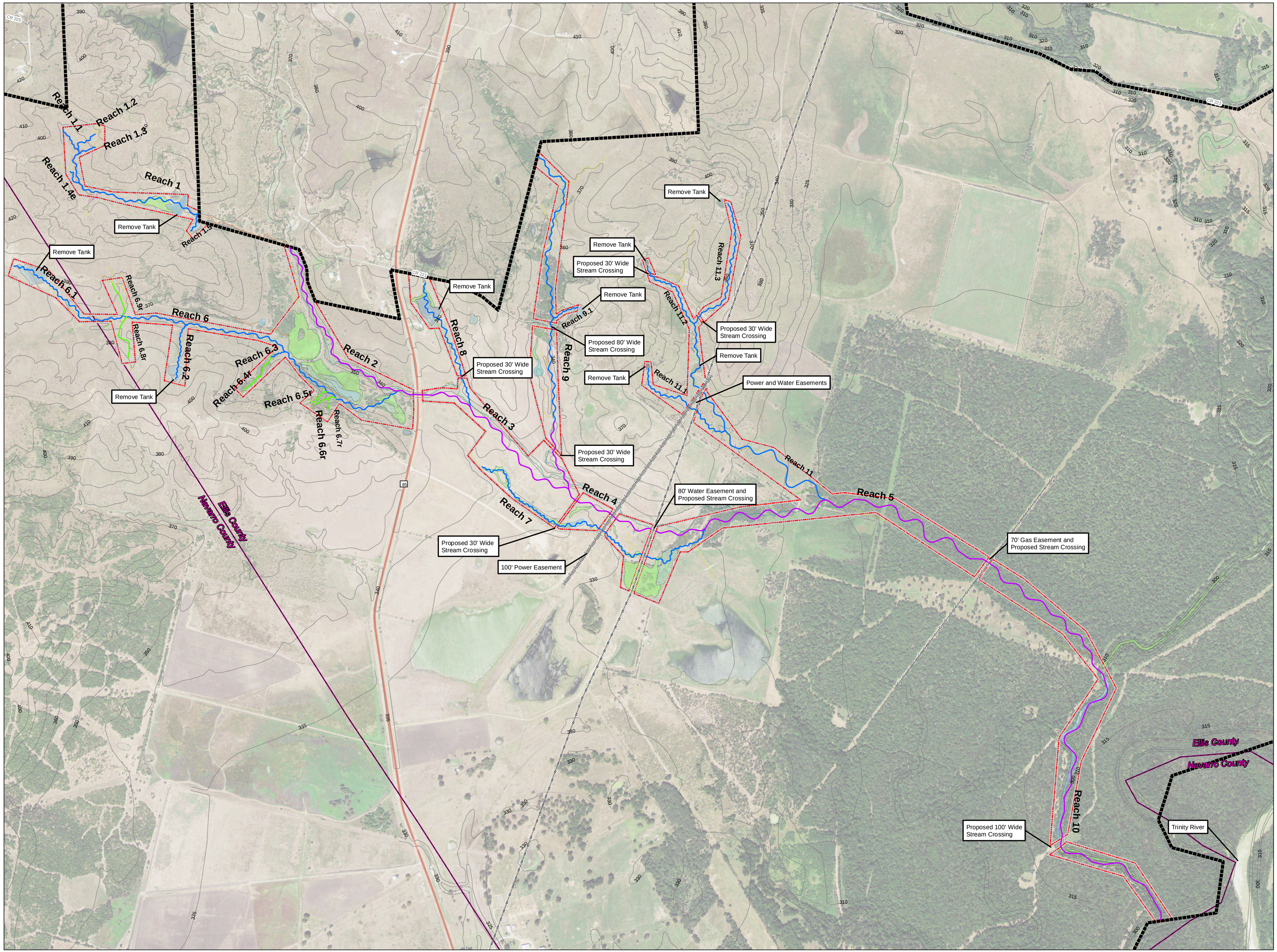
Level III Ecorgeions of Texas

Ecoregion Type
- Central Great Plains
- Cross Timbers
- East Central Texas Plains
- South Central Plains
- Texas Blackland Prairies

Miles
0 5 10 20

N

FIGURE 11	DATE: 01/30/2014 DESIGN: CMT DRAWN: CMT CHECKED: JCD	Proposed Service Areas	Bill Moore Mitigation Bank Ellis and Navarro Counties, Texas	N	Wetlands MANAGEMENT SWF-2012-00406



DRAFT

LEGEND AND SYMBOLS

- Study Area
- Proposed Conservation Easement
- Existing Forested Wetland
- Existing Emergent Wetland

Existing Utility

- Gas
- Power
- Water

Proposed Credit Type

- In-Channel Ephemeral
- In-Channel Intermittent
- Riparian

0 600 1,200
FEET

N

Bill Moore Mitigation Site
Ellis and Navarro Counties
Texas

CONCEPT MITIGATION PLAN

Prepared For:

Wetlands MANAGEMENT

Project
064419507

Date
February 4, 2014

Figure
12

MORPHOLOGICAL DATA TABLE
Bill Moore Mitigation Bank
Ellis and Navarro Counties, Texas

	VARIABLES (All units are in Feet)	REACH 1 EXISTING		REACH 1 DESIGN		REACH 2 EXISTING		REACH 2 DESIGN		REACH 3 EXISTING		REACH 3 DESIGN		REACH 4 EXISTING		REACH 4 DESIGN		REACH 5 EXISTING		REACH 5 DESIGN		REACHES 1.1, 1.2,1.3, 1.5, 6.1, 6.2, 6.3, 11.1, 11.2, 11.3 DESIGN	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1	Stream Type (Rosgen)	F5		C5		G5c		C5		C5		C5		G5c		C5		E5		C5		C5	
2	Drainage Area (square miles)	0.23		0.23		1.88		1.88		2.43		2.43		3.13		3.13		3.68		3.68		0.01 - 0.05	
3	Bankfull Width (W_{bkf})	10.7		12.2		25.9		20.4		11.6		20.4		14.3		22.6		18.6		24.6		5.9	
4	Bankfull Mean Depth (d_{bkf})	0.5		0.5		1.2		1.2		2.2		1.2		1.7		1.3		1.6		1.5		0.4	
5	Width/Depth Ratio (W_{blf}/d_{bkf})	23.8		26.0		21.1		16.9		5.2		16.9		8.3		16.9		11.8		16.4		16.4	
6	Bankfull Cross-Sectional Area (A_{bkf})	4.8		5.8		32.0		24.7		25.8		24.7		24.7		30.2		29.2		37.0		2.1	
7	Bankfull Mean Velocity, ft/s (V_{bkf})	4.6		3.8		3.6		4.7		4.7		4.9		5.1		4.1		4.5		3.5		4.3	
8	Bankfull Discharge, cfs (Q_{bkf})	22.1		22.1		115.0		115.0		120.0		120.0		125.0		125.0		130.0		130.0		9.0	
9	Bankfull Maximum Depth (d_{max})	0.8		0.8		2.0		1.9		2.6		1.9		2.5		2.1		3.1		2.4		0.6	
10	Max d_{max}/d_{bkf} ratio	1.9		1.7		1.6		1.6		1.2		1.6		1.5		1.6		2.0		1.6		1.7	
11	Low Bank Height to Max Bankfull d_{bkf} ratio	2.1		1.0	1.0	2.3		1.0	1.0	1.5		1.0	1.0	1.4		1.0	1.0	1.4		1.0	1.0	1.2	1.0
12	Width of Flood Prone Area (W_{fpa})	17.0		25.0	40.0	37.8		50.0	60.0	58.5		50.0	60.0	23.6		60.0	70.0	45.0		70.0	80.0	15.0	20.0
13	Entrenchment Ratio (W_{fpa}/W_{bkf})	1.6		2.0	3.3	1.5		2.5	2.9	5.0		2.5	2.9	1.7		2.7	3.1	2.4		2.8	3.3	2.5	3.4
14	Meander Length (L_m)	132.0		42.7	97.6	352.0		71.4	163.2	193.0		71.4	163.2	373.0		79.1	180.8	110.0		86.1	196.8	20.7	47.2
15	Ratio of Meander Length to Bankfull Width (L_m/W_{bkf})	12.3		3.5	8.0	13.6		3.5	8.0	16.6		3.5	8.0	26.1		3.5	8.0	5.9		3.5	8.0	3.5	8.0
16	Radius of Curvature (R_c)	43.0		30.5	42.7	131.0		51.0	71.4	62.0		51.0	71.4	83.0		56.5	79.1	34.0		61.5	86.1	14.8	20.7
17	Ratio of Radius of Curvature to Bankfull Width (R_c/W_{bkf})	4.0		2.5	3.5	5.1		2.5	3.5	5.3		2.5	3.5	5.8		2.5	3.5	1.8		2.5	3.5	2.5	3.5
18	Belt Width (W_{blt})	67.0		42.7	67.1	129.0		71.4	112.2	117.0		71.4	112.2	104.0		79.1	124.3	74.0		86.1	135.3	20.7	32.5
19	Belt Width Ratio (W_{blt}/W_{bkf})	6.3		3.5	5.5	5.0		3.5	5.5	10.1		3.5	5.5	7.3		3.5	5.5	4.0		3.5	5.5	3.5	5.5
20	Sinuosity (k) (Stream Length / Valley Length)	1.20		1.17		1.13		1.09		1.14		1.12		1.12		1.08		1.01		1.00		--	
21	Valley Slope (S_{valley}) (ft/ft)	0.01076		0.01076		0.00370		0.00370		0.00558		0.00558		0.00172		0.00172		0.00190		0.00190		--	
22	Average Stream Slope (S_{avg}) = (S_{valley}/k)	0.00899		0.00920		0.00326		0.00340		0.00488		0.00500		0.00154		0.00160		0.00188		0.00189		--	
23	Riffle Slope (S_{rift})	--		0.0129	0.0368	--		0.0048	0.0136	--		0.0070	0.0200	--		0.0022	0.0064	--		0.0026	0.0076	--	--
24	Ratio of Riffle Slope to Avg. Slope (S_{riffle}/S_{avg})	--		1.4	4.0	--		1.4	4.0	--		1.4	4.0	--		1.4	4.0	--		1.4	4.0	1.4	4.0
25	Pool Slope (S_{pool})	--		0.0000	0.0009	--		0.0000	0.0003	--		0.0000	0.0005	--		0.0000	0.0002	--		0.0000	0.0002	--	--
26	Ratio of Pool Slope to Avg. Slope (S_{pool}/S_{avg})	--		0.0	0.1	--		0.0	0.1	--		0.0	0.1	--		0.0	0.1	--		0.0	0.1	0.0	0.1
27	Maximum Pool Depth (D_{pool})	--		1.5		--		3.0		--		3.0		--		3.4		--		3.8		0.8	
28	Ratio of Pool Depth to Bkf Depth (D_{pool}/d_{bkf})	--		3.2		--		2.5		--		2.5		--		2.5		--		2.5		2.2	
29	Pool Width (W_{pool})	--		14.4		--		27.8		--		27.8		--		31.0		--		34.8		8.3	
30	Ratio of Pool Width to Bankfull Width (W_{pool}/W_{bkf})	--		1.2		--		1.4		--		1.4		--		1.4		--		1.4		1.4	
31	Pool Area (A_{pool})	--		8.1		--		34.4		--		34.4		--		43.1		--		54.4		3.2	
32	Ratio of Pool Area to Bankfull Area (A_{pool}/A_{bkf})	--		1.4		--		1.4		--		1.4		--		1.4		--		1.5		1.5	
33	Pool to Pool Spacing (p - p)	28.0	106.6	36.6	61.0	96.2	209.6	61.2	102.0	49.1	158.2	61.2	102.0	47.1	126.2	67.8	113.0	22.9	148.0	73.8	123.0	17.7	29.5
34	Ratio of Pool to Pool Spacing to Bankfull Width (p-p/W_{bkf})	2.6	10.0	3.0	5.0	3.7	8.1	3.0	5.0	4.2	13.6	3.0	5.0	3.3	8.8	3.0	5.0	1.2	8.0	3.0	5.0	3.0	5.0

MORPHOLOGICAL DATA TABLE
Bill Moore Mitigation Bank
Ellis and Navarro Counties, Texas

	VARIABLES (All units are in Feet)	REACH 6 EXISTING		REACH 6 DESIGN		REACH 7 DESIGN		REACH 8 DESIGN		REACH 9 EXISTING		REACH 9 DESIGN		REACH 10 EXISTING		REACH 10 DESIGN		REACH 11 EXISTING		REACH 11 DESIGN		REFERENCE		REFERENCE REACH 6.3	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1	Stream Type (Rosgen)	F5		C5		C5		C5b		C5c		C5b		F5b		C5		B5		C5		E5		B5	
2	Drainage Area (square miles)	0.41		0.41		0.08		0.09		0.57		0.57		3.87		3.87		0.18		0.23		2.50		0.04	
3	Bankfull Width (W_{bkf})	10.5		12.0		6.0		6.4		14.6		14.2		29.8		22.6		8.0		12.2		14.7		3.4	
4	Bankfull Mean Depth (d_{bkf})	0.7		0.7		0.5		0.5		0.9		0.7		1.1		1.3		0.5		0.5		1.7		0.1	
5	Width/Depth Ratio (W_{bkf}/d_{bkf})	15.7		16.7		12.5		12.8		16.8		19.7		27.6		16.9		17.7		26.0		8.5		26.2	
6	Bankfull Cross-Sectional Area (A_{bkf})	7.0		8.6		2.9		3.2		12.7		10.2		32.2		30.2		3.6		5.8		25.1		0.4	
7	Bankfull Mean Velocity, ft/s (V_{bkf})	4.3		3.5		4.2		3.8		3.8		4.7		4.2		4.5		4.1		3.5		3.9		3.4	
8	Bankfull Discharge, cfs (Q_{bkf})	30.0		30.0		12.0		12.0		48.0		48.0		135.0		135.0		15.0		22.1		97.0		1.5	
9	Bankfull Maximum Depth (d_{max})	1.0		1.1		0.8		0.8		1.8		1.1		2.1		2.1		0.8		0.8		2.6		0.2	
10	Max d_{max}/d_{bkf} ratio	1.4		1.5		1.7		1.6		2.1		1.5		1.9		1.6		1.7		1.7		1.5		1.6	
11	Low Bank Height to Max Bankfull d_{bkf} ratio	1.1		1.0	1.0	1.1	1.0	1.0	1.0	1.6		1.0	1.0	3.2		1.0	1.0	2.5		1.0	1.0	1.0		1.0	
12	Width of Flood Prone Area (W_{fpa})	15.1		25.0	35.0	15.0	20.0	15.0	20.0	48.5		30.0	40.0	36.3		60.0	70.0	11.2		25.0	40.0	34.2		7.0	
13	Entrenchment Ratio (W_{fpa}/W_{bkf})	1.4		2.1	2.9	2.5	3.3	2.3	3.1	3.3		2.1	2.8	1.2		2.7	3.1	1.4		2.0	3.3	2.3		2.1	
14	Meander Length (L_m)	142.0		42.0	96.0	21.0	48.0	22.4	51.2	178.0		49.7	113.6	439.6		79.1	180.8	--		42.7	97.6	102.0	360.0	76.4	
15	Ratio of Meander Length to Bankfull Width (L_m/W_{bkf})	13.5		3.5	8.0	3.5	8.0	3.5	8.0	12.2		3.5	8.0	14.8		3.5	8.0	--		3.5	8.0	7.0	24.6	22.5	
16	Radius of Curvature (R_c)	113.0		30.0	42.0	15.0	21.0	16.0	22.4	25.0		35.5	49.7	176.3		56.5	79.1	--		30.5	42.7	30.0	93.0	26.5	
17	Ratio of Radius of Curvature to Bankfull Width (R_c/W_{bkf})	10.8		2.5	3.5	2.5	3.5	2.5	3.5	1.7		2.5	3.5	5.9		2.5	3.5	--		2.5	3.5	2.0	6.3	7.8	
18	Belt Width (W_{blt})	76.0		42.0	66.0	21.0	33.0	22.4	35.2	48.0		49.7	78.1	54.9		79.1	124.3	--		42.7	67.1	108.0	177.0	18.4	
19	Belt Width Ratio (W_{blt}/W_{bkf})	7.2		3.5	5.5	3.5	5.5	3.5	5.5	3.3		3.5	5.5	1.8		3.5	5.5	--		3.5	5.5	7.4	12.1	5.4	
20	Sinuosity (k) (Stream Length / Valley Length)	1.10		1.09		--		--		1.24		1.20		1.12		1.09		1.01		1.13		2.59		1.04	
21	Valley Slope (S_{valley}) (ft/ft)	0.00510		0.00510		--		--		0.00909		0.00909		0.00230		0.00230		0.00900		0.00900		0.0077		0.01529	
22	Average Stream Slope (S_{avg}) = (S_{valley}/k)	0.00464		0.00470		--		--		0.00735		0.00760		0.00206		0.00210		0.00890		0.00800		0.0030		0.01472	
23	Riffle Slope (S_{riff})	--		0.0066	0.0188	--	--	--	--	--		0.0106	0.0304	--		0.0029	0.0084	--		0.0112	0.0320	0.0042	0.0120	0.0065	
24	Ratio of Riffle Slope to Avg. Slope (S_{riffle}/S_{avg})	--		1.4	4.0	1.4	4.0	1.4	4.0	--		1.4	4.0	--		1.4	4.0	--		1.4	4.0	1.4	4.1	0.4	
25	Pool Slope (S_{pool})	--		0.0000	0.0005	--	--	--	--	--		0.0000	0.0008	--		0.0000	0.0002	--		0.0000	0.0008	0.0000	0.0001	0.0006	
26	Ratio of Pool Slope to Avg. Slope (S_{pool}/S_{avg})	--		0.0	0.1	0.0	0.1	0.0	0.1	--		0.0	0.1	--		0.0	0.1	--		0.0	0.1	0.0	0.0	0.0	
27	Maximum Pool Depth (D_{pool})	--		1.8		1.1		1.2		--		2.0		--		3.4		--		1.5		3.4		0.8	
28	Ratio of Pool Depth to Bkf Depth (D_{pool}/d_{bkf})	--		2.5		2.3		2.4		--		2.8		--		2.5		--		3.2		2.0		6.2	
29	Pool Width (W_{pool})	--		16.2		9.7		10.2		--		17.8		--		31.0		--		14.4		19.1		20.1	
30	Ratio of Pool Width to Bankfull Width (W_{pool}/W_{bkf})	--		1.4		1.6		1.6		--		1.3		--		1.4		--		1.2		11.1		5.9	
31	Pool Area (A_{pool})	--		11.9		11.5		5.1		--		14.1		--		43.1		--		8.1		35.8		3.9	
32	Ratio of Pool Area to Bankfull Area (A_{pool}/A_{bkf})	--		1.4		4.0		1.6		--		1.4		--		1.4		--		1.4		1.4		9.0	
33	Pool to Pool Spacing (p - p)	66.5	311.6	36.0	60.0	18.0	30.0	19.2	32.0	27.9	155.6	42.6	71.0	231.8	660.0	67.8	113.0	--	--	36.6	61.0	33.7	68.2	18.0	75.0
34	Ratio of Pool to Pool Spacing to Bankfull Width (p-p/W_{bkf})	6.3	29.7	3.0	5.0	3.0	5.0	3.0	5.0	1.9	10.7	3.0	5.0	7.8	22.1	3.0	5.0	--	--	3.0	5.0	2.3	4.7	5.3	22.0