Dewberry

Draft Environmental Assessment

Tulsa Port of Catoosa Barge Fleeting Area Project Rogers County, Oklahoma February 2013

SUBMITTED BY:

Dewberry Engineers Inc. 1350 South Boulder, Suite 600 Tulsa, OK 74119-3216

SUBMITTED TO:

Tulsa Port of Catoosa 5350 Cimarron Road Catoosa, OK 74015-3027

Draft Environmental Assessment Tulsa Port of Catoosa Barge Fleeting Area Project Rogers County, Oklahoma

TABLE OF CONTENTS

1.0 INT	RODU	JCTION 1-1
<u>1.1</u> F	Projec	t Description 1-1
1.1.1	Port	t Location 1-1
1.1.2	Port	t Establishment and Ownership1-2
1.1.3	Port	t Authority Mission 1-2
1.1.4	Port	t Operation 1-3
1.1.5	Pro	posed Project 1-3
<u>1.2</u> F	Projec	t Purpose and Need 1-5
1.2.1	Pur	pose 1-5
1.2.2	Nee	d
2.0 ALT	FERNA	ATIVES ANALYSIS 2-1
2.1 I	ntrod	uction 2-1
		eral Action #1 – Real Estate Instrument/Property Access
	.1.1	Alternative 1: Conveyance of Property - Federal Property and Administrative
Ser	vices	Act
2.1	.1.2	Alternative 2: Granting an Easement 2-1
2.1	.1.3	Alternative 3: Lease (Preferred Alternative) 2-2
2.1	.1.4	Alternative 4: Land Exchange 2-3
2.1	.1.5	Alternative 5: No Action 2-4
2.1.2	Fed	eral Action #2 – USACE Permit Approval of Proposed Project
2.1.3	Con	cepts Considered and Dismissed 2-5
2.1.4	Alte	rnatives Advanced 2-6
2.1	.4.1	No Action Alternative 2-7
2.1	.4.2	Alternative 2 - Former Verdigris River Channel (Preferred Alternative) 2-9
2.1	.4.3	Alternative 3 - Former Private Terminal West of Bird Creek 2-9
2.1	.4.4	Alternative 5 - Cut-off South of I-44 Bridge 2-10
<u>2.2</u> <u>F</u>	Prefer	red Alternative2-10
2.2.1		ting Area Excavation 2-10
2.2.2	Tem	porary Haul Road 2-11
2.2.3	Exce	ess Excavation Placement 2-11

For

Tulsa Port of Catoosa Barge Fleeting Area Project Rogers County, Oklahoma

TABLE OF CONTENTS, Continued

3.0 EXISTING ENVIRONMENT	1
3.1 Geology and Soils	1
3.1.1 Geology	1
3.1.2 Soils	1
3.2 Water Resources 3-	3
3.2.1 Surface Water	3
3.2.2 Groundwater	4
3.2.3 Floodplains	4
3.2.4 Waters of the United States, including Wetlands	4
3.3 Transportation 3-	<u>5</u>
3.4 Infrastructure and Utilities 3-	5
3.5 Land Use and Zoning	5
3.5.1 Land Use	6
3.5.2 Zoning	6
3.6 Socioeconomics and Environmental Justice	7
3.7 Hazardous Waste3-1	1
3.7.1 EDR Database Search Results	1
3.7.2 Unmapped "Orphan" Sites 3-1	3
3.7.3 USEPA EnviroFacts 3-1	3
<u>3.8</u> <u>Air Quality3-1</u>	3
<u>3.9</u> Noise	4
3.10 Biological Resources	4
3.10.1 Terrestrial Ecology 3-1	4
3.10.2 Aquatic Ecology	7
3.10.3 Threatened and Endangered Species	8
3.11 Cultural Resources	0

For

Tulsa Port of Catoosa Barge Fleeting Area Project Rogers County, Oklahoma

TABLE OF CONTENTS, Continued

<u>3.12</u> Pr	reviously Identified Archaeological Sites3-22
<u>3.13 Ar</u>	rchaeological Field Results3-22
<u>3.14 Ae</u>	esthetics and Scenic Resources3-24
4.0 POT	ENTIAL IMPACTS AND PROPOSED MITIGATION FOR THE PROPOSED ACTION 4-1
	eology and Soils
	Preferred Alternative
4.1.2	No Action Alternative
4.2 W	/ater Resources
4.2.1	Preferred Alternative
4.2.1	1.1 Surface Water
4.2.1	1.2 Groundwater
4.2.1	1.3 Floodplains
4.2.1	1.4 Waters of the United States, including Wetlands
4.2.2	No Action Alternative
<u>4.3</u> <u>Tr</u>	ransportation
4.3.1	Preferred Alternative
4.3.2	No Action Alternative
<u>4.4 In</u>	frastructure and Utilities
4.4.1	Preferred Alternative
4.4.2	No Action Alternative
<u>4.5</u> La	and Use and Zoning
4.5.1	Preferred Alternative
4.5.2	No Action Alternative
<u>4.6</u> <u>Sc</u>	ocioeconomics and Environmental Justice
4.6.1	Preferred Alternative 4-7
4.6.2	No Action Alternative
<u>4.7 Ha</u>	azardous Waste 4-8

For

Tulsa Port of Catoosa Barge Fleeting Area Project Rogers County, Oklahoma

TABLE OF CONTENTS, Continued

4.7.1	Preferred Alternative
4.7.2	No Action Alternative
4.8 Ai	r Quality
	Preferred Alternative
4.8.2	No Action Alternative
4.9 No	Dise
	Preferred Alternative
	No Action Alternative
	ological Resources
4.10.1	Preferred Alternative 4-9
4.10	1.1 Terrestrial Ecology 4-9
4.10	1.2 Aquatic Ecology
4.10	1.3 Threatened and Endangered Species 4-11
4.10.2	No Action Alternative
4.11 Cu	Iltural Resources
	Iltural Resources
4.11.1	Preferred Alternative 4-12
4.11.1 4.11.2	Preferred Alternative 4-12
4.11.1 4.11.2	Preferred Alternative4-12No Action Alternative4-12
4.11.1 4.11.2 <u>4.12</u> Ae	Preferred Alternative
4.11.1 4.11.2 <u>4.12 Ae</u> 4.12.1 4.12.2	Preferred Alternative 4-12 No Action Alternative 4-12 esthetics and Scenic Resources 4-12 Preferred Alternative 4-12 No Action Alternative 4-12 Areferred Alternative 4-12 Areferred Alternative 4-12 Areferred Alternative 4-12 Areferred Alternative 4-13
4.11.1 4.11.2 <u>4.12 Ac</u> 4.12.1 4.12.2 5.0 AGE	Preferred Alternative 4-12 No Action Alternative 4-12 esthetics and Scenic Resources 4-12 Preferred Alternative 4-12 No Action Alternative 4-13 NCY COORDINATION, PUBLIC INVOLVEMENT, PERMITS AND FEDERAL
4.11.1 4.11.2 <u>4.12 Ac</u> 4.12.1 4.12.2 5.0 AGE	Preferred Alternative 4-12 No Action Alternative 4-12 esthetics and Scenic Resources 4-12 Preferred Alternative 4-12 No Action Alternative 4-12 Areferred Alternative 4-12 Areferred Alternative 4-12 Areferred Alternative 4-12 Areferred Alternative 4-13
4.11.1 4.11.2 <u>4.12 Ae</u> 4.12.1 4.12.2 5.0 AGEI COMPLIANC	Preferred Alternative 4-12 No Action Alternative 4-12 esthetics and Scenic Resources 4-12 Preferred Alternative 4-12 No Action Alternative 4-13 NCY COORDINATION, PUBLIC INVOLVEMENT, PERMITS AND FEDERAL
4.11.1 4.11.2 <u>4.12 Ae</u> 4.12.1 4.12.2 5.0 AGEI COMPLIANC <u>5.1 Ae</u>	Preferred Alternative 4-12 No Action Alternative 4-12 esthetics and Scenic Resources 4-12 Preferred Alternative 4-12 No Action Alternative 4-12 No Action Alternative 4-12 No Action Alternative 4-13 NCY COORDINATION, PUBLIC INVOLVEMENT, PERMITS AND FEDERAL 5-1 gency Coordination 5-1
4.11.1 4.11.2 <u>4.12 Ae</u> 4.12.1 4.12.2 5.0 AGE COMPLIANC <u>5.1 Ae</u> <u>5.2 Pu</u>	Preferred Alternative 4-12 No Action Alternative 4-12 esthetics and Scenic Resources 4-12 Preferred Alternative 4-12 No Action Alternative 4-12 No Action Alternative 4-13 NCY COORDINATION, PUBLIC INVOLVEMENT, PERMITS AND FEDERAL 5-1 gency Coordination 5-1 ublic Involvement 5-2
4.11.1 4.11.2 <u>4.12 Ae</u> 4.12.1 4.12.2 5.0 AGE COMPLIANC <u>5.1 Ae</u> <u>5.2 Pu</u>	Preferred Alternative 4-12 No Action Alternative 4-12 esthetics and Scenic Resources 4-12 Preferred Alternative 4-12 No Action Alternative 4-12 No Action Alternative 4-12 No Action Alternative 4-13 NCY COORDINATION, PUBLIC INVOLVEMENT, PERMITS AND FEDERAL 5-1 gency Coordination 5-1

For

Tulsa Port of Catoosa Barge Fleeting Area Project Rogers County, Oklahoma

TABLE OF CONTENTS, Continued

7.0	REFERENCES	7-:	1
-----	------------	-----	---

LIST OF FIGURES

- Figure 1-1 Project Location Map
- Figure 1-2 Site Location Map
- Figure 2-1 Alternative Concepts
- Figure 2-2 Build Alternatives
- Figure 2-3 Alternative 2 (Preferred Alternative) Former Verdigris River Channel
- Figure 2-4 Alternative 3 Private Terminal West of Bird Creek
- Figure 2-5 Alternative 5 Cut-off South of I-44 Bridge
- Figure 3-1 Project Area Soils Map
- Figure 3-2 FEMA Floodplain Map
- Figure 3-3 National Wetland Inventory Map
- Figure 3-4 Potentially Jurisdictional Waters Map
- Figure 3-5 Zoning Map
- Figure 4-1 Project Area Impacts to Wetlands and Open Water
- Figure 4-2 Potential Wetland Mitigation Site
- Figure 4-3 Riparian Impacts on USACE Property

LIST OF TABLES

- Table 2-1Concepts Considered and Dismissed
- Table 2-2Alternatives Screening Matrix
- Table 3-1
 Rogers County Zoning Districts
- Table 3-22010 Population and Race
- Table 3-3
 Minority Populations within the Project Area
- Table 3-4
 Population within Project Area with Incomes below Poverty Line

For

Tulsa Port of Catoosa Barge Fleeting Area Project Rogers County, Oklahoma

TABLE OF CONTENTS, Continued

- **Table 3-5**Animal Species Observed within Project Study Area
- Table 3-6
 USFWS Listed and Protected Species, Rogers County, Oklahoma
- Table 5-1Agency Coordination
- Table 5-2Relationship of Plans to Environmental Protection Statutes and Other
Environmental Requirements

LIST OF APPENDICES

- Appendix A Department of the Army Permit Information
- Appendix B Cultural Resources
- Appendix C Agency and Public Coordination
- Appendix D Fish and Wildlife Coordination

ACRONYMS AND ABBREVIATIONS

ABFE	advisory base flood elevation
ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effects
AST	Aboveground Storage Tank
BFA	Barge Fleeting Area
BFFA	Barge Fleeting Fill Area
bgs	below ground surface
BMP	Best Management Practice
CAA CAS CEQ CERC-NFRAP	Clean Air Act Cojeen Archaeological Services, LLC Council on Environmental Quality Comprehensive Environmental Response, Compensation, and Liability Information System-No Further Remedial Action Planned
CFR	Code of Federal Regulations
CO	carbon monoxide
CORRACTS	Correction Action Report
CRS	cultural resource survey
CWA	Clean Water Act
CY	cubic yards
CZMA	Coastal Zone Management Act
dB	decibel
DFIRM	Digital Flood Insurance Rate Map
DNL	Day-Night Average Sound Level
EA	Environmental Assessment
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
GLO	General Land Office

Draft Environmental Assessment Tulsa Port of Catoosa Barge Fleeting Area Project Rogers County, Oklahoma

FEMA FINDS FIRM FONSI FPPA	Federal Emergency Management Agency Facility Index Systems/Facility Registry System Flood Insurance Rate Map Finding of No Significant Impact Farmland Protection Policy Act
HIST LUST	Historic Leaking Underground Storage Tank
ΙΟ	Isolated Occurrences of Artifact
LUST	Leaking Underground Storage Tank
MSL	mean sea level
MKARNS	McClellan-Kerr Arkansas River Navigation System
National Register	National Register of Historic Places
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NISTAC	Nationwide Infrastructure Support Technical Assistance
	Consultants
NO ₂	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NORM	Naturally Occurring Radioactive Material
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
OAS	Oklahoma Archaeological Survey
ODEQ	Oklahoma Department of Environmental Quality
ONHIP	Oklahoma Natural Heritage Inventory Program
O ₃	ozone
OSHA	Occupational Safety and Health Administration
ΡΑ	Preferred Alternative

Draft Environmental Assessment Tulsa Port of Catoosa Barge Fleeting Area Project Rogers County, Oklahoma

Pb	lead
PEM	Palustrine emergent wetlands
PM _{2.5/10}	particulate matter less than 2.5 microns/10 microns
PSS	Palustrine scrub-shrub wetlands
Port	Tulsa Port of Catoosa
Port Authority	City of Tulsa-Rogers County Port Authority
RCRA-CESQG	Resource Conservation and Recovery Act-Conditionally Exempt Small Quantity Generators
RCRA-NonGen	Resource Conservation and Recovery Act-Non Generators
RM	River Mile
SHPO	State Historic Preservation Office
SO2	sulfur dioxide
SWP3	Stormwater Pollution Prevention Plan
THPO	Tribal Historic Preservation Officer
TRIS	Toxic Chemical Release Inventory System
U.S.	United States
USACE	U.S. Army Corps of Engineers
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
UST	Underground Storage Tank

1.0 INTRODUCTION

This Environmental Assessment (EA) was prepared by Dewberry Engineers Inc. (Dewberry), on behalf of the Tulsa Port of Catoosa (Port), in support of two federal actions which are necessary for the proposed expansion of the Port's Barge Fleeting Area (BFA). These two federal actions are: the conveyance or lease of United States Army Corps of Engineers (USACE) owned land to the Port, and the authorization through permits issued by the USACE under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act.

Alternatives to each federal action and their potential impacts were analyzed in accordance with the National Environmental Policy Act (NEPA) of 1969 (PL 91-190) and all other applicable laws to support the intent of NEPA by ensuring that applicable environmental information is available to other federal, state, and local agencies and the general public. In addition, under the Section 404(b)(1) guidelines, the USACE may only permit discharges of dredged or fill material into waters of the United States that represent the least damaging practicable alternative, so long as the alternative does not have other significant adverse environmental consequences. Guidance to prepare this EA and ensure compliance with NEPA are contained in the Council on Environmental Quality Regulations for Implementing NEPA (40 CFR 1500 through 1508), NEPA Scope of Analysis (USACE 33 CFR Parts 230 and 325, February 3, 1988), and USACE Engineering Regulation (ER) 200-2-2, Procedures for Implementing NEPA (March 4, 1988). This EA discloses the potential environmental impacts anticipated from both proposed actions which are necessary to provide a safe and efficient location for the Port towboat operator to store and moor barges within the Port's terminal basin.

The USACE's regulatory authority over this project stems from Section 10 of the Rivers and Harbors Act of 1899, USC 403, which governs activities in "Navigable Waters of the United States" as defined in the Code of Federal Regulations, 33 CFR 322.2, and Section 404 of the Clean Water Act, Public Laws 92-500 and 95-217, which governs the discharge of dredged or fill material in "Waters of the United States."

1.1 Project Description

1.1.1 Port Location

The Port (**Photo 1-1**) is situated on the northeastern edge of Tulsa, Oklahoma, in Rogers County, at the head of navigation for the McClellan-Kerr Arkansas River Navigation System (MKARNS). This 445-mile long waterway links Oklahoma and the surrounding five-state area with ports on the 25,000-mile long U.S. inland waterway system, as well as to domestic and

foreign ports beyond, by way of the Mississippi River and New Orleans, 1,044 river miles to the east and south.



Photo 1-1: Aerial view of the Port.

1.1.2 Port Establishment and Ownership

The 2,500-acre Port complex was acquired and initially developed using the proceeds of a \$21.2 million general obligation bond issued by the citizens of the City of Tulsa and Rogers County. Together, they formed The City of Tulsa-Rogers County Port Authority (Port Authority), an agency of the State of Oklahoma, to be the landlord/developer for the Port under a 99-year lease.

The Port opened for business in December 1970, concurrent with the opening of the MKARNS. Its first barge load of material, consisting of 600 tons of newsprint, arrived on January 21, 1971.

1.1.3 Port Authority Mission

The Port Authority's mission is to encourage industries that would regularly employ economical and environmentally friendly barge transportation to locate operations at the Port. As a result, over 60 percent of the Port's current industrial base either ship by barge, or buy from those who do, at least once annually.

1.1.4 Port Operation

The largest volume commodities handled at the Port are grains (wheat) and fertilizers. Wheat is planted on Midwest farms in the fall and spring of each year. The harvest of winter wheat begins in mid-May and continues through mid-July within the region served by the Port. After a few weeks, the spring wheat harvest begins in mid-August and continues through mid-September. Winter wheat is planted in mid-August through October, while spring wheat is planted April through May. Fertilizers are imported during planting seasons and the wheat is exported during harvests. On average, while it only takes a matter of hours to transfer wheat from the field to the local grain cooperative, it may take several weeks to transport the wheat from the cooperative to the Port's grain terminals by truck or railcar and then another several weeks to load onto a barge for transportation to a Gulf Coast port for export overseas. However, during the time between off-loading the fertilizer and loading of the wheat, these barges must be stored. While the timeframes for winter wheat planting and spring wheat harvest seem to overlap, the same is not true for the spring wheat planting and winter wheat harvest. There is approximately a four-week gap and it is during this time when eastern Oklahoma often receives its largest rainstorms, some of which result in high water events along either the Verdigris River or Bird Creek or both.

Currently, empty barges are stored within the Port's terminal basin, moored at times at the asphalt, petroleum, nitrogen, and molasses terminal docks when they are not in use. When a specific commodity designated barge tow is approaching, the Port will receive a 48-hour notice from the designated towboat captain of the tow's impending arrival. It is the Port towboat operator's responsibility to clear the specific dock of stored barges within the subsequent 48 hours. Upon the designated tow's arrival, the tow's barges are immediately off-loaded and the tow is turned around to begin its return trip. In the Port's current configuration, designated tows put a great deal of pressure on the Port towboat operator. In addition, the efficiency of the Port towboat operator is interrupted by having to stop what they were doing to move stored barges from a specific dock until the designated tow has come and gone.

1.1.5 Proposed Project

The Port has proposed to construct, operate, and maintain a BFA at the former Verdigris River channel at approximately Verdigris River Mile 50 (**Figure 1-1**). The BFA would be used to store both empty and loaded barges prior to and after transfer of cargo at the existing Port terminal. In effect, the proposed BFA would serve as a temporary "parking lot" for the barges using the docks. **Figure 1-2** shows the relative location of the proposed BFA and the applicant's existing terminal.

The proposed BFA would be located west of the MKARNS Navigation Channel, south of the Bird Creek Cut-off, east of the former Bird Creek channel and north of the Burlington Northern Santa Fe Railroad. It would have a 2,300-foot long, 300-foot wide toe-to-toe mooring area and the capacity to store more than 60 barges, assuming the barges are the standard, covered hopper barge size of 195 feet long by 35 feet wide. Barges would be moored three-abreast on both sides of the BFA, with 90 feet of clear water between the moored barges to allow for towboat operations.

The BFA would be constructed with three vertical to one horizontal, grassed side slopes. Rock riprap would be placed on the side slopes of the BFA from 10 feet above the normal pool water surface to the slope toe for stabilization due to minor wave action. Mooring deadmen and cables would be installed high on the side slopes along each bank for the barges to be tied off to. It is estimated that there would be 1.55 million cubic yards of excavation; approximately 1.225 million cubic yards of this material would be hauled to the proposed Barge Fleeting Fill Area (BFFA), located across Bird Creek from the BFA. The remaining excavated material would be used within the BFA to achieve final grades.

In order for construction of the BFA to proceed, the Port proposes to acquire approximately 87 acres, through a lease of USACE-owned property located immediately south of and adjacent to the Port's existing facility. Portions of the site were once used as a dredge disposal facility, but have not been used as such since the construction of the MKARNS. The property is a triangular island parcel bounded by the Bird Creek Constructed Channel (called the Bird Creek Cut-off) to the north, the former Bird Creek channel to the west, and the former Verdigris channel to the east, all of which are shallow watercourses. The properties on the opposite banks of these watercourses are currently owned by the Port. Given its distance from the MKARNS navigation channel and the generally shallow depth of the streams surrounding it, the USACE has abandoned its use of this property as a dredge disposal facility in favor of using three other dredge disposal facilities directly adjacent to the MKARNS. This former disposal facility has not been used as such by the USACE since the Port became operational in 1971 and the USACE does not intend to use this facility in the future (McQueen, Personal Communications, 2009). Under the MKARNS Land Use Allocations, it is zoned for industrial use and identified in various USACE documents as "Cut-off 18-12."

1.2 Project Purpose and Need

1.2.1 Purpose

The purpose of this proposed action is to provide a safe and efficient location for the Port towboat operator to store and fleet barges outside of the Port's existing slack-water terminal area. The construction of the BFA will allow the Port towboat operator to move demurred barges to a location outside the slack-water terminal basin and to position active barges at their respective commodity terminals for loading / offloading. This additional maneuvering room will ultimately allow the Port towboat operator to be able to reposition a greater number of barges within the normal business day.

1.2.2 Need

Commercial transportation on the MKARNS is anticipated to increase as a result of steady growth in river transportation in the nation, especially within the inland navigation system. As river transportation increases, the need for barge fleeting is expected to increase proportionally with increased use of the navigation system. In order to sustain the current demand for waterways transportation and accommodate future Port needs arising from the forecasted growth and increase in commercial navigation, additional area to efficiently fleet and maneuver barges is needed. Logistically and economically, the location of any additional fleeting needs to be situated adjacent to, or geographically close to their existing industrial facility and current fleeting operational area to best serve their customers.

Barge Storage and Operational Flexibility

The Port currently loads and unloads, on average, 45 barges per day in the Port terminal area. The Port's towboat and fleet operators have indicated that their ability to fleet barges (storage and delivery operations) is adversely affected once the number of barges in the Port terminal exceeds 60. It is quite common in the springtime for there to be more than 100 barges in the Port terminal basin at any time. Springtime in the Midwest brings rain; this is when many crops are planted, which requires fertilizer brought in on barges. Winter wheat, which is loaded on and transported via barges, is also harvested at this time throughout the Colorado-Kansas-Oklahoma-Texas region. Large rain events can result in high water flooding within the Arkansas and Mississippi River basins. Such flooding results in the number of barges exceeding 140 in the Port terminal area. The barges are held at the Port until river levels drop, due to the difficulty for towboat captains to control their tows when traveling downstream. An example of this barge congestion in the Port terminal area was experienced during the May 2008 high-water event. **Photos** 1-2 and 1-3 taken during that period show over 140 barges moored within the Port channel. Most of these barges are loaded with the year's winter wheat harvest and were ready to be moved downstream to New Orleans for shipment overseas. As the **Photos** attest, space for the towboats to maneuver around the moored barges was pinched in several locations. Harvested wheat continued to be brought into the Port by rail from Kansas and points beyond, so space had to be held open at the Port's three dry bulk operations, due to limited silo storage.

Due to the Port channel congestion, clear water between moored barges can be less than 70 feet (**Photo 1-2**). The width of a standard barge is 35 feet, which does not provide ample maneuvering room and limits the towboat operators to moving one barge at a time, as shown in **Photo 1-3**.



Photo 1-2: Barge congestion at the Port.

Photo 1-3: During barge congestion in the Port channel, maneuvering room for towboat operators is extremely compromised.

Construction of a new BFA would provide additional mooring space, thus reducing congestion and providing the towboat captains greater operational flexibility.

Anticipated Port Growth

Over 69 million tons of cargo, in over 42,800 barges, has been handled at the Port from January 1971 through May 2012. The current average annual barge cargo volume at the Port over the past five years is 2.2 million tons in 1,250 barges. It is projected that this cargo volume would increase by a minimum of 100,000 tons per year in 65 barges over the next decade. By 2022

the Port would be realizing an average annual barge shipping volume of 3.2 million tons in a little over 2,100 barges. These projections are even more significant given that the MKARNS navigation channel is anticipated to be deepened as authorized in Section 136 of the Energy and Water Development Appropriations Act of 2004, which authorized a navigation project depth of 12 feet for the MKARNS. The MKARNS Environmental Impact Statement (2005) addressed the issues and impacts associated with river flow management, navigation channel depth increase, and navigation channel depth maintenance within the MKARNS. Currently, commercial navigation is not at optimum productivity within the MKARNS since its nine-foot draft navigation channel limits towboat loads compared to the Lower Mississippi River's authorized 12-foot draft channel. Therefore, the MKARNS is currently undergoing expansion from a nine-foot to 12-foot draft channel as future federal funding allows.

This growth projection is primarily based on the Panama Canal Expansion project currently under construction and anticipated to be completed in late 2015. With these improvements, container ships from the Far East which currently cannot sail into the Gulf of Mexico without taking a circuitous route around the cape of South America, must off-load their containers at western U.S. ports such as San Diego, Long Beach, and Oakland. The Panama Canal widening improvements would allow even the mega-container ships to pass through the canal and sail into ports such as Mobile, Galveston, and New Orleans. Containers destined for the middle and upper Midwest can be off-loaded directly onto Port bound barges. It is anticipated that soon after the initial arrival of these ships in New Orleans, regularly scheduled Container-on-Barge service would be initiated to the Port.

Typically, when an area sees a significant increase in container traffic, a regional transload facility is developed by a railroad or trucking company. The Port is ideally located for such a facility. The Port not only has access to an inland navigation system that is connected to the world, but also has access to two Class 1 railroads (Burlington Northern Santa Fe and Union Pacific) and a Class 3 railroad (Southern Kansas and Oklahoma), and is in close proximity to the interstate highway system. In addition, the Tulsa International Airport is located less than ten miles to the west, with world class aerospace industrial facilities immediately adjacent to the main north-south runway.

Other cargos that can be economically transported by barge periodically come into play. The federal government's recent scrutiny of the Keystone Pipeline construction has renewed interest in the transportation of bulk crude oil on the MKARNS. A plan currently being tested entails the transport of crude oil from Cushing, Oklahoma by tanker truck to the Port and loading the oil into tank barges for transport to Gulf Coast refineries.

Another bulk cargo transported by barge from the Port is scrap steel. There is a profitable market for scrap steel from the United States to be purchased by Far East steel manufacturers. The scrap is loaded into covered hopper barges and towed across the Pacific Ocean directly to its destination.

The latest commodity considered for transport by barges is sand used in the hydraulic fracturing (fracking) process during natural gas well production. The fracking process pumps a liquid/sand/chemical mixture into new and existing natural gas wells to create space between layers of natural gas bearing shales. Once fissures are created, the natural gas can escape from the shale and be collected above ground for processing. It has been estimated that to complete an average natural gas well, it takes 1.5 million cubic feet of fracking sand. Both the Port of Muskogee and Port of Catoosa have been contacted about off-loading multiple barges of sand in the past several months. Domestic natural gas exploration remains active, especially with dramatically fluctuating oil prices in recent years.

The Port terminal is currently home to approximately 65 industrial facilities employing an estimated 3,500 people. Over the past five years, it has realized an average of three new industrial locations/expansions annually. Upon reaching total development, the Port expects to have 100 industries employing over 5,000 people. The current consortium of industries in operation at the Port have invested over \$1 billion in capital improvements, while generating annual payrolls exceeding \$150 million.

2.0 ALTERNATIVES ANALYSIS

2.1 Introduction

As described earlier, the proposed project involves two federal actions: the lease of USACE owned land to the Port and the authorization of permits by the USACE under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. Alternatives considered for each action are summarized below.

2.1.1 Federal Action #1 – Real Estate Instrument/Property Access

2.1.1.1 Alternative 1: Conveyance of Property - Federal Property and Administrative Services Act

Under this alternative, the needed property would be transferred by a public sale, negotiated sale or public benefit conveyance to the Port pursuant to the requirements of the Federal Property Act. Under this authority, properties undergo US Department of Defense, federal agency and homeland security screening before being determined to be eligible for a negotiated sale of public benefit conveyance. Property with a value in excess of \$50,000 must be turned over to the General Services Administration (GSA) for disposal. The GSA conducts the aforementioned federal and homeland security screening and determines which disposal method is in the best interest of the federal government. A disposal under this authority would also be subject to congressional reporting as specified in 10 USC § 2668, which states that all disposals in excess of \$750,000 must be presented and reviewed by the Committee on Armed Services of the Senate and the Committee on Armed Services of the House of Representatives. This method of conveyance involves a high level of risk because the Department of Defense and other federal agencies, as well as homeless organizations, would have an opportunity to obtain the property through the screening process before it would be offered for sale by the GSA. Once the screening process is complete, the GSA would then sell the subject property by public auction.

2.1.1.2 Alternative 2: Granting an Easement

Under this alternative, the Port would have legal access to use the property through a long-term, 50-year easement agreement pursuant to 10 USC § 2668, which reads:

If the Secretary of a military department finds that it will not be against the public interest, the Secretary may grant, upon such terms as the Secretary considers advisable, easements for rights-of-way over, in, and upon public lands permanently withdrawn or reserved for the use of that department, and other lands under the Secretary's control for—

- 1) railroad tracks;
- 2) gas, water, sewer, and oil pipe lines;
- *3)* substations for electric power transmission lines and pumping stations for gas, water, sewer, and oil pipe lines;
- 4) canals;
- 5) ditches;
- 6) flumes;
- 7) tunnels;
- 8) dams and reservoirs in connection with fish and wildlife programs, fish hatcheries, and other improvements relating to fish-culture;
- 9) roads and streets;
- 10) poles and lines for the transmission or distribution of electric power;
- 11) poles and lines for the transmission or distribution of communications signals (including telephone and telegraph signals);
- 12) structures and facilities for the transmission, reception, and relay of such signals; and
- 13) any other purpose that the Secretary considers advisable.

This alternative allows for the Tulsa District Chief of Real Estate to enter into a non-competitive easement agreement with the Port for a term not to exceed 50 years. The interest granted under this agreement would authorize the Port to build, operate and maintain a canal (BFA) on the subject property. This is a relatively low-risk alternative because the proposed usage and execution authority are clearly defined in 10 USC § 2668, and both are within the authority delegated to the Tulsa District Chief of Real Estate.

2.1.1.3 Alternative 3: Lease (Preferred Alternative)

Under this alternative, the subject parcel would be leased to the Port pursuant to 10 USC § 2667, which is the general leasing authority of the military departments and is used for all Department of the Army leasing that is not specifically authorized by other statutes. Leases granted under this authority must satisfy the requirements of the statute, which read:

- a. The lease has been determined to promote the national defense or be in the public's interest;
- b. The property is under the control of the Army;
- c. The property is not for the time needed for public use;
- d. The property is not excess property, as defined by Section 3 of the Federal Property and Administrative Services Act of 1949, as amended;

- e. The lease will not be for more than 5 years, unless the Secretary determines that a longer period will promote the national defense or the public interest;
- f. The interest of the lessee of property leased under this section may be taxed by State or local governments. All leases shall provide that, if and to the extent that leased property is later made taxable by state or local governments under an act of Congress, the lease shall be renegotiated; and
- g. The total consideration, in cash or in kind, is not less than the estimated fair market rental of the leased interest. The fair market value of the leased interest should take into account the property, the restrictions on use and access to the property, the terms and degree of Government control in the lease document, the termination rights, and any other specifics of the type of use.

Leases can be granted under this authority for any legitimate purpose. Leases under this authority grant the Lessee exclusive use of the leased area so long as they comply with the terms and conditions set forth in the lease. Waiver of competition and lease terms up to 25 years must be approved by the Secretary. A long-term lease under this authority would have to endure four levels of review, concurrence and execution.

2.1.1.4 Alternative 4: Land Exchange

Under this alternative, the Port would exchange land currently under its ownership for land owned by the USACE in accordance with the requirements under River and Harbor Improvements, USC 33 Chapter 12, Navigation and Navigable Waters, 33 USC 558b and Application to Authorized Works for Flood Control, 33 USC 558b-1, which authorize the Secretary of the Army to exchange lands acquired for river and harbor and flood control for privately-owned land required for such purposes. To comply with federal regulations regarding the exchange, the purposes and values of the involved parcels must demonstrate a clear benefit to the US Government. This method of conveyance involves a high level of risk because of the detailed level of documentation associated with this real estate action. The final approval of this transaction rests with both the Department of Justice and the Secretary of the Army.

The primary means under which a clear benefit to the Government would need to be demonstrated would be the relative acreages associated in the proposed land exchange. The Port owns approximately 34 acres of land along the west bank of the MKARNS and west of an existing, active USACE dredge disposal facility (**Figure 2-1**). There are two other active disposal facilities along the east bank of the MKARNS in this same area of the navigation system. The island and adjacent property that are currently USACE-owned are approximately 87 acres

(Figure 2-1). The disparity in acreages immediately precludes a comparable exchange between the USACE and the Port. In addition, the USACE currently operates the three disposal facilities at the head of the MKARNS, and they are adequate for the current and future dredging requirements in this area of the navigation system. The USACE has neither the need nor the funding to expand the size of any of these current disposal facilities. As such, the additional 34-acre parcel adjacent to the west bank disposal facility and currently owned by the Port is not needed by the USACE.

The disparity in acreages between the two parcels, and the potential cost that would be incurred by the US Government in order to expand the active disposal facility space, do not support the requirements of 33 USC 558b and 558b-1. With this alternative, there is no clear benefit to the US Government; therefore, this alternative was dismissed from further evaluation.

2.1.1.5 Alternative 5: No Action

Under the No Action Alternative, there would be no transfer of property from the USACE to the Port. As such, the Port would not be able to expand their fleeting facilities for barge storage at their current facility. This alternative was dismissed as that it does not meet the project purpose and need.

2.1.2 Federal Action #2 – USACE Permit Approval of Proposed Project

The second federal action and second set of alternatives relates to the construction of the BFA and filling of the BFFA, both of which may require USACE approval. Ownership and/or legal access to the property does not affect the USACE permit decision; however, legal access by the Port to the site is required for construction. Given that this activity is considered a water dependent activity and would also require the potential placement of fill material into waters of the United States, the Port would submit an Individual Permit Application for a USACE Permit under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. The proposed project has the potential to result in both impacts and benefits to the built, natural, and social environments. In order to select the most appropriate alternative that meets the proposed project's purpose and need, an analysis of alternatives was conducted. This section summarizes the extensive planning that led to the recommendation of the Preferred Alternative (PA).

For the Permit Decision action, three outcomes/alternatives are relevant:

- **USACE Permit Alternative 1**: The USACE would issue the permits required to authorize construction of the BFA either with or without specific conditions.
- **USACE Permit Alternative 2:** The USACE would deny the permits at a specific location because another practicable alternative location exists that would be the least environmentally damaging alternative.
- **USACE Permit Alternative 3:** The USACE would deny the Port's application for the DA permits. This Alternative is considered as the No Action Alternative.

The process that led to the recommendation of the PA was a multi-phase evaluation which began with the project team's development of several BFA construction options which were considered in order to meet the project's purpose and need. By the end of the screening process, a total of eight concepts were developed. These initial concepts were evaluated to determine if they would meet the proposed project's purpose and need. Due to the proposed project's water dependency, concepts were considered along waterways, including Verdigris River cut-off (RM 49.5), former private terminal west of Bird Creek, Verdigris River cut-off near Rogers Point Park, oxbow south of I-44 bridge, east bank of the Verdigris River Channel (RM 49.5), Yonkipin Lake (RM 49.5), and American Electric Power Service Company of Oklahoma (AEP-PSO) Black Fox site at approximate RM 32. For comparison purposes, the No Action Alternative was included as one of the eight initial concepts. **Figure 2-1** presents the location of these eight concepts in relation to the Port.

2.1.3 Concepts Considered and Dismissed

Beginning in the summer of 2009, progress meetings among the project team members, including the Port, were held to discuss, develop and ultimately decide on the concepts that would be dismissed or advanced. Four of the eight concepts were dismissed based upon their distance from the Port or development/construction issues. **Figure 2-2** presents an overall figure of concepts considered and dismissed. A summary of the concepts that were considered and dismissed is provided in **Table 2-1**, below.

Table 2-1

Concepts Considered and Dismissed

Concept Reason for Abandonment/Dismissal				
Concept 4	Eliminated due to its proximity to Rogers Point Park and potential impacts to the park facility related to the site's			
Concept 6	development as a barge fleeting area. This property is designated as an active ACOE dredge disposal facility, requiring ACOE approval and disposal prior to its development as a barge fleeting area, making it economically impractical with time constraints. In addition, unsafe conditions exist for barge storage due to exposure to the river current.			
Concept 7	Removed from consideration due to the lake's perched condition over bedrock, 20-feet above the Verdigris River, which if excavated would drain Yonkipin Lake.			
Concept 8	Eliminated due to its 15-mile one-way distance from the Port terminal (below Johnson's Port 33), making it economically and operationally impractical.			

2.1.4 Alternatives Advanced

Build Alternatives (formerly called concepts) 2, 3, and 5, as well as the No Action Alternative (1), were advanced as part of the alternatives analysis process. As part of the analysis conducted to evaluate build alternatives, environmental constraints maps were developed for the entire project study area. The constraints maps included information from online state and federal agency websites, Geographic Information System (GIS) data layers, and responses to requests from regulatory agencies. Furthermore, a preliminary site reconnaissance was conducted to field verify and/or add environmental constraints to the maps.

The environmental constraints maps were reviewed by the project team during the initial analysis of build alternatives and helped guide the decision making process by highlighting environmental concerns for each of the alternatives.

Because the proposed project seeks to safely and efficiently expand the Port's fleeting capacity, those sites located in closest proximity to the Verdigris River and to the Port terminal were

favored over more distant sites. Alternative 2 emerged as the recommended PA based on its access and proximity to the existing port terminal operations and the MKARNS.

The alternatives advanced for consideration are discussed in the section below. **Table 2-2** presents a summary of the Alternatives Screening Matrix for the advanced alternatives.

2.1.4.1 No Action Alternative

This alternative would leave the existing conditions unchanged. No additional fleet storage space would be created to improve Port operations, which would hinder future growth of water-borne transportation at this port terminal. By not providing additional barge fleeting space, growth at the Port would be obstructed and not meet the purpose and need of the project. Therefore, this alternative was eliminated.

Criteria		No Action Alternative		
	2 (PA)	3	5	
Meets Purpose and Need	Yes	Yes	Yes	No
Barge Mooring Capacity	62	50	77	N/A
Land Acquisition	40 Ac. (USACE)	13 Ac. (USACE)	25 Ac. (USACE); 25 Ac. on island (private); 40 Ac. on west bank (private)	N/A
Open Water Impacts	2,550 LF	496 LF	300 LF	N/A
Distance to Port Terminal	1,000 ft.	5,500 ft.	3 miles	N/A
Fleeting Area Current	Yes; slow	No	Yes; slow	N/A
Fleeting Area Oxygenation	Floating aerators proposed	Floating aerators Proposed	Floating aerators proposed	N/A
Est. Maintenance Costs (yr.)	\$50,000	\$100,000	\$50,000	N/A
Est. Operational Costs (yr.)	\$130,000	\$182,000	\$260,000	N/A
Est. Capital Costs (yr.)	\$11,800,000	\$40,000,000	\$16,800,000	N/A

Table 2-2 Alternatives Screening Matrix

2.1.4.2 Alternative 2 - Former Verdigris River Channel (Preferred Alternative)

This alternative involves over-excavating the former Verdigris River channel, west of the Navigation Channel, south of the Bird Creek Cut-off, east of the former Bird Creek channel and north of the Burlington Northern Santa Fe Railroad (**Figure 2-3**). Under this alternative, the proposed BFA would be created by excavating the existing channel to a wider and deeper channel in the location of the former Verdigris River channel, immediately south and west of the Port's slack-water terminal channel at the confluence of the Bird Creek cut-off and Verdigris River, i.e., the beginning of the MKARNS.

The proposed BFA would have a 2,300-foot long, 300-foot wide toe-to-toe mooring area. A multi-cell box culvert would connect the former Bird Creek channel with the Fleeting Area, maintaining the current that exists through this area. This alternative is in close proximity to the existing Port terminal channel, thus reducing operating costs of fleeting barges compared to the more distant alternatives. Approximately, 3.6 acres of forested wetland would be excavated, 2,550 linear feet (LF) of jurisdictional open water would also be excavated and 1,900 LF of anticipated, non-jurisdictional open water would be filled in the BFFA under Alternative 2.

2.1.4.3 Alternative 3 - Former Private Terminal West of Bird Creek

This alternative is located within the undeveloped 500-acre parcel west of Bird Creek and south of the Port's industrial park (**Figure 2-4**). It would utilize a previously excavated slip that was constructed to be a private barge terminal. However, construction was halted after more rock excavation was required than funding allowed. This area sat abandoned for a number of years until the Port purchased the property several years ago. The existing slip is approximately 160 feet wide and 3,200 feet long. The west end of the slip is not dug to depth and would require deepening. The existing width allows two barges to be moored on one side and one on the other without additional widening. This leaves a 55-foot wide path of open water between the moored barges for towboat operations.

This alternative would require an access channel to be constructed within the Bird Creek Cutoff. Extensive bedrock exists within this area requiring significant blasting to deepen the channel within the bedrock to allow for towboat/barge operations between the east end of the cut-off and the mouth of the proposed fleeting area. In addition, 496 LF of anticipated, nonjurisdictional open water would be disturbed with this alternative.

Towboat operation would be difficult during high water events on Bird Creek with this alternative. The Port's towboats would need to execute a tight turn when entering or exiting

the Cut-off access channel. During high water events, this turn would be made more difficult due to increased velocities on Bird Creek. Although this alternative meets the project purpose and need, it provides less barge mooring space than the PA, does not provide the efficient movement or maneuvering of barges to and from the Port, and expenses associated with rock removal and disposal to deepen or widen the cut-off would be cost prohibitive. Therefore, this alternative was dismissed from consideration as a viable alternative.

2.1.4.4 Alternative 5 - Cut-off South of I-44 Bridge

Many river ports utilize cut-offs created by river re-routings, for safer and more efficient operations (**Figure 2-5**). Such a cut-off is located three miles downstream of the Port below the I-44 Bridge. The cut-off is of similar length as Alternative 2 (3,500 LF), and the excavation volume is anticipated to be similar as well. The fleeting area would be 300 feet wide toe-to-toe. An unnamed creek flows into the elbow of the cut-off. This creek would be routed into the fleeting area through a multi-cell box culvert and would result in a current running through the fleeting area. The relatively long distance from the Port's existing terminal basin under this alternative would increase operating costs.

As with Alternative 3, during high water events on the Verdigris River, the Port's towboat operators would have difficulties entering the cut-off fleeting area from the north due to the high river velocities. In addition, approximately 300 LF of open water would be disturbed with this alternative.

Although this alternative meets the project purpose and need, it was dismissed from consideration due to its distance from the Port and anticipated problems with barge maneuverability during high water events on the river.

2.2 Preferred Alternative

Alternative 2 was chosen as the PA due to its close proximity to the Port terminal and Navigation Channel. A discussion of proposed construction activities associated with the PA is provided below.

2.2.1 Fleeting Area Excavation

The BFA under the PA would be 2,300 feet long and 300 feet wide, with a depth of 12 feet below normal pool elevation 532.00 above mean sea level (abmsl). The BFA would have the capacity to store more than 60 barges, assuming the barges are the standard covered hopper barge size of 195 feet long by 35 feet wide. Barges would be moored three-abreast on both

sides of the BFA, with 90 feet of clear water between the moored barges to allow for towboat operations.

The BFA would be constructed with three-to-one grassed side slopes. Rock riprap would be placed on the side slopes from the BFA bottom to 10 feet above normal water surface elevation. A maintenance road at the top of the east bank would be constructed to an elevation of 582.00, and to 584.00 on the west bank. The Maximum Possible Flood elevation is 580.00 along this stretch of the Verdigris River. Mooring deadmen with cables would be installed high on the side slopes along each bank for the barges to be tied off to. The BFA Site Plan and Grading Plan for the PA are included in **Appendix A**.

It is estimated that there would be a total of approximately 1.55 million cubic yards of excavation; approximately 1.225 million cubic yards of this material would be hauled to the proposed BFFA. The remaining excavated material would be used to achieve the final grades desired for the BFA.

2.2.2 Temporary Haul Road

A temporary single span structure would be installed across the Bird Creek Cut-off to allow earth material to be transported from the BFA to the BFFA. The 90-foot long single span structure will have a clear width of approximately 14 feet. The location of the temporary structure was selected based upon the narrowest section of the Bird Creek Cut-off and will span the Cut-off approximately 70 feet between the rock walls of the channel. The bridge would be designed for HS20 vehicular traffic loads. Bridge abutments would be constructed of precast concrete blocks. The final design and selection of the temporary bridge structure and foundation will be the responsibility of the Contractor, under the final approval by the Port's Project engineer.

Once construction of the BFA has been completed, the temporary haul road would be removed, but the temporary Bird Creek Cut-off crossing would remain in place until a permanent vehicle bridge has been constructed. All disturbed areas would be restored to original grades and replanted with native vegetation in order to prevent erosion.

2.2.3 Excess Excavation Placement

The excess excavation would be hauled across the Bird Creek Cut-off, as described above, to the proposed BFFA. This area consists of approximately 292 acres on the north side of Bird Creek, south of the existing Port Industrial Park. Soil would be placed in eight-inch lifts and compacted to 90 percent of Standard Proctor density. The proposed Bird Creek North Grading

Plan is included in **Appendix A.** The excavated material would be graded to an elevation approximately one foot higher than the 100-year floodwater surface elevation, which ranges from 571.90 at the Burlington Northern Santa Fe – Bird Creek Bridge to 564.50 at the northeast corner of the proposed BFFA. The BFFA includes an open water feature that was been classified by Kleinfelder (**Appendix A**) as non-jurisdictional based on its lack of hydrologic connectivity to Waters of the United States. This classification would need to be confirmed with the USACE prior to its disturbance. However, should the USACE determine that the open water is jurisdictional, resulting in the open water being regulated by the USACE, additional sites would need to be considered and evaluated for the disposal of excess fill material. An alternatives' analysis would need to be performed that would address avoidance, minimization and compensation with regard to the disposal site selected.

3.0 EXISTING ENVIRONMENT

This chapter presents a summary of several analyses that were undertaken to identify existing conditions in the BFA and the BFFA, as well as potential mitigation areas. The BFA and BFFA study areas for this analysis are defined as shown in **Figure 1-1**. Data on wetlands, terrestrial ecology, and threatened and endangered (T&E) species at the BFA and BFFA were taken from reports prepared by Kleinfelder Central, Inc. in 2011 and 2012 (**Appendix A**). Data on archaeological resources were taken from reports prepared by Christopher A. Cojeen Archaeological Services, LCC (CAS) in 2010 and 2011, and in 2012 on the BFA and BFFA (**Appendix B**).

3.1 Geology and Soils

3.1.1 Geology

The BFA and BFFA study areas are located entirely within the Claremore Cuesta Plains Geomorphic province (within the Prairie Plains Physiographic Region), an area generally described as "resistant Pennsylvanian sandstones and limestone dipping gently westward, forming cuestas between broad shale plains" (Curtis, Jr., Ham and Johnson 2008). A cuesta is a ridge formed by gently tilted sedimentary rock strata with a steep cliff or escarpment on one side and a gentle dip or back slope on the other. This landform occurs in areas of tilted strata and is caused by the differential weathering and erosion of the hard capping layer and the soft underlying layer, which erodes more rapidly.

The bedrock consists predominantly of shale containing some thin-bedded to massive buff sandstone and beds of limestone. The bedrock deposits are of Pennsylvanian Age and underlie more recent alluvium deposits of sand, silt, clay and gravel associated with the floodplains and terrace deposits of streams.

A geotechnical study on the BFA site was performed in July 2011. Major strata encountered during subsurface exploration included native material of silty clay with varying amounts of sand and clay. Overburden depths ranged from 32 to 50 feet below existing ground surface. Shale and sandstone bedrock was encountered from 32 to 40 feet below the existing ground surface. Bedrock encountered consisted of highly weathered to weathered shale.

3.1.2 Soils

Soil types within the BFA and BFFA study areas were extracted from the Natural Resource Conservation Service (NRCS) Soil Data Mart. The soil map units described below are organized

by the county in which they are located. **Figure 3-1** depicts their location and extent within the study areas.

<u>BarG – Barge silty clay loam, 0 to 30 percent slopes.</u> This soil unit occurs on spoil banks dredged from rivers in long, narrow, convex ridges parallel to the stream. This unit consists of nearly level to steep, well-drained soils that formed in materials weathered from loamy alluvium of Pleistocene age. These soils have slow to rapid runoff, depending on the amount of compaction, age, amount of weathering, and slope with moderately slow permeability. These soils are located in the Cherokee Prairies and Arkansas Valley and Ridges. Slopes range from 0 to 30 percent.

<u>Os – Osage clay, 0 to 1 percent slopes, occasionally flooded.</u> This soil unit consists of very deep, poorly-drained, very slowly permeable soils that formed in thick clayey alluvium. These soils are poorly-drained with low to very low permeability. These soils are on found on floodplains along major streams and have slopes ranging from 0 to 1 percent.

<u>Vd – Verdigris silt loam, 0 to 1 percent slopes, occasionally flooded.</u> This soil unit consists of very deep, well-drained soils that formed in silty alluvium on floodplains in the Cherokee Prairies major land resource area. These soils are well-drained with negligible to very low runoff and permeability is classified as moderate. These soils are occasionally subject to flooding.

<u>Ve – Verdigris clay loam, 0 to 1 percent slopes, occasionally flooded.</u> This soil unit is similar to the Verdigris silt loam; however, it is subject to occasional flooding.

<u>Vf – Verdigris silty clay loam, 0 to 2 percent slopes, frequently flooded.</u> This soil unit is similar to the Verdigris silt loam; however, it is subject to frequent flooding.

3.2 Water Resources

3.2.1 Surface Water

The Verdigris River Basin covers approximately 4,400 square miles and encompasses all or parts of 11 counties in southeastern Kansas and six counties in northeastern Oklahoma. The Verdigris River is a tributary of the Arkansas River. The Arkansas River originates in central Colorado, where it flows southeast into and across Kansas before crossing into Oklahoma just south of Arkansas City. The main stem of the Verdigris River enters Oklahoma at the northeastern corner of Nowata County and flows in a south-southeasterly direction for about 135 miles to its junction with the Arkansas River near Muskogee, Oklahoma. Elevation ranges from 1,650 feet above mean sea level (MSL) at its headwaters in Kansas to 680 feet above MSL at the state line, to 385 feet above MSL where it meets the Arkansas River. Near the Town of Oologah, Oklahoma, the Verdigris River is dammed to form Lake Oologah, a major USACE flood control facility for eastern Oklahoma.

The Bird Creek Basin covers approximately 1,136 square miles and encompasses all or parts of five counties in northeastern Oklahoma. Bird Creek is tributary to the Verdigris River and originates in Osage County, flowing in a southeasterly direction before joining the Verdigris River in Rogers County, south of the Port terminal basin.

According to the 2010 Oklahoma Integrated Water Quality Report, both the Verdigris River and Bird Creek are classified as Category 5A waterbodies. Category 5A waterbodies do not attain water quality standards and are considered impaired or threatened for one or more designated uses by a pollutant(s).

The BFA study area includes a portion of the former channel of the Verdigris River, which was disconnected from the main river channel when a straighter, dredged connection to the Port was constructed in the early 1970s. This portion of the former river channel now consists of a shallow, silted-in side channel connected to the Bird Creek "Cut-off". There is little flow through this side channel, which is expected to continue to silt-in over time.

The larger BFFA study area borders the northern/western stream bank of Bird Creek. In addition, shallow-ponded surface waters associated with various delineated wetland areas are located within this parcel. Many of these ponded areas appear to have been created and/or enlarged by beaver dams, as further discussed in the report *Delineation of Potentially Jurisdictional Waterbodies Report, Evaluation of Historic Wetlands and Threatened and Endangered Species Potential Habitat* (Kleinfelder, 2011) (**Appendix A**).

3.2.2 Groundwater

The project site is located in the Cherokee Group Groundwater Basin located in northeast Oklahoma. Basin rock units are principally comprised of interbedded shale and sandstone with thin limestone stringers and thin beds of coal. Groundwater occurrence and availability in this unit is limited. Groundwater is also present in the overlying alluvium and terrace deposits that consist mainly of unconsolidated sand, silt, clay and gravel.

The geotechnical study performed in July 2011 encountered groundwater within the unconsolidated deposits between 10 and 42 feet below existing ground surface.

3.2.3 Floodplains

Bird Creek, which hydrologically connects the BFA and BFFA study areas, is a studied stream under the Federal Emergency Management Agency (FEMA). Portions of the two study areas are located within the 100-year floodplain of Bird Creek. **Figure 3-2** depicts the 100-year and 500-year floodplains of Bird Creek and the Verdigris River within the vicinity of the study areas. Activities in floodplains are regulated at the federal level pursuant to FEMA regulations.

3.2.4 Waters of the United States, including Wetlands

The US Fish and Wildlife Service (USFWS) maintains digital mapping, known as the National Wetlands Inventory, of the nation's wetlands and deepwater habitats. This mapping was prepared using high altitude imagery, supplementary information, and limited ground truth spot checks. The wetlands are classified according to "A Classification of Wetlands and Deepwater Habitats of the United States" by L. Cowardin. The NWI wetland types located within the study area are depicted on **Figure 3-3**. Since NWI mapping is not based on surveyed delineations, potential impacts to waters/wetlands in the BFA and BFFA were not assessed based on the location or extent of wetlands as depicted in that mapping. Instead, waters/wetlands in the BFA and BFFA were field delineated, as described below.

Waters of the United States and wetlands within the BFA and BFFA were delineated by Kleinfelder in December 2010 (BFFA and small portion of the BFA) and November 2011 (portion of BFA) in accordance with the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987). The 1987 Manual is the federal delineation manual used in the Clean Water Act Section 404 Regulatory Program for the identification and delineation of wetlands. The 1987 Manual has been updated through a series of Regional Supplements, Guidance Documents and Memoranda from the USACE. The *Draft Interim Regional Supplement*

to the Corps of Engineers Wetland Delineation Manual: Midwest Region is currently used for wetland delineations in northeastern Oklahoma.

The BFA contains nine potentially jurisdictional waterbodies. Of these nine jurisdictional waterbodies, three are jurisdictional wetlands and six are open water areas. The BFFA contains 12 waterbodies, one mapped, blue-line intermittent stream; three unmapped intermittent streams; two mapped wetlands; three unmapped wetlands; and two mapped ponds. Of these waterbodies, at least seven are anticipated to be potentially jurisdictional. **Figure 3-4** generally presents potentially jurisdictional waters on the BFA and BFFA study areas. Refer to **Appendix A** for a detailed breakdown of potentially jurisdictional wetlands and open waters within the project area. Wetlands and open waters within the study areas were delineated and mapped in the field.

3.3 Transportation

Transportation within the vicinity of the proposed project includes highway, rail and waterway transportation. Within the study area is Interstate 44 (I-44), US Highway 66 and Oklahoma State Highway 167 and 266. I-44 is a major link in the interstate highway network. Route 66 is a major collector highway and Routes 167 and 266 are primary arterial roadways. The study area is also served directly by the Burlington Northern/Santa Fe (BNSF) which provides freight rail service to the Port. The study area also lies at the head of the MKARNS. As part of the MKARNS, the Verdigris River provides barge traffic access to the Port Industrial Park.

3.4 Infrastructure and Utilities

The study area is currently vacant and undeveloped. There are no utilities or infrastructure located on either the BFA or the BFFA.

3.5 Land Use and Zoning

This section considers existing land use and zoning for areas potentially affected by the proposed project. The analysis includes assessments of existing land use, zoning, public policy, neighborhood character, community facilities (neighborhood institutions, such as schools, community centers, hospitals, etc.), open spaces and demographic characteristics.

Land Use refers to the activity that occurs on land and within the buildings and structures that occupy it. Types of land use include: residential; commercial; industrial; public and semi-public institutional; transportation, communications and utilities; open space; and vacant land. The zoning ordinance controls the use, density, and bulk (i.e., the size of the building in relation to

the size of the lot) of development within a municipality. A zoning ordinance is divided into two parts: zoning text and zoning maps. Text establishes zoning districts and sets forth the regulations governing land use and development in each district. Maps depict the location of the zoning districts.

3.5.1 Land Use

The project site is located in unincorporated Rogers County, Oklahoma. Immediately south of the project site, across the BNSF railway easement, is the City of Catoosa. The BFFA and the BFA are located within the Port property boundaries. Currently, both of these areas are undeveloped, although portions of the BFFA are used for agricultural purposes.

Land uses surrounding the project area are mixed. To the north of the project area is the Port Industrial Park and Terminal Basin. The Port is a master-planned industrial park and includes approximately 65 industrial companies and incorporates a mix of warehouse and industrial uses.

Directly south of the BFFA, and across the BNSF railway easement, is an undeveloped strip of land that has been identified by the City of Catoosa as Development Sensitive. Beyond this strip are residential neighborhoods. To the southeast is the City of Tulsa Wastewater Treatment Plant. A commercial area is located southwest of the project site along Route 167. To the west, along North 193rd East Avenue, is Fellowship Tabernacle, Sherwood Construction offices/yard, and private residences.

3.5.2 Zoning

Within Rogers County there are incorporated and unincorporated areas. Most of the study area is located within unincorporated Rogers County. However, there are some non-contiguous parcels in the southern portion of the study area that are in the incorporated City of Catoosa. The Rogers County Zoning Ordinance controls the zoning within the project area. The City of Catoosa controls the zoning located in the incorporated City of Catoosa. The four basic types of zoning districts are residential, commercial, agriculture and industrial. These basic categories can be further broken down (e.g., lower-, medium-, and higher-density residential; neighborhood commercial, highway commercial or office commercial; and light industrial or heavy industrial).

The study area includes 11 distinct zoning districts, as shown on Figure 3-5 and listed in Table 3-1.

Table 3-1

Rogers County Zoning Classifications

Zone	Classification	Definitions	
I-2	Industrial	Light Industrial	
I-3	Industrial	Medium Industrial	
I-4	Industrial	Heavy Industrial	
A-G	Agricultural	Agriculture	
A-I	Agricultural/Industrial	Agriculture likely to transition to industrial use	
A-R	Agricultural/Residential	Agriculture likely to transition to residential use	
C-4	Commercial	General Commercial	
RS-25	Residential	Residential Low Density	
RS-60	Residential	Residential Low Density	
RS-40	Residential	Residential Medium Density	
RST-40	Residential	Single Family Manufactured houses	

Source: Rogers County Planning Department, City of Catoosa Zoning Code

3.6 Socioeconomics and Environmental Justice

On February 11, 1994, President Clinton issued Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations (FR 1994). The Executive Order focused attention on Title VI of the Civil Rights Act of 1964 by providing that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations." It is the USACE's policy to fully comply with Executive Order 12898 by incorporating environmental justice concerns into decision-making processes. In this regard, the USACE ensures that it would identify, disclose, and respond to potential adverse social and

environmental impacts on minority and/or low-income populations within the area affected by a proposed USACE action.

A minority or low-income community or population is considered as any readily identifiable group of minority or low-income persons living in geographic proximity. A minority is classified by the U.S. Census as African-American, Hispanic-American, Asian- and Pacific-American, American Indian, Eskimo, or Aleut, and other non-Caucasian persons. A low-income community or population is classified as having a household income at or below the U.S. Department of Health and Human Services poverty guidelines.

Data from the 2010 Census on race and ethnicity within the study area was collected and analyzed. Population data is collected at census tract and block group level (**Table 3-2**). Five Census Block Groups are located within the study area, as identified below.

- Census tract 504.05, Block Group 1
- Census tract 504.06, Block Group 1
- Census tract 504.07, Block Group 1
- Census tract 504.08, Block Group 1
- Census tract 506.02, Block Group 1

According to the 2010 Census, a total of 13,645 persons resided within the census tracts located in these block groups. Almost 80% of the study area's population was White, while American Indian and Alaska Native comprised nearly 10%. Approximately 1% was Black or African-American. Asians also accounted for just 1% of the population in the study area. "Other" race groups comprised approximately 2% of the study area's population. Those who were two or more races comprised 6% of the population. Persons of Hispanic or Latino origin and who may be of any race were nearly 4% of the population.

Table 3-22010 Population and Race

	State of Ol	klahoma	Rogers	County	Study	y Area
Population	3,751,	351	86,9	905	13,	645
2010 Racial Characteristics of the Study Area	Number	Percent	Number	Percent	Number	Percent
White	2,706,845	72%	65,412	75%	10,891	80%
Minorities: Black or African American	277,644	7%	865	1%	117	1%
American Indian and Alaska Native	321,687	9%	11,382	13%	1,420	10%
Asian	65,076	2%	932	1%	146	1%
Native Hawaiian and Other Pacific Islander	4,369	0.1%	53	0.1%	1	0.1%
Other	154,409	4%	1,212	1%	232	2%
Population of two or more races	221,301	6%	7,046	8%	836	6%
Total Minority	1,044,506	28%	21,490	25%	2,752	20%
Hispanic (may be of any race)	332,007	9%	3,229	4%	519	4%

Source: 2010 US Census: Population and Housing

The distribution and frequency of minority and low-income populations within the study area is portrayed in **Table 3-3**. Overall, the minority population within the project area was below or similar to the state and county percentages.

Census Tract	Block Group	Population in Sample	Minority Population	Percentage of Minority	Persons of Hispanic Origin	Percentage of Hispanic
State of Oklahom a		3,751,351	1,044,506	28%	332,007	9%
Rogers County		86,905	21,490.00	25%	3,229	4%
504.05	1	3,033	427	14%	114	3%
504.06	1	2,263	313	14%	59	3%
504.07	1	2,354	577	25%	105	4%
504.08	1	3,002	801	27%	137	5%
506.02	1	2,993	636	21%	104	3%

Table 3-3Minority Populations within the Project Area

Source 2010 US Census Population and Housing

Poverty levels for the project area are reported only at the census tract level and are estimates based on the 2006-2010 American Community Survey. Only one census tract, Census Tract 504.08, had a percentage of the population with income below the poverty line, which was similar to or significantly higher than, the state, county or surrounding area as shown in **Table 3-4**.

Table 3-4
Population within Project Area with Incomes below Poverty Line

Census Tract	Population in Sample	Population with 2006-2010 Incomes Below The Poverty Line	Percent Below the Poverty Line
State of Oklahoma	3,559,437	577,247	16.2%
Rogers County	84,040	84,040	9.5%
504.05	3,782	310	8.2%
504.06	2,174	61	2.8%
504.07	2,173	36	1.7%
504.08	2,734	443	16.2%
506.02	2,772	152	5.5%

Source: U.S. Census Bureau, Census 2006-2010 American Community Survey

3.7 Hazardous Waste

3.7.1 EDR Database Search Results

An Environmental Data Resources, Inc. (EDR) database search conducted in March 2012 found no hazardous waste listings for the BFA/BFFA study areas. However, six properties were identified within one mile of the study area boundary and include:

- Agrico Chemical Co.
- Solvay Fluorides LLC
- OKG Bulkhandling, Inc.
- Steel and Pipe Supply
- Asphalt Technology

• BJ's Pit Stop

The six properties are discussed in the following sections.

Agrico Chemical Co., is located west of the Town of Verdigris, approximately 4,700 feet north and hydraulically up-gradient of the study area boundary. This site appears on the Comprehensive Environmental Response, Compensation, and Liability Information System - No Further Remedial Action Planned (CERCLIS-NFRAP), Correction Action Report (CORRACTS), and Resource Conservation and Recovery Act-Conditionally Exempt Small Quantity Generators (RCRA-CESQG) regulatory lists. Due to this site's distance from the study area boundary, the nature of the databases listed for the Agrico property and the information presented in the EDR Report, this CERCLIS-NFRAP, CORRACTS and RCRA-CESQG site does not pose an environmental concern to the property or the proposed BFA project.

Solvay Fluorides, LLC is located at 5010 North Skiatook Road and is approximately 1,200 feet up-gradient of the northern study area boundary. This site appears on the RCRA-CESQG, Toxic Chemical Release Inventory System (TRIS), and Facility Index Systems/Facility Registry System (FINDS) regulatory lists. Due to the site's distance from the study area boundary, the nature of the databases listed for the Solvay Fluorides, LLC property and the information presented in the EDR Report, this RCRA-CESQG, TRIS and FINDS, this site does not pose an environmental concern to the property or the proposed BFA project.

OKG Bulkhandling, Inc., located at 980 Fort Gibson Road, is approximately 1,000 feet upgradient of the study area boundary. This site appears on the Resource Conservation and Recovery Act-Non Generators (RCRA-NonGen) and FINDS regulatory lists. Due to the site's distance from the study area boundary, the nature of the databases listed for the OKG Bulkhandling, Inc. property and the information presented in the EDR Report, this RCRA-NonGen site does not pose an environmental concern to the property or the proposed BFA project.

Steel and Pipe Supply, located at 1003 and 1050 Fort Gibson Road, is approximately 1,000 feet up-gradient of the northern study area boundary. This site appears on the RCRA-NonGen, FINDS and Aboveground Storage Tank (AST) regulatory lists. Due to the site's distance from the study area boundary, the nature of the databases listed for the Steel and Pipe Supply property and the information presented in the EDR Report, this RCRA-NonGen, FINDS and AST site does not pose an environmental concern to the property or the proposed BFA project.

Asphalt Technology, located at 24606 South Highway 66, is approximately 1,800 feet downgradient of the study area boundary. This site appears on the BROWNFIELDS regulatory list. Due to the site's distance from the study area boundary, the nature of the databases listed for Asphalt Technology and the information presented in the EDR Report, this BROWNFIELDS site does not pose an environmental concern to the property or the proposed BFA project.

BJ's Pit Stop, located at 5500 SW Highway 66, is approximately 1,800 feet east and downgradient of the study area boundary. This site appears on the Leaking Underground Storage Tank (LUST), Underground Storage Tank (UST), and Historic-Leaking Underground Storage Tank (HIST LUST) regulatory lists. Due to the site's distance from the study area boundary, the nature of the databases listed for the BJ's Pit Stop property and the information presented in the EDR Report, this LUST, UST, and HIST LUST site does not pose an environmental concern to the property or the proposed BFA project.

3.7.2 Unmapped "Orphan" Sites

EDR listed 38 regulated/reported environmental sites that could not be mapped, due to poor or inadequate address information. These sites are known as "orphan" sites. After a review of the EDR orphan site list, it is the opinion of Dewberry that these sites do not pose an environmental concern to the subject property and the proposed BFA project based on their location and site type.

3.7.3 USEPA EnviroFacts

Dewberry searched the USEPA's online EnviroFacts database for information that may pertain to the environmental condition of the study area. A total of 17 sites were listed for zip code 74015 in Catoosa, Rogers County, Oklahoma. The listings were reviewed to determine the likelihood of potential impacts to the subject property. Based on a review of the information obtained from USEPA's online EnviroFacts database, there were no sites found to pose an environmental concern to the subject property and the proposed BFA project.

3.8 Air Quality

The U.S. Environmental Protection Agency (EPA) and the Oklahoma Department of Environmental Quality (ODEQ), regulate air quality in Oklahoma. The Clean Air Act (42 U.S.C. 7401–7671q), as amended, gives EPA the responsibility for establishing the primary and secondary National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50) that set accep**Table** concentration levels for six criteria pollutants: fine particulate matter (PM10), very fine particulate matter (PM2.5), sulfur dioxide, carbon monoxide, nitrous oxides (NOx), ozone (O3), and lead. Short-term standards (1-, 8-, and 24-hour periods) have been established for pollutants that contribute to acute health effects, while long-term standards (annual averages)

have been established for pollutants that contribute to chronic health effects. On the basis of the severity of the pollution problem, areas that do not attain the standards are categorized as marginal, moderate, serious, severe, or extreme.

Air quality in Oklahoma is measured and regulated by the Oklahoma Department of Environmental Quality (ODEQ) - Air Quality Division. Currently, the State of Oklahoma is in attainment of all National Ambient Air Quality Standards.

3.9 Noise

Noise is defined as unwanted or intrusive sound. Noise impacts on the human environment range from intensity levels that interfere with communication and daily activities to those that can cause adverse health effects. Noise levels naturally decrease as the receptor moves further away from the source. Noise sensitive receptors include residential areas in proximity to the BFFA and BFA, as well as the residential area and a church along North 193rd East Avenue.

No noise surveys have been conducted within the study area. Therefore, an evaluation of existing noise levels must be based on land usage. Noise generated in the project area is related to transportation uses such as highways, railroads and waterways and industrial uses within the Port terminal area. In general, land vehicles cause greater noise effects than waterway transportation. However, horns and whistles of waterway transportation vehicles generate the highest noise levels. The background noise resulting from the current level of activity at the Port, as well as from the heavy industrial businesses located within the industrial park, is substantial.

3.10 Biological Resources

3.10.1 Terrestrial Ecology

The Osage Cuestas ecoregion is an irregular to undulating plain that is underlain by interbedded, westward-dipping sandstone, shale, and limestone. East-facing cuestas and low hills are present. Topography is distinct from the nearby Flint Hills, Ozark Highlands, and Cherokee Plains ecoregions. Natural vegetation is mostly tallgrass prairie, but a mix of tallgrass prairie and oak—hickory forest is native to eastern areas. Overall, the mosaic of natural vegetation is unlike the neighboring Cross Timbers and Ozark Highlands ecoregions. Today, rangeland, cropland, riparian forests, and on rocky hills, oak woodland or oak forest occur; cropland is not as common as in the neighboring Cherokee Plains Ecoregion. (Woods et al, 2005).

Natural vegetation for this ecoregion consists mostly of tallgrass prairie (dominants: big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), and Indiangrass (*Sorghastrum nutans*), grading eastward into a mosaic of tallgrass prairie and oak–hickory forest; and on rocky hilltops, cross timbers (dominants: blackjack oak (*Quercus marilandica*), post oak (*Quercus stellata*), and little bluestem (*Sorghastrum nutans*)). Tallgrass prairie is native on deep loams derived from shale or limestone. Bottomland forests are native on floodplains and low terraces. Currently, on rocky hills, dry upland forest and woodland is found. Dry prairie composed of short and tall grasses occurs on shallow, gravelly soils of limestone scarps. In riparian areas are forests containing boxelder (*Acer negundo*), silver maple (*Acer saccharinum*), bur oak (*Quercus macrocarpa*), Shumard oak (*Quercus shumardii*), American elm (*Ulmus americana*), hackberry (*Celtis occidentalis*), pecan (*Carya illinoensis*), walnut (*Juglans sp.*), sycamore (*Platanus occidentalis*), and eastern cottonwood (*Populus deltoides*).

Land cover and land use for this ecoregion is a mosaic of rangeland, grassland, cropland, and especially in more rugged areas, woodland. Wooded riparian corridors occur on the wettest bottomlands. Wheat, soybeans, grain sorghum, and alfalfa hay are major crops. Livestock (especially cattle) farming is important. Strip mining for coal and oil production have degraded water quality in some streams (Woods et al., 2005).

On-site plant communities within the BFA and BFFA study areas are typical of the ecoregion discussed above, and include boxelder (*Acer negundo*), hackberry (*Celtis occidentalis*), silver maple (*Acer saccharinum*), black willow (*Salix nigra*), and cottonwood (*Populus deltoides*) as the dominant overstory species. Many of these species demonstrate significant damage from a severe ice storm in 2007. As such, there is a lot of downed woody material throughout the project area. The understory includes broadleaf uniola (*Chasmanthium latifolium*), poison ivy (*Toxicodendron radicans*), wild grape (*Vitis* sp.), and greenbrier (*Smilax bona-nox*). In cleared and/or sunnier areas of the project site, a monoculture of Johnson grass (*Sorghum halepense*) is present. In some places, the understory has been disrupted by feral hogs, especially in those areas along the toe of slope of the railroad right-of-way.

Wildlife species observed during field surveys within the project study area are summarized in **Table 3-5** below.

Common Name	Scientific Name			
Birds (Sibley, 2000)				
American Crow	Corvus brachyrhynchos			
American Goldfinch	Spinus tristis			
Belted Kingfisher	Ceryle alcyon			
Bewick's Wren	Thryomanes bewickii			
Blue Jay	Cyanocitta cristata			
Canada Goose	Branta canadensis			
Carolina Chickadee	Poecile carolinensis			
Cedar Waxwing	Bombycilla cedrorum			
Great Blue Heron	Ardea herodias			
Mallard	Anas platyrhynchos			
Northern Cardinal	Cardinalis cardinalis			
Pileated Woodpecker	Dryocopus pileatus			
Red-tailed Hawk	Buteo jamaicensis			
Tufted Titmouse	Baeolophus bicolor			
White Breasted Nuthatch	Sitta carolinensis			
Unidentified Ducks				
Unidentified Geese				
Mammals (Caire et al., 1989)				
American Beaver	Castor canadensis			
Eastern Cottontail	Sylvilagus floridanus			
Eastern Gray Squirrel	Sciurus carolinensis			
Nine-banded Armadillo	Dasyppus novemcinctus			
White-tailed Deer	Odocoileus virginianus			
Invertebrates				
Unidentified Crayfish				

Table 3-5Animal Species Observed within Project Study Area

3.10.2 Aquatic Ecology

Both the Verdigris River and Bird Creek are classified as warm water aquatic communities by the 2010 Oklahoma Integrated Water Quality Report. A warm water aquatic community is classified as a subcategory of the beneficial use category "Fish and Wildlife Propagation," where the water quality and habitat are adequate to support climax fish communities suitable for the full range of warm water benthos.

The aquatic resources within the MKARNS have undergone changes since the creation of the navigation channel. Prior to the construction of locks, dams and reservoirs within the MKARNS, the fish fauna were reported to have contained fewer and smaller sport fishes than currently assessed in the river (USACE, 2005). However, construction of the navigation system has resulted in increased occurrence of minimum flows, stabilized channel conditions and the creation of reservoirs that provide habitat for lake fishes, but limit habitat for native riverine species.

Monitoring and stocking programs of fisheries resources continue to be a cooperative effort between the USACE and state wildlife agencies. The focus has primarily been upon popular sport fish, such as largemouth bass, crappie, walleye, blue catfish, flathead catfish, white bass, and striped bass.

A survey for mussels within the MKARNS study area was undertaken in 2004 by Ecological Specialists, Inc. for the USACE. The purpose of the survey was to address impacts to freshwater mussels from dredging and dredge disposal associated with the widening and deepening of the navigational channel. In general, the study found that the MKARNS consists of a navigation channel with loose sand substrate, and channel borders that range from steep rip-rapped banks to extensive shallow mud flats. Mussel beds were primarily found in substrate consisting of a sand, silt, and clay mixture. Patches of mussels were found along the banks and in coves, with gently sloping banks. Mussels were absent from homogeneous substrate, such as the 100% sand in the channel and areas near the banks that contained a high percentage of silt. Overall, very few mussel beds were found within the MKARNS.

The conclusion of the freshwater mussel survey was that the MKARNS does not provide an abundance of habitat for mussels. All mussel species observed under this study were considered common species, and it was concluded that the river does not support a significant mussel community.

Prior to the construction of the MKARNS on the Verdigris River, the river contained a diverse assemblage of native mussels (Boeckman and Bidwell, 2008). Impoundments constructed on

the river have significantly altered the riverine system. The study performed by Boeckman and Bidwell involved the sampling of 31 locations along the Verdigris River to document the status of freshwater native mussels in Oklahoma following the introduction of the zebra mussel. The 2008 study sampled 31 sites (20 above Oologah Lake and 11 below) between July and October 2006. Sites below Oologah Lake were located from one to 25 km below the Oologah Lake dam. As the 2008 survey stated, habitat beyond this point in the vicinity of the Port was considered unsuitable due to dredging in the MKARNS Navigation Channel. Likewise, based upon the 2004 MKARNS survey, and findings of the 2008 Boeckman and Bidwell survey, it is unlikely that the shallow, muddy-bottomed, homogeneous substrate of Bird Creek or the former Verdigris River channel (i.e., proposed BFA) would provide viable habitat to support a mussel population.

3.10.3 Threatened and Endangered Species

State Listed Species

A data request for information on threatened and endangered (T&E) species within the study area was sent to the Oklahoma Natural Heritage Inventory Program (ONHIP). The response, dated January 27, 2011 (**Appendix C**), included information from the Natural Heritage Database on occurrences of any rare wildlife species or wildlife habitat within the study area. The only species listed for the study area was the Water Nymph Crayfish (*Orconectes nais*). The current State rank for this species is Unknown. Although little is known or documented about the Water Nymph Crayfish, general habitat requirements for crayfish species include flowing to non-flowing water in streams and ditches with mud or sand bottoms and an abundance of organic debris. Living/rooted vegetation is not a necessity.

Adequate data on the distribution and population size of Oklahoma crayfish is limited. However, a recent survey of the crayfish fauna has shown that the fauna distribution is not completely known. Since 1989, there have been four new records added that bring the total number of crayfish species in Oklahoma to 28. Additionally, an evaluation of museum species is contributing recent records for several rare crayfish, including most of the species living outside of caves that are identified as Oklahoma Wildlife Species of Greatest Conservation Need in the Comprehensive Wildlife Conservation Strategy. Identification of these specimens is very cost effective compared to additional field surveys and has yielded new records for species such as the Menae Crayfish, the Midget Crayfish, the Ouachita Mountain Crayfish and the Southwestern Creek Crayfish. There has been a gap in the crayfish data where current information such as this can now be used for conservation planning, allowing state rankings to be updated and proper management practices to be put into place. However, based on these records, these species of crayfish are not believed to be present within the study area.

Federally Listed Species

The list of federally listed species and designated critical habitat areas in Rogers County, Oklahoma was reviewed (USFWS, 2012). These sources were reviewed to determine if the proposed project has the potential for adverse impacts to listed species or their habitat. Based upon the habitat descriptions of those species that were indicated to occur in Rogers County, a qualitative comparison to the habitat present within the BFA and BFFA that could increase the potential for listed species to be present or adjacent to the proposed project was made during field reconnaissance efforts. The qualitative comparison was based upon regional and local ecological characteristics including soils, terrain, hydrology, and vegetation. The USFWS was not directly contacted. Notes were also taken on livestock grazing, development, pollution and other disturbances that could decrease the potential for listed species to be present, nave the potential to be present, or have been observed in the past in Rogers County.

Table 3-6 USFWS Listed and Protected Species Rogers County, Oklahoma

Common Name	Scientific Name	Federal Listing	Critical Habitat	
American Burying Beetle	Nicrophorus americanus	E	No	
Interior Least Tern	Sterna antillarum	E	No	
Piping Plover	Charadrius melodus	Т	No	
Whooping Crane	Grus americana	E	No	
Western Prairie Fringed Orchid	Platanthera praeclara	Т	No	
Arkansas Darter	Etheostoma cragini	С	No	
Neosho Mucket Mussel	Lampsilis rafinesaqueana	С	No	
Rabbitsfoot Mussel	Quadrula cylindrica	С	No	
Bald Eagle	Haliaeetus leucocephalus	DL*	No	
T = threatened, E = endangered, C = candidate, DL = delisted *Bald Eagle is protected under the Bald and Golden Eagle Protection Act				

Note: No critical habitat has been designated for the nine species listed above in Rogers County, Oklahoma (USFWS Critical Habitat Mapper)

During the field activities conducted by Kleinfelder in December 2010 and November 2011, the BFA and BFFA were evaluated for the potential presence of suitable habitat for threatened or endangered species. The presence of bald eagles has been documented in various downstream portions of the MKARNS, along the Verdigris River. The known presence of bald eagles along other parts of the navigation system indicates that they are not affected by barge traffic and/or

normal recreational boating activity as they nest, perch, or forage. The bald eagle prefers large trees or high perches along large waterways for both perching and nesting. Although some suitable roosting, nesting, and foraging habitat exists along Bird Creek and the MKARNS, no bald eagles or nests were observed during various site surveys conducted in 2009, 2010, and 2011. In addition, contact with the George Miksch Sutton Avian Research Center in Bartlesville, Oklahoma, in August 2012 confirmed that one inactive bald eagle nesting site is known to occur approximately four miles northeast of the Port and one active nest is approximately eight miles from the Port facilities. There are no known or mapped bald eagle nests in this area of the navigation system.

As discussed in detail in the Kleinfelder reports (**Appendix A**) suitable habitat may exist in the project area for the American Burying Beetle (ABB). The ABB is federally listed as endangered. This species is found in 22 counties in eastern Oklahoma. An additional six Oklahoma counties lie within the historic range of the ABB and two others have had unconfirmed sightings since 1992. This insect species is present on less than 10% of its original range. Mature forest is its preferred natural habitat, but it can be found in hedgerows, grasslands, and shrublands. This scavenger needs small vertebrates (from 50-200 grams in size) to feed upon. Habitat requirements for the ABB include areas with loose, well-drained soils with a well-formed litter layer from oak-hickory and oak-pine forests, as well as open native grassland and open native fields along forest edges. According to the USFWS, pastures where native grasses have been displaced by cultivation of Bermuda grass (*Cynodon dactylon*) are not expected to support the ABB. There is no Critical Habitat designated for the ABB in Rogers County (USFWS, 1991).

Portions of the study areas have potentially suitable habitat for the ABB, excluding the developed urban areas and gravel areas of the existing BNSF Right-of-Way. There are approximately 49 acres (Kleinfelder, 2011) and 130 acres (Kleinfelder, 2012) of forested and upland grassland plant communities that provide potentially suitable ABB habitat within the BFFA and BFA, respectively.

Suitable habitat does not exist within the project limits to support the remainder of the species listed in **Table 3-6**.

3.11 Cultural Resources

As no historic architectural resources are located within the viewshed of the project area, the cultural resources study was limited to the assessment of archaeological resources. The summary provided in this section is based on the findings of two archaeological surveys

conducted by Cojeen Archaeological Services, LCC (CAS), prepared as part of the proposed project (CAS 2010, 2011) studies.

As part of this analysis, an Area of Potential Effects (APE) was defined and historic properties within the APE that are listed in or potentially eligible for listing in the National Register of Historic Places (National Register) were identified. An APE is defined as a location potentially impacted by construction (physical effect) or that may experience effects once construction is completed (contextual effect). An APE is defined in 36 CFR Part 800.16(d) as:

the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

The APE for archaeological resources includes all areas of proposed ground disturbance. Such impacts associated with the proposed project include subterranean disturbances, excess excavation, and dredging, new barge fleeting areas, installation of rock riprap on the side slopes, and installation of a temporary gravel-surfaced haul road.

In order to assist in identifying known or potential historic properties that may exist within the APE, archival research was conducted at the Oklahoma Archeological Survey (OAS), University of Oklahoma, Norman, Oklahoma and the Rogers County Court House, Claremore, Oklahoma. In addition, early and mid-20th century maps, as well as mid-to-late-20th century and current aerial Photographs were examined for structures, trails and roads in the APE. General Land Office (GLO) plat maps of the APE were also examined, including the original survey dated 04/09/1898 (survey completed 07/03/1896) (Bureau of Land Management 2008). Also consulted were the Oklahoma Historic Preservation Office (SHPO) files on properties determined eligible for listing in the National Register. No properties listed in or determined eligible for listing in the National Register (i.e., Oklahoma SHPO Determinations of Eligibility listings, October 2009, supplemental listing April 2010) are located within the APE.

In order to identify archaeological resources in the APE, two archaeological surveys were conducted as part of this project (CAS 2010, 2011). In November 2010, CAS conducted a preliminary archaeological site assessment of an approximately 30-acre study area on Tulsa Port Authority lands located in portions of the NE/4 of Sections 17 T20N, R15E, Rogers County, Oklahoma. The approximately 30 acres of land area studied represents the portion of the footprint of proposed impact on the east bank of Bird Creek. In November and December 2011,

CAS conducted an additional archaeological assessment of an approximately 115-acre study area, on USACE and Port lands located in portions of Sections 8, 16 and 17 T20N, R15E, Rogers County, Oklahoma.

Survey methodology began with pedestrian reconnaissance transects of no more than 50-foot interval spacing. Surface inspections were aimed at identifying any previously documented potential historic and prehistoric archaeological resources and locating surface indications that would suggest the presence of unidentified historic properties. Areas of proposed ground disturbance were visually inspected and focused on the topography and whether landscape modifications and construction activities may have destroyed areas with a high potential to contain significant resources and cause changes in the character or use of historic properties. Maps of previously recorded historic and prehistoric archaeological sites were consulted prior to the site visits. Surface inspection was augmented by hand dug shovel tests of no more than 50-foot intervals in lower visibility settings in an attempt to locate archaeological resources. Matrix was screened through one-quarter inch screen mesh, excavated to between 30 and 70 centimeters (cm). In addition to the archaeological shovel testing, two soil cores placed in relatively intact portions of the APE were examined by a geomorphologist to identify possible intact buried soil horizons.

3.12 Previously Identified Archaeological Sites

No previously recorded prehistoric and/or historic-period archaeological sites are located within the APE, according to the maps, files, and reports held by OAS in Norman, Oklahoma. One previously identified prehistoric archaeological site, Site 34RO345, is located within one-quarter-mile south of the study area and is discussed below.

Prehistoric Site 34RO345 is an unassigned prehistoric camp recorded during a cultural resources survey for the nine-acre dredging project located along Spunky Creek. Artifacts recovered from the site include small pieces of fired clay, four bifaces, three unifaces, two pieces of fire-cracked rock, and 691 fragments of debitage. The recorder noted the possibility for intact site stratigraphy is high. National Register status of this site was not assessed.

3.13 Archaeological Field Results

As discussed earlier, in order to identify archaeological resources in the APE, two archaeological surveys were conducted as part of this project (CAS 2010, 2011). A total of 123 shovel tests was excavated as part of these studies. Of these, 102 shovel tests were excavated as part of the 115-acre tract and 21 shovel tests were excavated as part of the 30-acre tract. The

investigations revealed two historic-period archaeological sites and three isolated occurrences of artifacts (IO). These include Site 34RO343 and Site 34RO347.

Site 34RO343 is the remains of a mid-20th century farmstead located on a terrace overlooking the Verdigris River channel to the west. Features observed at the site include a concrete block house foundation (Feature 1), a poured cement cellar (Feature 2), two 12 inch (30 cm) cement circular casings (Feature 3), a possible water well represented by a metal pipe set in concrete (Feature 4), and two rectangular poured cement stem wall foundations (Feature 5). The five features and associated artifacts were observed on the surface in a moderately wooded setting over a 360x215 feet area with leaf litter and sparse understory showing 40-50% visibility. The 1942, 1958 and 1964 aerial Photographs show three discernible standing structures. The farmstead is extant on the 1972 aerial Photograph.

Based on the lack of archaeological integrity of the artifacts (a mixture of flotsam, modern dumping activity and occupation-related debris) and the poor condition of the features, the site does not appear to be eligible under Criterion C or D of the National Register. A records check of the NE/NE of Section 17 T20N, R15E did not suggest association with an event or important persons. Therefore, this site does not appear to be eligible under Criterion for 34RO343 is recommended.

Site 34RO347 is the remains of a concrete block outbuilding of unknown function. The roof and upper portions of the walls are missing leaving a rectangular stem wall approximately five feet tall. Two railroad ties intersect the center of the outbuilding and protrude from the east side. Approximately 10 feet west of the feature is a six-inch metal pipe with a hook on top that appears to have held a pulley. Push piles of cleared timber and dirt are evident surrounding the structure and adjacent to the two-track road trending generally north-south through the site area. Sheet metal, steel cable and concrete fragments were noted in push piles north, south and west of the outbuilding. Modern debris including glass and aluminum food containers, aluminum cans and plastic bottles were also observed on the surface and in the push piles surrounding the structure.

Aerial Photographs from 1942, 1958 and 1964 show two to three structures in the approximate location of Site 34RO347. The 1972 aerial Photograph shows the terrace where the site area was once located transformed to a peninsula with the construction of the Bird Creek cut-off, cleared of all vegetation with dredge soil dumped on the surface. A single structure, what appears to be the concrete block outbuilding, is visible in the site area on the 1972 aerial Photograph. However the resolution of the Photograph is not sufficient to determine if the structure is intact.

Based on the poor condition of the outbuilding and lack of archaeological integrity of the artifacts, Site 34RO347 does not appear to be eligible under Criterion C or D of the National Register. An initial records check of the NE/NE of Section 17 T20N, R15E revealed no association with significant events or persons, therefore this site does not appear to be eligible under Criterion A or B of the National Register. No further archeological investigation for Site 34RO347 is recommended.

Additionally, three IOs were located. IOs by their isolated nature are not considered National Register-eligible resources, and no further archeological concern is warranted for the identified IOs.

Scott Fine, Oklahoma State University PhD candidate under Brian Carter, examined two soil cores. Both showed weak soil structure, accumulating from an alluvial setting. Because of the weak soil structures and alluvial nature of deposition (thin deposits) confidence in plant remains for C-14 dating was low and was not utilized as a field method. Moreover, no artifacts or evidence of human occupation was observed in the cores.

3.14 Aesthetics and Scenic Resources

Aesthetics is a personal and subjective evaluation of a visual scene, and is difficult to quantify. Rogers County is predominantly agricultural with other land uses including residential, industrial, and recreational areas. Route 66 and Route 167 are roadways that are generally at grade, with trees adjacent to the road, which obscures an observer's view of the study area. Views from the Route 66 Bridge over the Verdigris River are also obscured by the adjacent railway and mature tree canopy.

4.0 POTENTIAL IMPACTS AND PROPOSED MITIGATION FOR THE PROPOSED ACTION

This section describes what, if any, impacts to resources described in Section 3.0 are anticipated based on the lease of the USACE property with the proposed improvements, as well as the No Action Alternative. If applicable, cumulative impacts are also discussed. A brief discussion of the threshold used to determine what, if any, potential impacts may occur based on the proposed improvements also is provided for each resource. In addition, a discussion of compensatory mitigation for open waters, wetlands and terrestrial impacts are discussed under Sections 4.2.1.1, 4.2.1.4 and 4.10.1.1, respectively, which are impacted resources requiring mitigation. With regard to the lease action, land use and socioeconomics are the two resources identified as impacted resources. No other impacts are anticipated with regard to the lease action on remaining resources, such as geology, water resources, transportation, infrastructure/utilities, zoning, environmental justice, hazardous waste, air quality, noise, biological resources, cultural resources or aesthetics/scenic resources.

4.1 Geology and Soils

4.1.1 Preferred Alternative

Construction Impacts

Under the PA, soils, and at depth, weathered bedrock, would be excavated along the former Verdigris River channel to create a 2,300-foot long, 300-foot wide, 14-foot deep open water area for barge storage. It is estimated that there would be a total of approximately 1.55 million cubic yards of excavation; approximately 1.225 million cubic yards of this material would be hauled to the proposed BFFA, located across Bird Creek from the BFA. The remaining excavated material would be re-used within the BFA as on-site grading material. This would result in short-term impacts to native soils from creating unstable conditions through desiccation, excavation, movement, re-grading and stockpiling, and minor long term impacts to soils from a slight increase in barge traffic, resulting in sediment suspension, after completion of the project.

Consideration during construction must be given to the instability of the native materials once subjected to vegetation stripping/grubbing, drying, transporting, compacting and re-grading. Best management practices (BMPs) would be implemented based on the moisture content of the soils, and appropriate stabilization techniques employed to ensure their stability for re-use on site in berms or fill areas in the BFFA. BMPs outlined in the proposed project's Stormwater Pollution Prevention Plan (SWP3) would be strictly adhered to, to ensure proper use and grading of excavated material.

Reuse of the excavated material in the upland BFFA is anticipated to have a minor direct, longterm effect on the soils and topography of the BFFA. Erosion and compaction would occur from reuse and grading activities. Runoff and erosion would be minimized during reuse/grading by use of BMPs. Excavated saturated material will be allowed to dry out adjacent to the BFA excavation within temporarily diked areas. Once the material is considered dried and compaction-ready, excavated material will be moved over to the BFFA for final grading. The addition of excavated material to the BFFA would serve to raise the elevation of the reuse site.

Operational Impacts

Once constructed, impacts to geology and soils are not anticipated. Maintenance dredging of the fleeting area would be required to maintain appropriate depths for operations. BMPs would be employed to ensure proper handling and disposal of dredge material.

4.1.2 No Action Alternative

Without construction of the BFA/BFFA, geology and soils would remain unchanged. There would be no impact to geology or soils.

- 4.2 Water Resources
 - 4.2.1 Preferred Alternative
 - 4.2.1.1 Surface Water

Construction Impacts

Surface water and local drainage patterns would be interrupted during the construction stage of the BFA. During construction, blocking/damming of the former channels of the Verdigris River and Bird Creek from the Bird Creek Cut-off would temporarily discontinue the minimal flows currently traveling through these connected waterways. Upon completion of construction, the blocks/dams would be removed and flow would be restored through the new BFA and the former Bird Creek channel via a culvert that would be installed to connect the proposed BFA with the former Bird Creek channel to maintain a connection between these two waterbodies.

Within the BFFA, 1,900 LF of the total 3,300 LF of non-jurisdictional open water will be filled as part of this project. BMPs, such as grass-lined channels, ditch checks, sediment basins and soil curtains, will be constructed and installed to minimize sediment intrusion and particle suspension in the remaining, adjacent non-jurisdictional open water area within the BFFA.

Vegetation clearing and berm installation would create cleared areas susceptible to minor erosion, thereby potentially contributing to siltation and turbidity within the former channels of the Verdigris River and Bird Creek. However, minimal impacts to the adjacent Verdigris River and Bird Creek are anticipated due to the temporary blocking / damming of the two former channels during construction and utilization of BMPs. BMPs envisioned include silt fence, fiber rolls and / or brush barriers along the waters' edge and at the toe of downhill slopes during clearing & grubbing and rough grading activities; sediment traps for areas draining 5 acres or less; mulching, mulching mats, compost blankets, geotextile fabrics, soil roughening, and / or slope diversions to control erosion on slopes following completion of rough grading operations; water wagon or truck dispersion of water for dust control; and finally restoration / revegetation of constructed grades using native trees, plants and grasses to permanently control erosion.

Operational Impacts

Surface water flow would continue through the BFA, which would be hydrologically connected to both the former channel of Bird Creek (via proposed culvert), as well as to the Bird Creek Cut-off, maintaining the previous drainage patterns and flow. The normal pool elevation for the Verdigris River is elevation 532.0 feet above (MSL), which would be maintained within the BFA for fleeting operations. Periodic maintenance dredging of the BFA would increase turbidity and would add to the normal silt load of the river. Towboat activities in the BFA, in the Bird Creek Cut-off and Verdigris River, could also cause turbidity from propeller wash. However, the median 14-foot depth of the channel will likely not be disturbed by the 8.5-foot draft of the towboat. In addition, empty barges would be stored within the BFA with less draft than the towboats positioning the barges. Therefore, no impacts to surface waters resulting from the operation of the BFA are anticipated with the project.

4.2.1.2 Groundwater

Construction Impacts

Based upon the depth to groundwater and proposed excavation depths for the project, it is not anticipated that groundwater would be intercepted or disturbed during project construction. No pumping of groundwater is proposed during construction of the project. Groundwater may discharge into the BFA during high rainfall events; however, dewatering of the disturbance area would address any increased flows into the excavation as part of BMPs to be employed during construction activities. Therefore, no impacts are anticipated to groundwater resources.

Operational Impacts

Operations at the BFA do not require groundwater pumping. No impacts are anticipated related to the operation of the BFA.

4.2.1.3 Floodplains

Construction Impacts

Bird Creek, which hydrologically connects the BFA and BFFA study areas, is a studied stream under FEMA. Portions of the two study areas are located within the 100-year floodplain of Bird Creek. Activities in floodplains are regulated at the federal level pursuant to FEMA regulation Executive Order 11988. The goal of this project with regard to floodplain impacts is to achieve a "no rise" increase to the 100-year floodplain elevation of those floodplain areas within the vicinity of the project. A "No Rise" Certification is being prepared as part of this project by an Oklahoma professional engineer.

Operational Impacts

No impacts to floodplains are anticipated with the operation of the BFA.

4.2.1.4 Waters of the United States, including Wetlands

Construction Impacts

According to Section 404 of the Clean Water Act (CWA) of 1972, work (dredging) within navigable waters and the placement of fill material into Waters, including intermittent streams and wetlands, requires authorization by the USACE (EPA, 1972). The type of authorization (e.g., individual permit, nationwide permit, regional permit, or letter of permission from the District Engineer) depends on the acreage, volume, linear distance along a stream course, and purpose of the activity.

Project area disturbance would result in 3.6 acres of wetland impacts, open water impacts, including 2,550 LF (5.7 acres) of jurisdictional open water excavation, and 1,900 LF (6.5 acres) of non-jurisdictional man-made linear pond elimination by filling. In addition, 774 LF (0.4 acres) of minor jurisdictional waters draining to the Bird Creek Cut-off will be filled with the project. Refer to **Figure 4-1** for project area impacts. It is anticipated that the project would be permitted under an Individual Permit, pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899.

In preparation for submission of USACE permits, a mitigation site search was conducted to address the need for compensatory wetland mitigation for project impacts to waters/wetlands that would result from the proposed project. Impacts to all waters/wetlands would be mitigated in accordance with the USACE's 2008 Mitigation Rules and the USACE Tulsa District's October 2004 Aquatic Resource Mitigation and Monitoring Guidelines.

The following provides details of a potential site identified during the mitigation site search. A 115 acre site was identified that fronts the Verdigris River channel to the south, agricultural fields to the west, Highway 266 to the north, and a commercial development to the east (**Figure 4-2**). An improved pasture, located along the river, makes up the approximate southern half of the property, while the northern half contains a mixture of bottomland forest, intermittent streams, upland areas, and constructed ponds. Wetland delineation activities identified approximately 71.01 acres of potentially jurisdictional Waters onsite (0.40 acres of streams, 4.87 acres of ponds and 65.74 acres of forested/emergent wetland). Based on observed site conditions, there are opportunities for enhancing the existing jurisdictional waters onsite by removing non-native species, converting the man-made pond back to bottomland hardwood, and converting the improved pasture to native grassland. With the establishment of a conservation restriction, this native grassland would then function as a protective buffer for the to-be-enhanced wetlands.

In addition, to supplement the potential mitigation site described above, mitigation to compensate for unavoidable impacts to jurisdictional waters resulting from the construction of the BFA, the Port is also considering the enhancement and/or creation of aquatic resources in the immediate vicinity of the BFFA (**Figure 4-1**). Preliminary mitigation plans would be provided as part of the permit application for all mitigation proposed to off-set project impacts.

Operational Impacts

Once construction is completed, no additional impacts to wetlands or open waters are anticipated with the operation of the BFA.

4.2.2 No Action Alternative

Surface waters, groundwater, floodplains and wetlands/waters of the United States located in and adjacent to the former channels of the Verdigris River and Bird Creek and on the BFA/BFFA would remain undisturbed. There would be no impact to surface waters, groundwater, floodplains or wetlands/waters of the United States under the No Action Alternative.

4.3 Transportation

4.3.1 Preferred Alternative

Once completed, the proposed project is not expected to significantly increase vehicular traffic on the local roadway, rail or waterway network. During construction there may be a short-term increase in truck and vehicular traffic at the site; however, this would be a temporary impact.

4.3.2 No Action Alternative

Under the No-Action Alternative, the proposed barge fleeting area improvements would not occur and the existing facility will remain in its current condition. Specifically, the Port facility will not be able to efficiently handle the increased number of barges that it has experienced, especially during high water events.

4.4 Infrastructure and Utilities

4.4.1 Preferred Alternative

The study area does not currently include any infrastructure and utilities. Under the proposed project, the former channel of the Verdigris River and the mouth of Bird Creek Cut-off would be widened to provide additional docking area for barges, especially during high water events. The barges are not motorized and do not require utility connections. During construction, it is anticipated that the contractor will place a temporary office trailer(s) at the construction yard. These trailers will require utilities (i.e., electric, telephone, etc.). Following construction, the office trailer(s) and temporary utility services will be removed.

4.4.2 No Action Alternative

Under the No Action Alternative, the proposed barge fleeting area improvements would not occur and the existing facility will remain in its current condition. Specifically, the Port facility will not be able to efficiently handle the increased number of barges that it has experienced, especially during high water events.

4.5 Land Use and Zoning

4.5.1 Preferred Alternative

No significant land use impacts are anticipated following completion of construction. At the BFFA, the land use would change from agricultural use to industrial development. At the BFA, with the lease of the Corps property to the Port, land use would change from undeveloped to

waterway. Because of the proximity of the project area to the Port Industrial Park and the project area's relative distance from residential areas, no significant impacts to surrounding areas are expected. Regarding zoning, the underlying zoning of this area would also remain unchanged and no significant impacts are anticipated.

The proposed improvements would offer numerous benefits by creating a more efficient movement of goods through the Port and surrounding region.

4.5.2 No Action Alternative

For the No Action Alternative, the land use and zoning would remain unchanged and as a result, no impacts would occur.

4.6 Socioeconomics and Environmental Justice

To determine socioeconomic impacts, the USACE property lease and the proposed improvements were evaluated in relation to job creation and community cohesion. For EJ populations, census data was collected from the census block group level that encompasses the project area and then compared to the surrounding community, as well as to the entire State of Oklahoma.

4.6.1 Preferred Alternative

During construction of the proposed improvements, jobs would be created, thereby benefiting the local economy. It is expected that local or regional construction contractors would be utilized for these improvements and they would in turn spend their money in and around the local and regional area.

In addition, the USACE lease of the property to the Port and the proposed improvements would allow the Port to accommodate an increase in barge traffic resulting from the current expansion of the Panama Canal. Once the canal is widened, mega-container ships can reach Gulf of Mexico ports such as Mobile, New Orleans and Galveston. The Port would then become an important multi-modal component in the distribution of goods and services in and out of these regional ports. This added activity would in turn have a positive impact on the local economy.

The lease and subsequent implementation of the proposed improvements would create an opportunity for future business expansion within the Port creating new jobs and having a positive impact on the local economy.

There are no acquisitions of private land. All improvements would be constructed on land leased to the Port from the USACE. No minorities or low income populations would be disproportionately impacted by the proposed improvements.

4.6.2 No Action Alternative

Under the No Action Alternative, there would be no impacts to socioeconomic resources or EJ populations. There would be no land acquisitions and no minorities or low income populations would be disproportionately impacted.

4.7 Hazardous Waste

To determine potential hazardous material and waste impacts, the proposed improvements were evaluated relative to existing conditions at the site. Particular attention was paid to the area of proposed ground disturbance and excavation.

4.7.1 Preferred Alternative

Under the PA, soils in the BFA would be excavated to the required depth to accommodate barges and towboat drafts. Reuse and grading of excavated materials in the BFFA would bury existing soils at that location. Properties identified within the one-mile radius search for hazardous materials/wastes are not located within the disturbance area and do not pose an environmental concern for the project. Therefore, no impact is anticipated.

4.7.2 No Action Alternative

The No Action Alternative would leave the ground surface undisturbed. No impact related to hazardous materials and waste would occur.

4.8 Air Quality

4.8.1 Preferred Alternative

There would be minor, temporary adverse impacts to air quality as a result of exhaust emissions from the dredge equipment and any associated machinery, vessels, and vehicles associated with the construction of the PA. Criteria air pollutant emissions resulting from diesel fuel combustion include nitrogen dioxides (NO₂), sulfur dioxide (SO₂), carbon monoxide (CO), volatile organic compounds (VOCs), and particulate matter (PM10/PM2.5). After construction, air pollutant emissions are expected to be no more than the No Action Alternative because the USACE will continue to perform maintenance dredging in the navigation channel, and to the Port in its Terminal Basin. Minor additional long-term emissions also would be generated by the increased towboat operations in the BFA. However, since the State of Oklahoma is in attainment for all criteria air pollutants at this time, air quality impacts during construction and operation of the BFA are expected to be minor and would not affect overall air quality in the region.

4.8.2 No Action Alternative

Under the No Action Alternative, the proposed project would not occur and the existing facility would remain in its current condition; barge storage would continue to be handled in the Port's Terminal Basin, and the BFA / BFFA would remain undisturbed, and there would be no temporary impacts to air quality.

4.9 Noise

4.9.1 Preferred Alternative

The background noise resulting from the current level of activity at the Port, including the heavy industrial businesses located within the Port Industrial Park, is substantial. Noise generated by the machinery necessary to perform earthwork associated with the BFA and BFFA, would temporarily increase noise levels in the area. However, due to the relative remoteness of the area and the short construction period, this would only have minimal effects. In addition, Rogers County does not have a noise ordinance. As a result, no noticeable changes to noise levels from the construction or operation of the proposed project are anticipated.

4.9.2 No Action Alternative

Without construction of the BFA/BFFA, current noise levels would remain unchanged.

4.10 Biological Resources

The project study area is host to a variety of biological resources, including terrestrial habitat and biota, aquatic habitats and biota, and potential for federally threatened and endangered species. The principal impacts to biological resources would result from construction activities.

4.10.1 Preferred Alternative

4.10.1.1 Terrestrial Ecology

Construction Impacts

Approximately 37 acres of mature forest would be cleared for the project. The densest portion of forest which would be cleared is located within the BFA construction area. Approximately 66

acres of sparse, mixed scrub-shrub area would be cleared along the construction access road and within the BFFA. Approximately 3.6 acres of forested wetland would be cleared with the proposed project. Upon completion of construction within the BFA, berms would be seeded with an appropriate grass mixture and maintained periodically through mowing.

Clearing of forest and the conversion of forested area to mowed turf would permanently disrupt the normal nesting, feeding and foraging habits of terrestrial wildlife currently utilizing the BFA and BFFA sites. Those species displaced would likely move to undisturbed forest adjacent to the site. Therefore, no significant impact is anticipated for displaced species.

Impacts to 26 acres of mature forest within the upland riparian zone of the former Verdigris River channel will require compensatory mitigation at a minimum ratio of one-to-one acres replaced to acres removed. In order to mitigate for impacts to the upland riparian zone, the Port of Catoosa will prepare an enforceable mitigation plan in consultation with the USACE that will address not only aquatic resources but also riparian/upland resources impacted by BFA project construction. In addition to avoidance and minimization, the Port will provide compensatory mitigation with a primary goal to compensate for impacts resulting from the clearing of approximately 26 acres of hardwood forest as well as impacts to the waterways during the construction of the proposed BFA (**See Figures 4-1, 4-2 and 4-3**). No managed grasslands exist within the BFA or BFFA project area, therefore none will be impacted requiring mitigation.

Operational Impacts

No impacts are anticipated with the operation of the BFA.

4.10.1.2 Aquatic Ecology

Construction Impacts

Dewatering and excavation of the former channel of the Verdigris River would destroy nesting, feeding and resting areas utilized by aquatic species. However, the channel is largely silted in with minimal flow due to the prior "construction" of the Bird Creek Cut-off. There is little quality habitat available to support a diverse, high quality population of aquatic species, as noted in Section 3.10 of this report. Therefore, impacts associated with the excavation of this former river channel are considered to be minor, with negligible impacts anticipated to species currently utilizing the channel.

Operational Impacts

Upon completion of the excavation and establishment of the pool elevation, aquatic species accustomed to activities associated with fleeting barges would adapt to post-construction conditions. Therefore, no impacts as a result of operations are anticipated.

4.10.1.3 Threatened and Endangered Species

Construction Impacts

Although some suitable habitat for roosting, nesting, and foraging exists along Bird Creek and the MKARNS, no bald eagles or nests were observed during various site surveys conducted by the Port consultants and the USACE in 2009, 2010, and 2011. Furthermore, contact with the GM Sutton Avian Research Center in Bartlesville, Oklahoma, in August 2012, confirmed that one inactive bald eagle nesting site is known to occur approximately four miles northeast of the Port and one active nest is mapped approximately eight miles from the Port facilities. There are no known or mapped bald eagle nests in the study area. Should bald eagles be encountered during construction of the proposed BFA and BFFA, construction would be temporarily suspended, pending coordination with the USFWS to determine the necessary protocols to avoid impacts to this species. At this time, the USACE has determined that the proposed project should have no effect on the bald eagle.

The ABB is the only federally-protected threatened and endangered species potentially inhabiting portions of the site. As such, an ABB presence/absence survey would be undertaken in accordance with the published ABB protocols to determine the presence/absence of the ABB within the proposed construction areas. Upon completion of the study, results would be supplied to the pertinent agencies for review. Should the ABB be found in the proposed project area, a formal consultation process with the USFWS would be initiated prior to construction. Until the results of the presence/absence survey are known, the USACE cannot make a determination regarding the potential impact of the proposed project on the ABB.

The USACE has determined that the proposed project should have no effect on the Neosho mucket mussel, the Rabbitsfoot mussel, the Arkansas darter, the Interior least tern, the piping plover, the whooping crane, and/or the western prairie fringed orchid. No suitable habitat for any of these species was observed within the study area.

Operational Impacts

No impacts to threatened and endangered species are anticipated with the operation of the BFA.

4.10.2 No Action Alternative

Terrestrial habitats, aquatic resources and potential habitat for the ABB located either adjacent to, or in the vicinity of, the former channel of the Verdigris River and on the BFA/BFFA would remain undisturbed. Therefore, no impacts are anticipated.

4.11 Cultural Resources

4.11.1 Preferred Alternative

No properties listed in or determined eligible for listing in the National Register are located in the APE. Based on the findings of the archaeological surveys conducted for the proposed project, no additional study is warranted. As a result, no impact to cultural resources is expected as no historic properties are located within the APE.

4.11.2 No Action Alternative

As there would be no ground disturbance and no construction activities under the No Action Alternative, there would be no impact to historic properties or archaeological resources.

4.12 Aesthetics and Scenic Resources

4.12.1 Preferred Alternative

The proposed project would have only minor short-term visual impacts related primarily to construction activities. Construction activities would require the removal of vegetation along the former channels of the Verdigris River and Bird Creek and within the BFFA. Construction activities would be short-term and with time, vegetation would grow back. Proposed construction associated with this project are compatible with adjacent uses, and the continued development within the Port Terminal. Excavated soil material from the BFA would be spread on the BFFA; however, the elevation of this site would not change significantly and would not be seen from surrounding areas. In addition, because of the relatively remote locations of both the BFA and the BFFA, no significant visual impacts are anticipated.

Draft Environmental Assessment Tulsa Port of Catoosa Barge Fleeting Area Project Rogers County, Oklahoma

4.12.2 No Action Alternative

Under the No Action Alternative, the BFA/BFFA would not be constructed and aesthetic and scenic resources would remain unchanged. Therefore, no impacts are anticipated.

5.0 AGENCY COORDINATION, PUBLIC INVOLVEMENT, PERMITS AND FEDERAL COMPLIANCE

5.1 Agency Coordination

The Port and/or its consultants have coordinated closely with regional, federal, state and county agencies over the course of the development of the proposed project. This coordination has been performed in such a way that the relevant concerns of the agencies have been considered in the development of the proposed project's design, and in the assessment of environmental impacts.

Following is a list of all meetings held to date with regional, state and county agencies, as well as with local governing bodies and others with whom coordination has occurred during the course of the proposed project. **Appendix C** contains minutes to the meetings listed below.

Table 5-1

Date of Meeting	Subject Matter	Agencies/Jurisdictions Involved
July 27, 2009	Scoping Meeting	 US Dept. of Commerce - Economic Development Admin (EDA) USACE-Regulatory USACE-Environmental USACE-Cultural Resources USFWS Indian Nations Council of Governments (INCOG) Port
Sept. 21, 2009	Scoping Clarification Meeting	 USACE-Regulatory USACE-Environmental USACE-Cultural Resources Port

Agency Coordination

Draft Environmental Assessment Tulsa Port of Catoosa Barge Fleeting Area Project Rogers County, Oklahoma

Table 5-1 (Continued)

Agency Coordination

Date of Meeting	Subject Matter	Agencies/Jurisdictions Involved
May 3, 2011	Initial Environmental Results Review Meeting	 USACE-Real Estate USACE-Counsel USACE-Navigation USACE-Operations USACE-Ft. Gibson Office USACE-Regulatory USACE-Regulatory USACE-Environmental Port Dewberry
February 14, 2012	EA Progress Briefing with USACE-Tulsa District	 USACE-Regulatory USACE-Environmental USACE-Cultural Resources Port Dewberry
June 21, 2012	New American Burying Beetle Protocols	 USFWS USACE-Environmental Dewberry
January 30, 2013	EA draft comments with USACE-Tulsa District	 USACE-Regulatory USACE-Environmental USACE-Counsel Port Dewberry

5.2 Public Involvement

It is anticipated that additional coordination meetings with regulatory agencies, public officials and the general public would be scheduled as the project advances. In addition, a public hearing would be scheduled at a future date as part of the NEPA and/or permitting processes.

5.3 Permits

USACE permits will be required in regard to the disturbance of wetlands and open waters. Section 10 and 404 permits address these impacts and this permit application will be submitted for USACE review and approval prior to the anticipated start of construction.

ODEQ permits address water quality concerns from proposed construction projects. A Section 401 Water Quality Certificate must be obtained to certify that the proposed project will not violate the water quality standards of the State and a Stormwater Pollution Prevention Plan permit will be required to certify that sediment will not be deposited into the Verdigris River watershed as a result of construction activities.

Finally, the USFWS will require an incidental take permit for the ABB should an ABB be trapped as part of the ABB Presence/Absence survey to be conducted prior to the start of construction, within the designated period of that year.

A Section 10/404 Permit from the USACE would be required for all impacts to wetlands/waters associated with the project. This permit application would be submitted for USACE review and approval prior to the anticipated start of construction.

State permits and approvals would be required from the ODEQ for the proposed project. These permits, approvals and certifications are summarized below:

- A Section 401 Water Quality Certificate must be obtained from the ODEQ to certify that the proposed project would not violate the water quality standards of the state;
- A review of hydraulic calculations by the local engineering department to make a determination with regard to the minor rise upstream resulting from project construction;
- A Conditional Letter of Map Revision must be obtained from Rogers County/FEMA; and
- Approval of a Stormwater Pollution Prevention Plan by ODEQ, which will include Best Management Practices, National Pollutant Discharge Elimination System (NPDES) and Soil Erosion and Sediment Control Plans (SESC).

Table 5-2 presents project compliance with applicable Federal environmental statutes.

Table 5-2

Relationship of Plans to Environmental Protection Statutes and Other Environmental Requirements

Policy	Compliance Status
Archeological and Historic Preservation Act, 1974, as amended, 16 U.S.C. 469, et seq	All plans in full compliance
Clean Air Act, as amended, 42 U.S.C. 7609, et seq	All plans in full compliance
Clean Water Act, 1977, as amended (Federal Water Pollution Control Act), 33 U.S.C. 1251, et seq	All plans in full compliance
Endangered Species Act, 1973, as amended, 16 U.S.C. 1531, et seq	All plans in full compliance
Federal Water Project Recreation Act, as amended, 16 U.S.C. 460-1-12, et seq	All plans in full compliance
Fish and Wildlife Coordination Act, as amended, 16 U.S.C. 661, et seq	All plans in full compliance
Land and Water Conservation Fund Act, 1965, as amended, 16 U.S.C. 4601, et seq	All plans in full compliance
National Historic Preservation Act, 1966, as amended, 16 U.S.C. 470a, et seq	All plans in full compliance
National Environmental Policy Act, as amended, 42 U.S.C. 4321, et seq	All plans in full compliance ⁽¹⁾
Native American Graves Protection and Repatriation Act, 1990, 25 U.S.C. 3001-13, et seq	All plans in full compliance
Rivers and Harbors Act, 33 U.S.C. 401, et seq	All plans in full compliance
Watershed Protection and Flood Prevention Act, 16 U.S.C. 1001, et seq	All plans in full compliance

Table 5-2 (Continued)

Relationship of Plans to Environmental Protection Statutes and Other Environmental Requirements

Policy	Compliance Status
Wild and Scenic Rivers Act, as amended, 16 U.S.C. 1271, et seq	All plans in full compliance
Water Resources Planning Act, 1965	All plans in full compliance
Floodplain Management (E.O. 11988)	All plans in full compliance
Protection of Wetlands (E.O. 11990)	All plans in full compliance
Environmental Justice (E.O. 12898)	All plans in full compliance
Protection of Children (E.O. 13045)	All plans in full compliance
Farmland Protection Policy Act, 7 U.S.C. 4201, et seq	All plans in full compliance

Note: Full Compliance - Having met all requirements of the statutes, Executive Orders, or other environmental requirements for the current stage of planning.

(1) National Environmental Policy Act of 1969 requires an environmental review prior to a Federal agency making an irretrievable commitment of Federal resources.

Draft Environmental Assessment Tulsa Port of Catoosa Barge Fleeting Area Project Rogers County, Oklahoma

6.0 LIST OF PREPARERS

Dewberry Engineers Inc.

Craig Swengle, P.E., Project Manager Bachelor of Science, Civil Engineering, Pennsylvania State University

Ileana Ivanciu, PG, Environmental Director Master of Science, Geology and Geophysics, University of Bucharest Bachelor of Science, Geology and Geophysics, University of Bucharest

Andrea Burk, Senior Architectural Historian Master of Science, Historic Preservation, Columbia University Bachelor of Arts, History and Communication, Rutgers College

Brian Sayre, Senior Natural Resources Specialist Master of Arts, Environmental Studies, Montclair State University Bachelor of Arts, Environmental Sciences, University of Virginia

Billy Cox, P.E., Project Engineer Bachelor of Science, Civil Engineering,

Scott Legate, Project Designer Associates Degree, Tulsa Community College

Michelle Measday, Senior Environmental Specialist Master of Arts, Environmental Science, Montclair State University Bachelor of Arts, Geology, Rutgers University

Matthew Schlitzer, Senior Wetland Specialist Bachelor of Science, Natural Resource Management, Colorado State University

Brock Giordano, Archaeologist Master of Arts, Western Michigan University, Anthropology Bachelor of Arts, Salve Regina University, American Studies Jennifer Baer, AICP, Senior Planner Master of Arts, Master of Public Administration, New York University Bachelor of Arts, Political Science, Drew University

Todd Burden, CADD Technician, Bachelor of Arts, Political Science/Public Service, University of Central Oklahoma

Clifford Moore, Senior CADD/GIS Specialist Bachelor of Arts, Geography/Cartography, Rutgers University

Kleinfelder Central, Inc.

Blair Baker, Senior Environmental Professional Bachelor of Science, University of Tulsa

Kim Shannon, Environmental Scientist Bachelor of Science, Civil Engineering, Northeastern University

Jason Caskey, Environmental Professional Bachelor of Science, Civil Engineering, Purdue University

Cojeen Archaeological Services, LLC

Christopher A. Cojeen, Principal Investigator Dual Bachelor of Arts, Anthropology and History, University of Oklahoma

USACE – Tulsa District

Patricia A. Newell, Biologist/NEPA Specialist Master of Science, Ecology and Public Policy, George Mason University Bachelor of Science, Botany, University of Maryland

7.0 REFERENCES

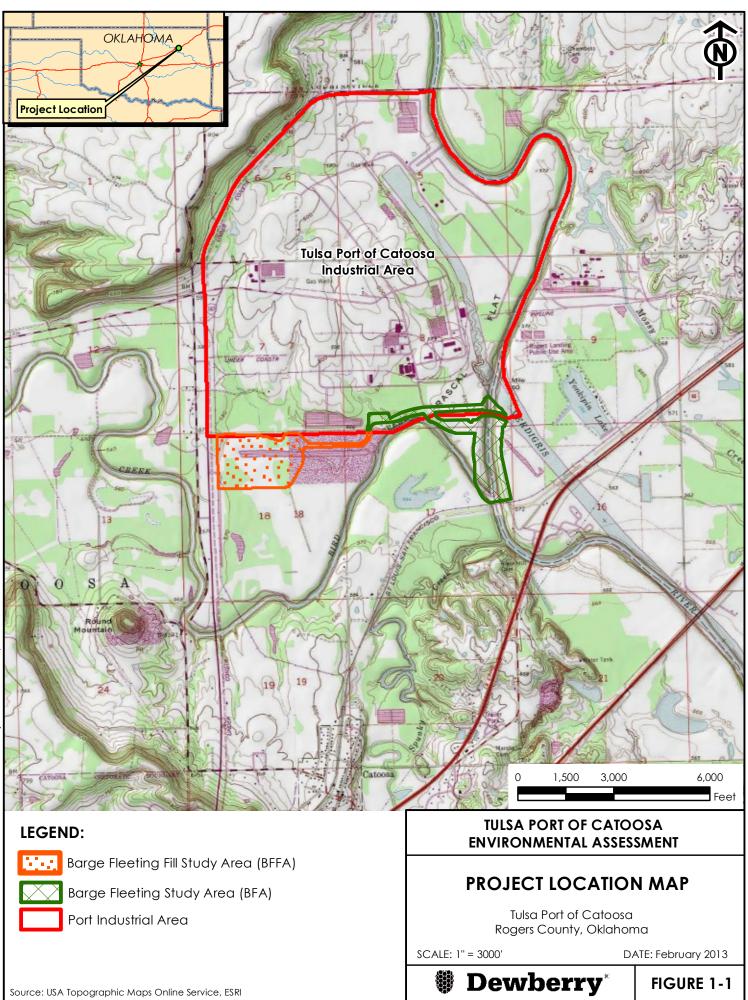
- Audubon. (2008). *Audubon*. Retrieved January 2, 2012, from http://audubon2.org/watchlist/viewspecies.jsp?id=214
- Boechman, C. J. (2008). Status of Freshwater Native Mussels in the Oklahoma section of the Verdigris River after introduction of the Zebra Mussel. *American Malacological Bulletin* 25, 1-8.
- Borror, D.J. and R.E. White. (1970). *The Peterson Field Guide Series, A Field Guide to the Insects* of America North of Mexico. Boston: Houghton Mifflin Company.
- Charpentier, R. R. (1995). Cherokee Platform Province. *National Assessment of United States Oil* and Gas Resources .
- Cojeen, C. A. (2011). Report on the Archeological Site Assessment of the Tulsa Port of Catoosa 115-Acre Portion of the Barge Fleeting Area Project, Rogers County, Oklahoma. Tulsa: Archaeological Services, LCC (CAS).
- Cojeen, C. A. (2010). Report on the Preliminary Archeological Site Assessment of the Tulsa Port of Catoosa, East Bank Portion of the Barge Fleeting Area Project, Rogers County, Oklahoma. Tulsa: Archaeological Services, LCC (CAS).
- Cowardin, L. F. (1979). *Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31.* Washington, DC: US Fish and Wildlife Service.
- Curtis, Nelville M., Jr., Wouldiam E. Ham and Kenneth S. Johnson. (2008). Geomorphic Provinces of Oklahoma. Oklahoma Geological Survey Educational Publication No. 9, Oklahoma Geological Survey.
- Eberle, M.E. and W.S. Stark. (2000). Status of the Arkansas Darter in the south-central Kansas and adjacent Oklahoma. *Naturalist*, 32:103-113.
- Environmental Laboratory. (1987). *Corps of Engineers Wetland Delineation Manual. Technical Report Y-87-1.* Vicksburg: USACE Waterways Experiment Station.
- Federal Emergency Management Agency (FEMA). (1987). Rogers County, Oklahoma. Panel 405379 0120B.
- Howery, M. (2011). Staff, Oklahoma Department of Wildlife Conservation. *Whooping Crane* occurences in Rogers County, Oklahoma. (K. Shannon, Interviewer)

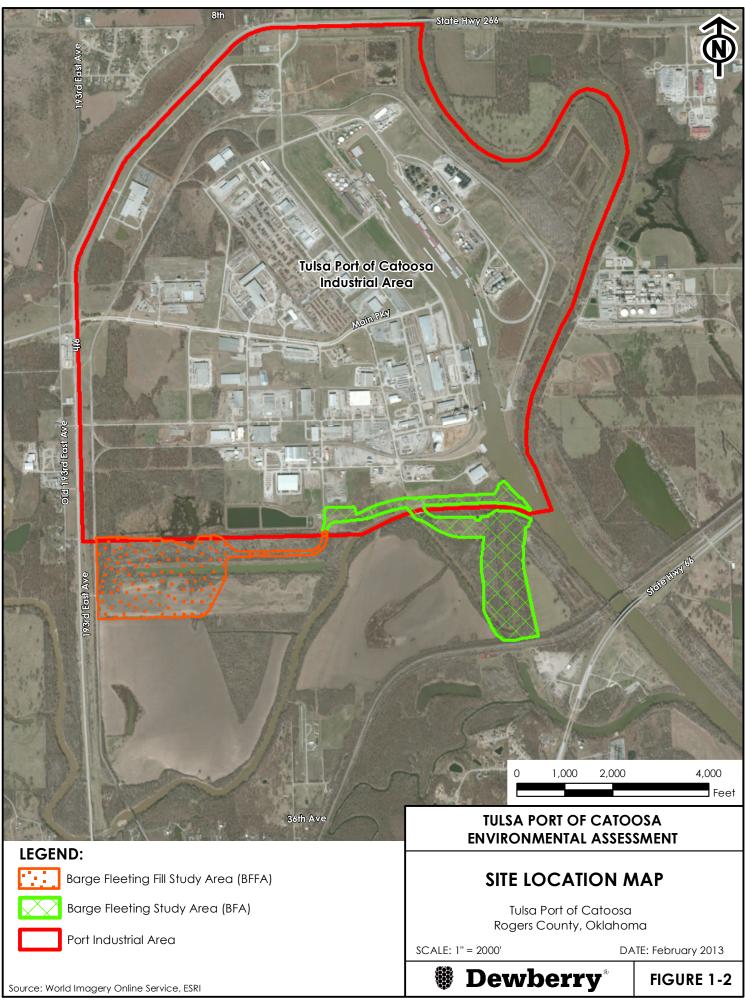
- Jenkins, A. (2011). Bald Eagle location and proximity within or near the Tulsa Port of Catoosa study areas. (K. Shannon, Interviewer)
- Johnson, K. S. (2008). Geologic History of Oklahoma. *Earth Science and Mineral Resources of Oklahoma. Oklahoma Geological Survey Educational Publication No. 9*, 21. Norman, Oklahoma: Oklahoma Geological Survey.
- Johnson, K. S. (2008). Geologic Map of Oklahoma. *Earth Science and Mineral Resources of Oklahoma. Oklahoma Geological Survey Educational Publication No. 9*, 21. Norman, Oklahoma: Oklahoma Geological Survey.
- Kleinfelder Central, I. (2012). Delineation of Potentially Jurisdictional Waterbodies Report, Evaluation of Historic Wetlands and Threatened and Endangered Species Potential Habitat. Poritons of Section 4 and 5 of Township 20 North, Range 15 East, Potential Mitigation Site. Rogers County, Oklahoma.
- Kleinfelder Central, I. (2011). Delineation of Potentially Jurisdictional Waterbodies Report, Evaluation of Historic Wetlands and Threatened and Endangered Species Potential Habitat. Poritons of Section 7, 17, and 18 of Township 20 North, Range 15 East, BFA and BFFA. Rogers County, Oklahoma.
- Kleinfelder Central, I. (2012). Delineation of Potentially Jurisdictional Waterbodies Report, Evaluation of Historic Wetlands and Threatened and Endangered Species Potential Habitat. Poritons of Section 8, 16 and 17 of Township 20 North, Range 15 East, Barge Fleeting Area. Rogers County, Oklahoma.
- Luza, Johnson Kenneth S. and Kenneth V. (2008). Rivers, Streams and Lakes of Oklahoma. *Earth Science and Mineral Resources of Oklahoma. Oklahoma Geological Survey Educational Publication No. 9*. Norman, Oklahoma: Oklahoma Geological Survey.
- Luza, K. V. (2008). Stream Systems of Oklahoma. *Earth Science and Mineral Resources. Oklahoma Geological Survey Educationl Publication No. 9*. Norman, Oklahoma: Oklahoma Geological Survey.
- MacBeth Division, Kollmorgen Instruments Corp. (MacBeth). (1994). Munsell Soil Color Charts. Baltimore, Maryland.
- Mather, C. (1990). *Status Survey of the Western Fanshell and the Neosho Mucket in Oklahoma*. Final Report to the Oklahoma Department of Wildlife Conservation. Project No. E-7.

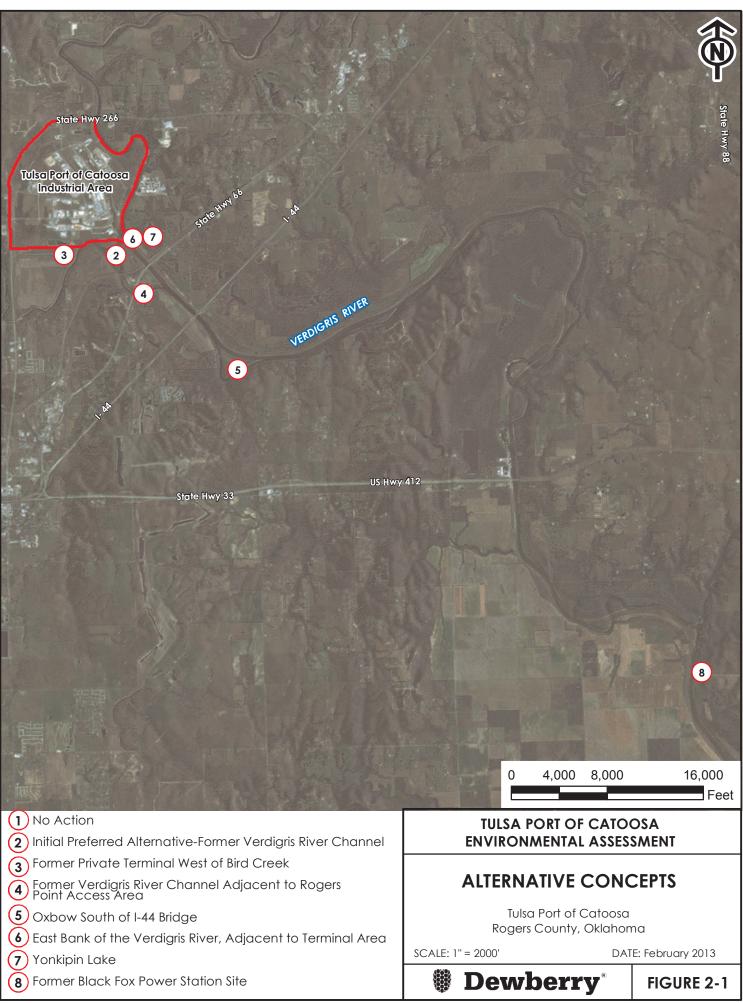
- National Weather Service (NWS). (2010). *Tulsa, Oklahoma Total Monthly and Yearly Rainfall, 1888 to 2012*. Retrieved 2010, from http://www.srh.noaa.gov/tsa/?n=climo_tulyearrain
- Oklahoma Climatological Survey (OCS). (2010). *Rogers County Climate Summary*. Retrieved 2010, from http://climate.mesonet.org/county_climate/products/quickfacts/rogers.pdf
- Oklahoma Department of Environmental Quality. (2008). *The State of Oklahoma 2008 Water Quality Assessment Integrated Report.* Oklahoma City: The State of Oklahoma.
- Sibley, D. A. (2000). *National Audubon Society The Sibley Guide to Birds.* New York City: Alfred A. Knopf.
- US Army Engineer Research and Development Center. (2008). *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region*. Retrieved 2011, from http://el.erdc.usace.army.mil/elpubs/pdf/trel08-27.pdf
- US Department of Agriculture (NRCS). (2008). *Soils Survey for Rogers County, Oklahoma*. Retrieved 2011, from Natural Resources Conservation Service in Cooperation with Oklahoma Agricultural Experiment Station: http://websoilsurvey.nrcs.usda.gov
- US Department of Agriculture, N. (2009). *PLANTS Database*. Retrieved 2011, from National Plant Data Center: http://plants.usda.gov
- US Environmental Protection Agency. (1972). Clean Water Act (Amended 1977 and 1987). 33 U.S.C. §§ 1251-1387. Washington DC.
- US Fish and Wildlife Service (USFWS) Oklahoma Ecological Services Field Office. (n.d.). *County* occurrences of Oklahoma Federally-Listed Endangered, Threatened, Proposed and Candidate Species. Retrieved from http://www.fws.gov/southwest/es/oklahoma
- USACE. (2007). Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos V. United States & Carabell V. United States. Retrieved 2011, from http://www.usace.army.mil/cw/cecwo/reg/swa_guide/rapanos_guide_memo.pdf
- USACE. (1974). Final Environmental Impact Statement. Operation and Maintenance Program, McClellan-Kerr Arkansas River Navigation System, Oklahoma. USACE, Little Rock and Tulsa Districts.
- USACE. (2005). Final Environmental Impact Statement. Arkansas River Navigation Study (Arkansas and Oklahoma). USACE, Little Rock and Tulsa Districts.

- USFWS. (1991). American Burying Beetle (Nicrophorus americanus) Recovery Plan. Newton Corner, Massachusetts.
- USFWS. (1940). Bald and Golden Eagle Protection Act 16 U.S.C. §§ 668-668d, as amended 1959, 1962, 1972 and 1978. Washington DC.
- USFWS. (1985b). Determination of Endangered and Threatened Status for the Piping Plover: Final Rule. Washington DC: Federal Register 50(238): 50726-50734.
- USFWS. (2007). Endangered and Threatened Wildlife and Removing the Bald Eagle in the Lower 48 States. Retrieved 2011, from From the List of Endangered Threatened Wildlife. Federal Register 72(130): 37345-37372.
- USFWS. (1985a). *Interior Population of Least Tern Determined to be Endangered*. Washington DC: Federal Register 50:21784-21792.
- USFWS. (1988). National List of Plant Species that Occur in Wetlands. Retrieved 2011, from http://www.fws.gov.nwi/bha.download.1988region2.txt
- USFWS. (1990). *Recovery Plan for the Interior Population of the Least Tern (Sterna antillarum).* Grand Isle, Nebraska.
- USFWS. (n.d.). *Western Prairie Fringed Orchid (Platanthera praeclara) Fact Sheet*. Retrieved from http://www.fws.gov/southwest/es/oklahoma/orchid1.htm
- USGS. (1963). 7.5 Minute Series, Topographic Quadrangle Map of Catoosa, OK (**Photo** revised 1980). Washington DC: USGS.
- Vaughn, C. (1997). Determination of the Status and Habitat Preference of the Neosho Mucket in Oklahoma. Oklahoma City: Annual Performance Report submitted to Oklahoma Department of Wildlife Conservation.
- Weins, K., and Roberts, T. (Weins). (2003). *WRP Technical Notes Collection (ERDC TN-WRP-HS-CP-2.1)*. Retrieved 2011, from "Effects of Headcutting on the Bottomland Hardwood Wetlands adjacent to the Wolf River, Tennessee,": http://www.wes.army.mil/el/wrtc/wrp/tnotes.html
- Woods, A.J., Omernik, J.M., Butler, D.R., Ford, J.G., Henley, J.E., Hoagland, B.W., Arndt, D.S. and Moran, B.C. (2005). *Ecoregions of Oklahoma (color poster with map, descriptive text, summary Tables, and Photographs)*. Reston: USGS.

FIGURES

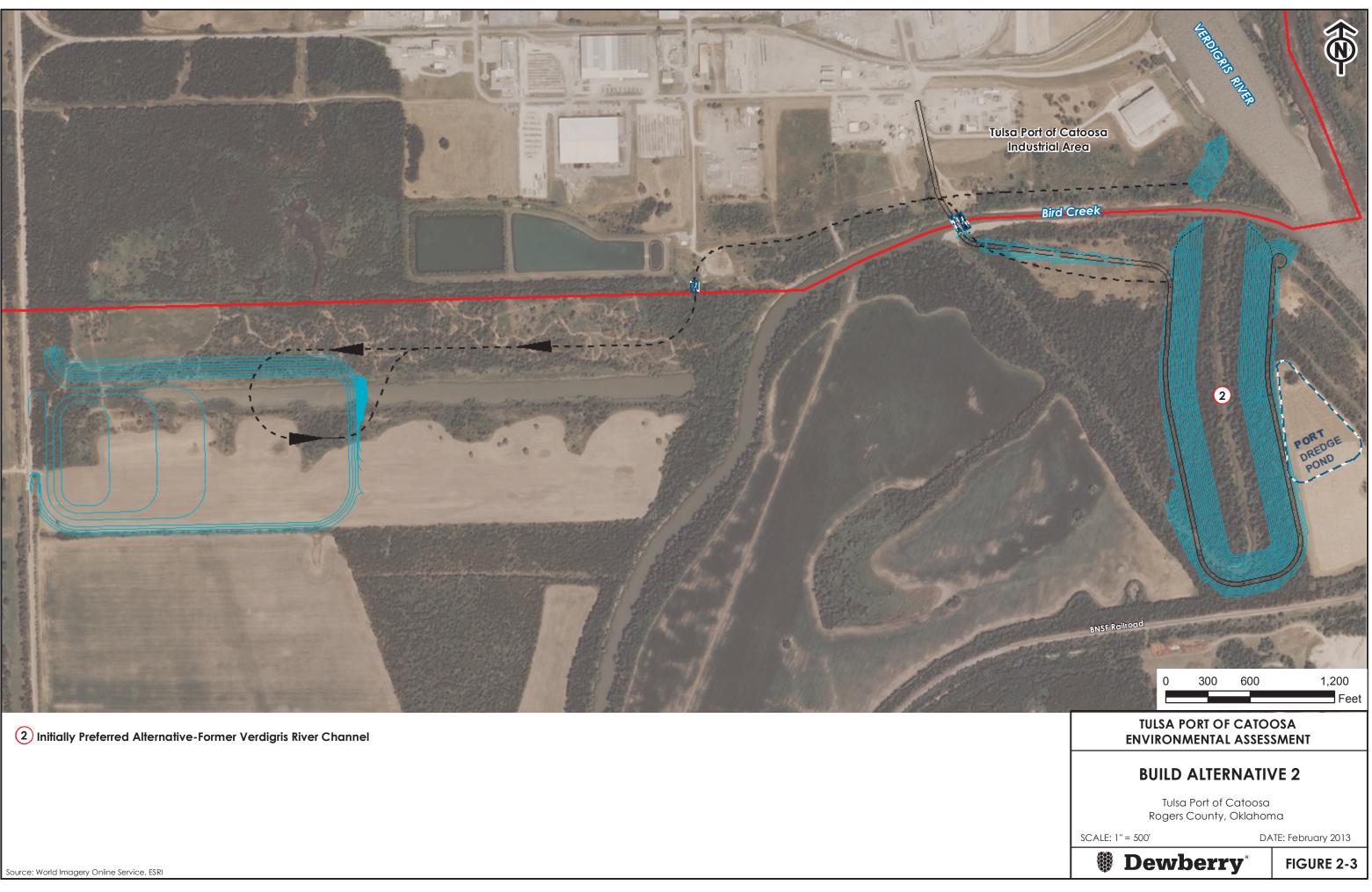


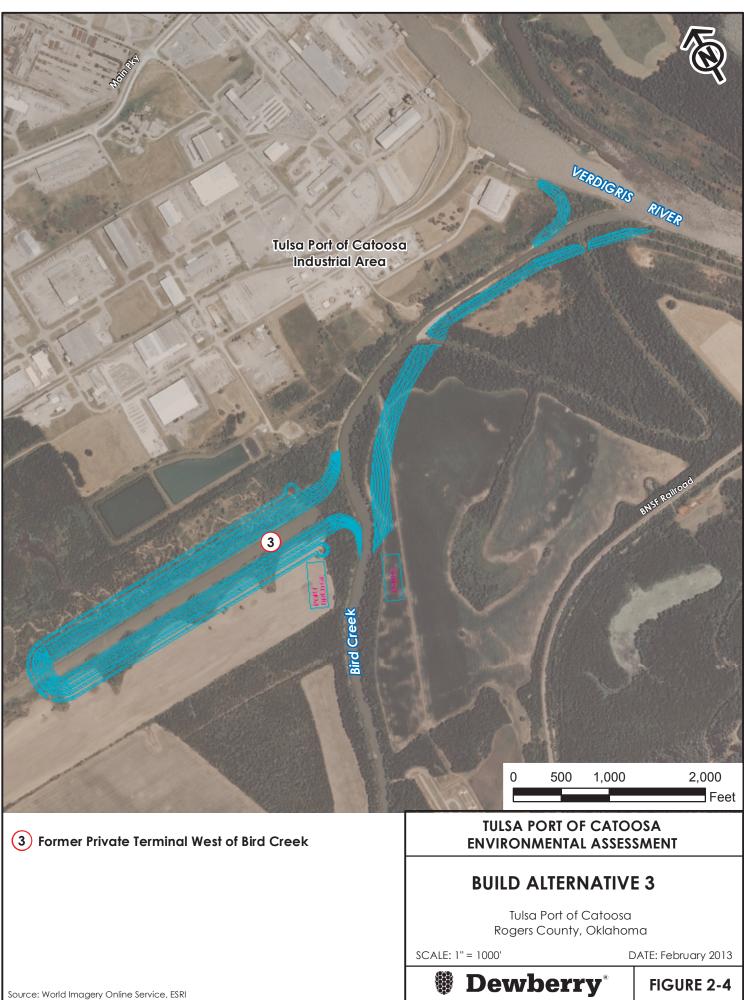


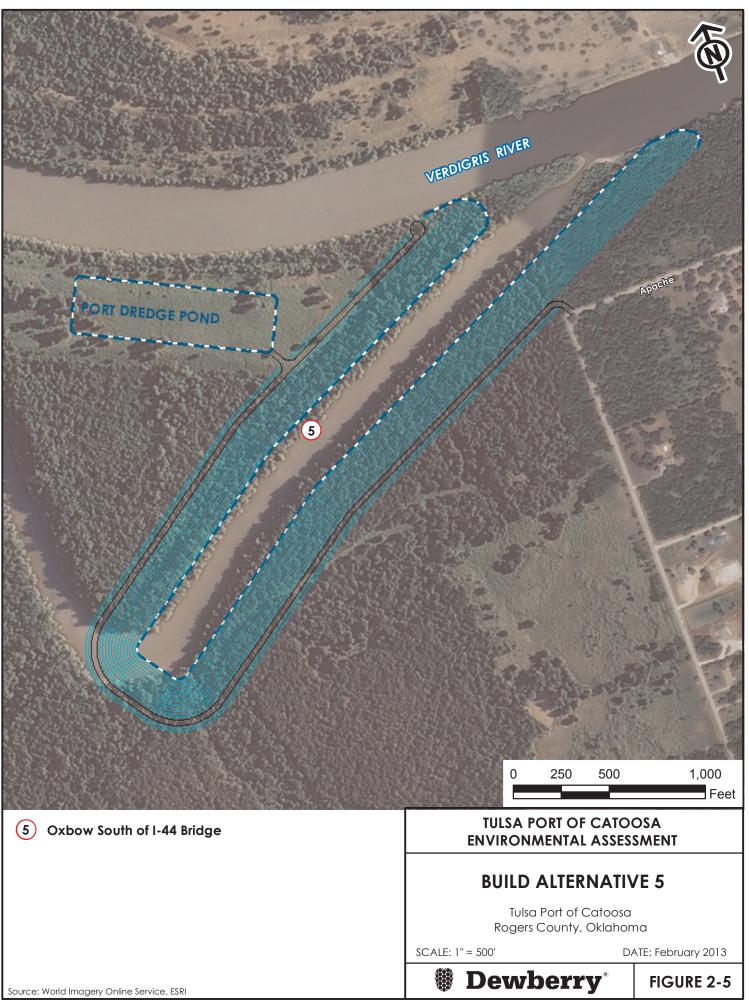


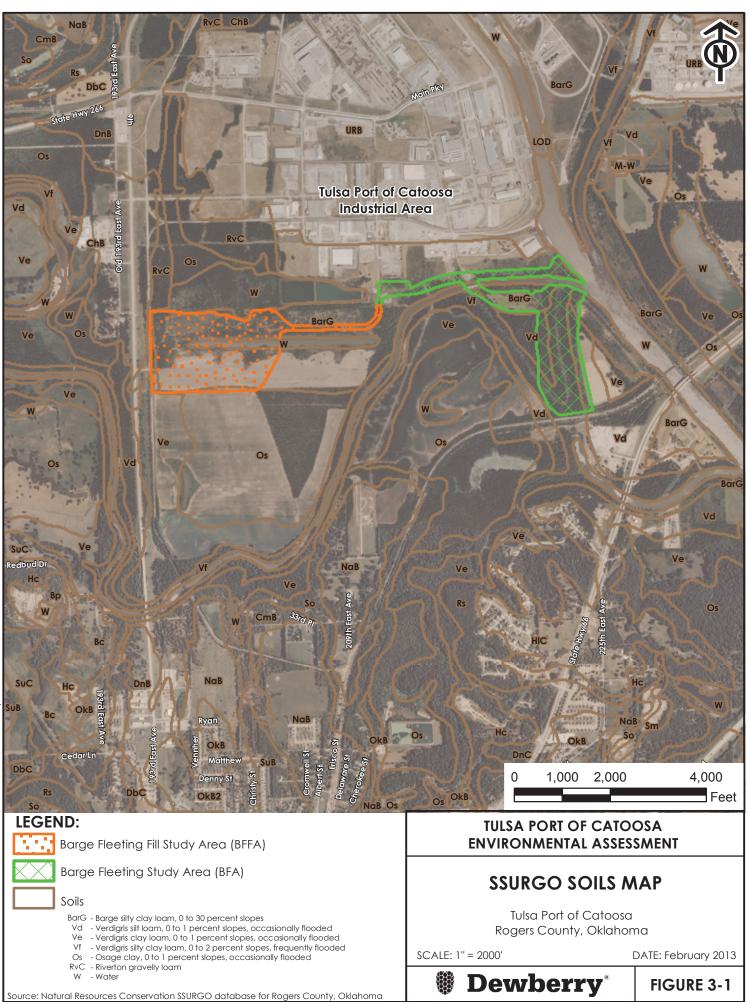
Source: World Imagery Online Service, ESRI

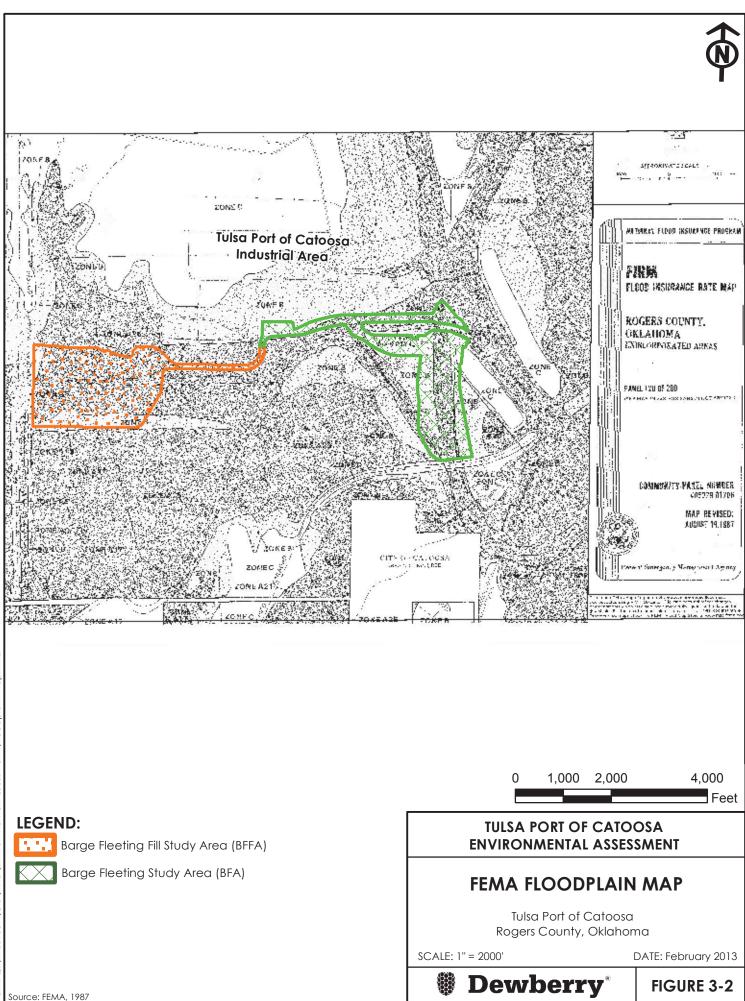


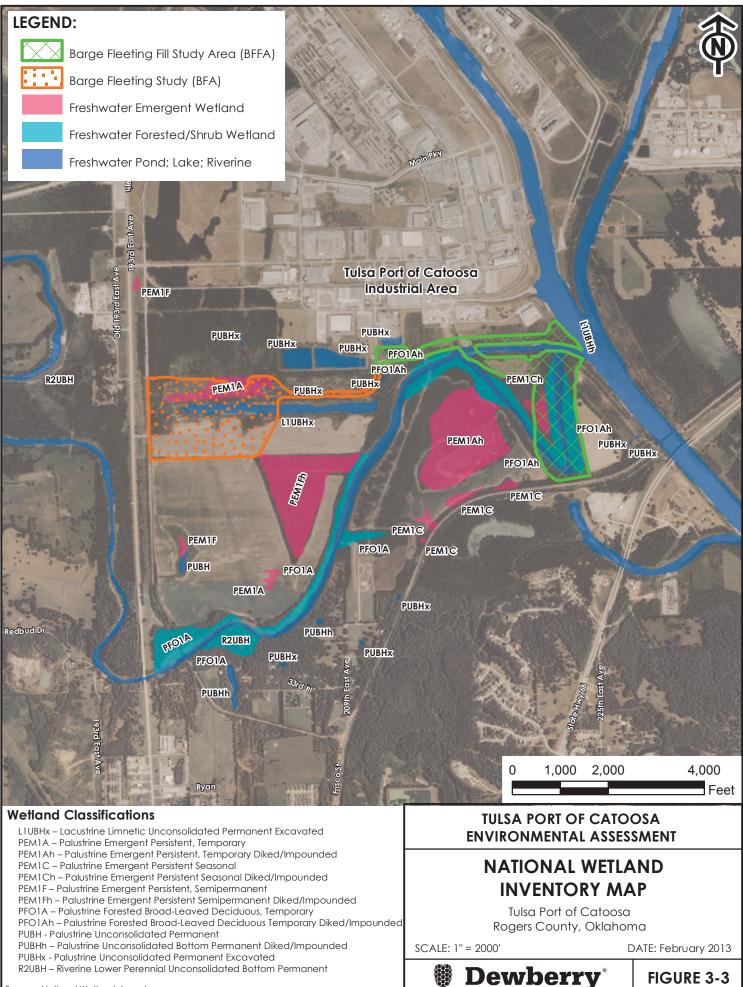




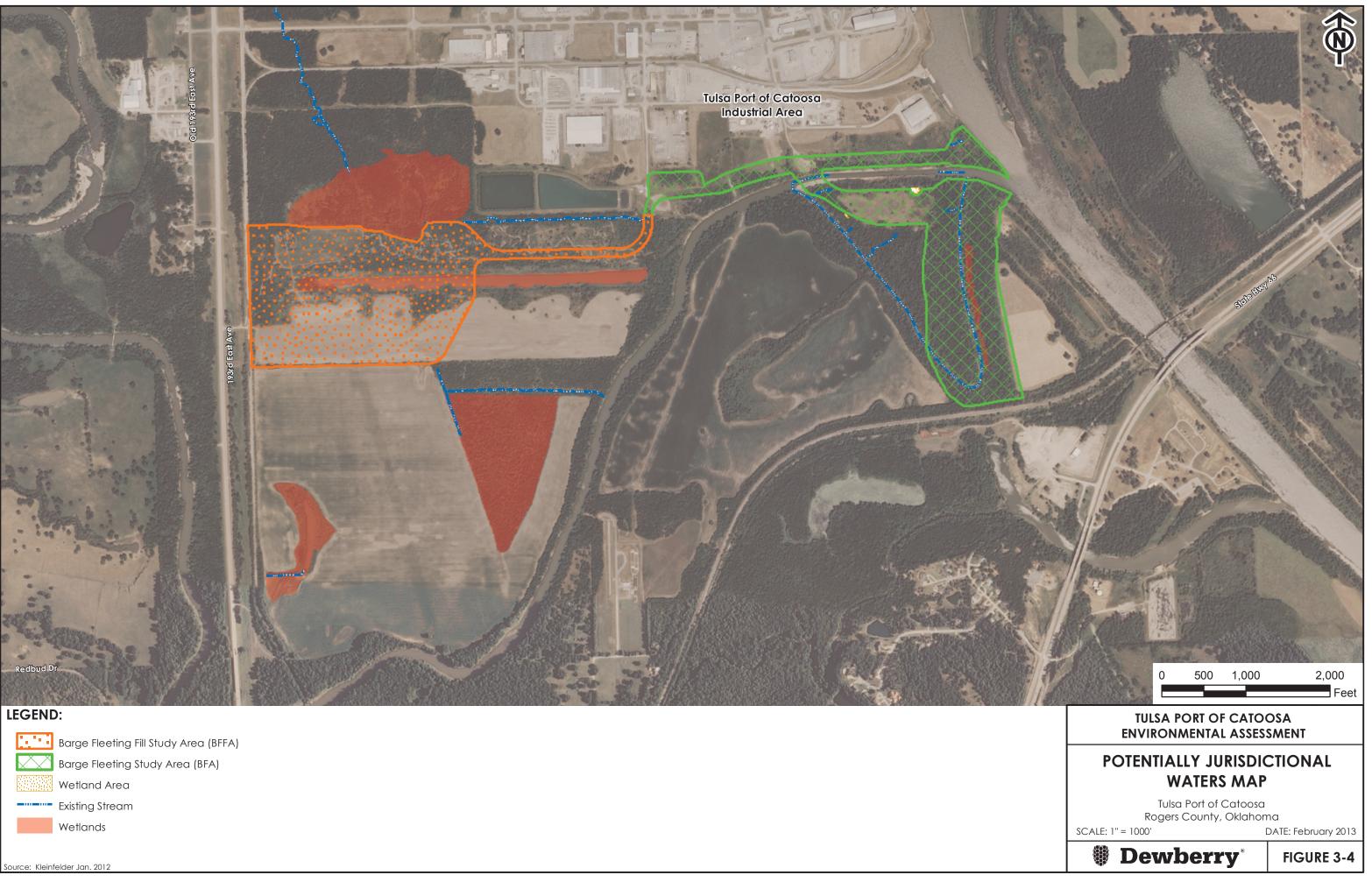




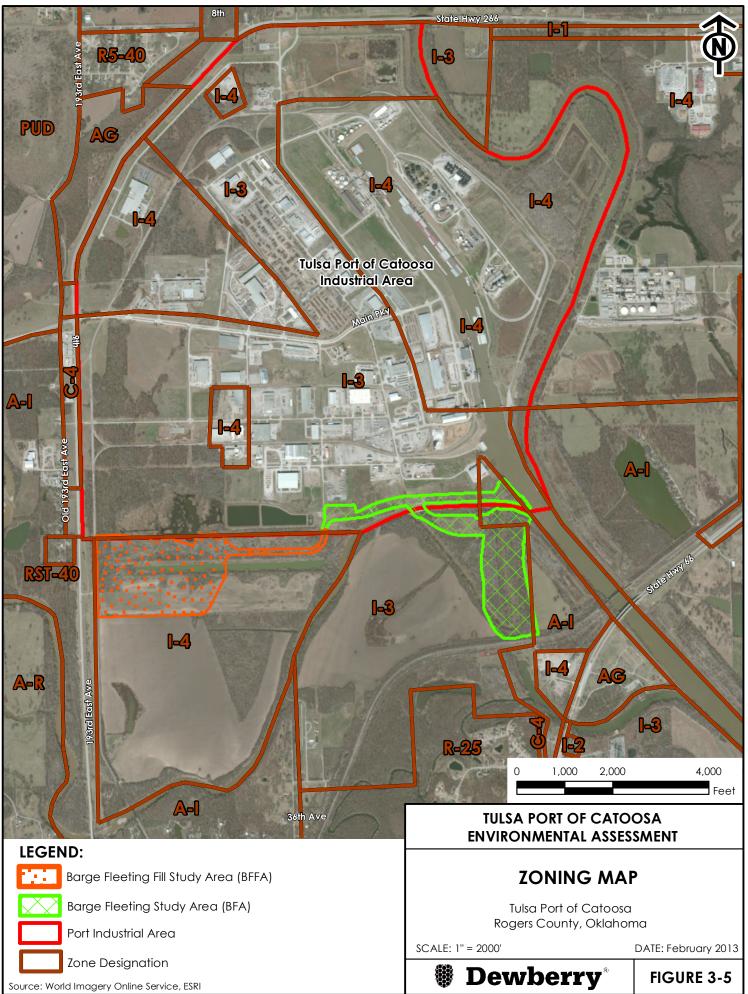


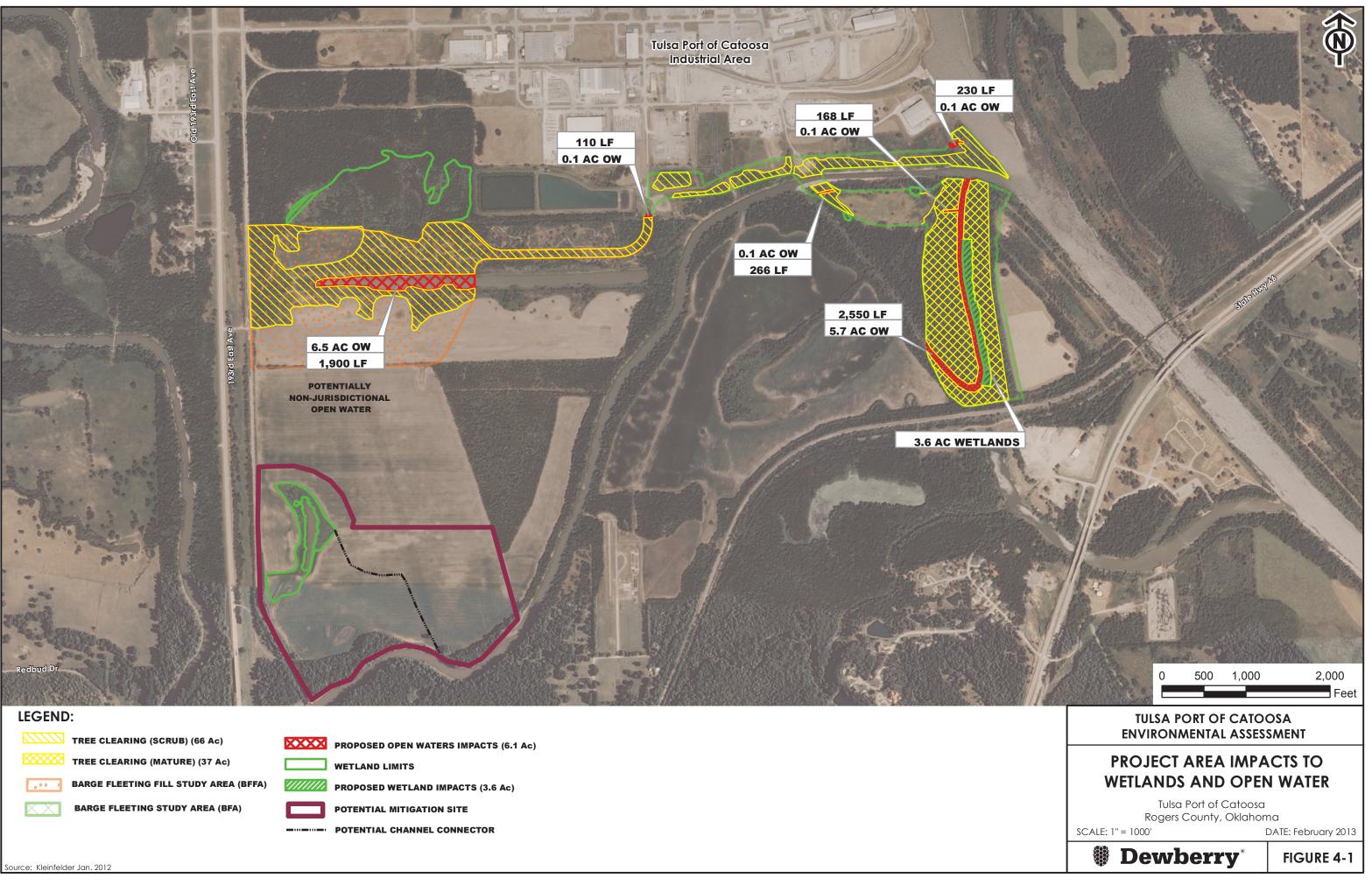


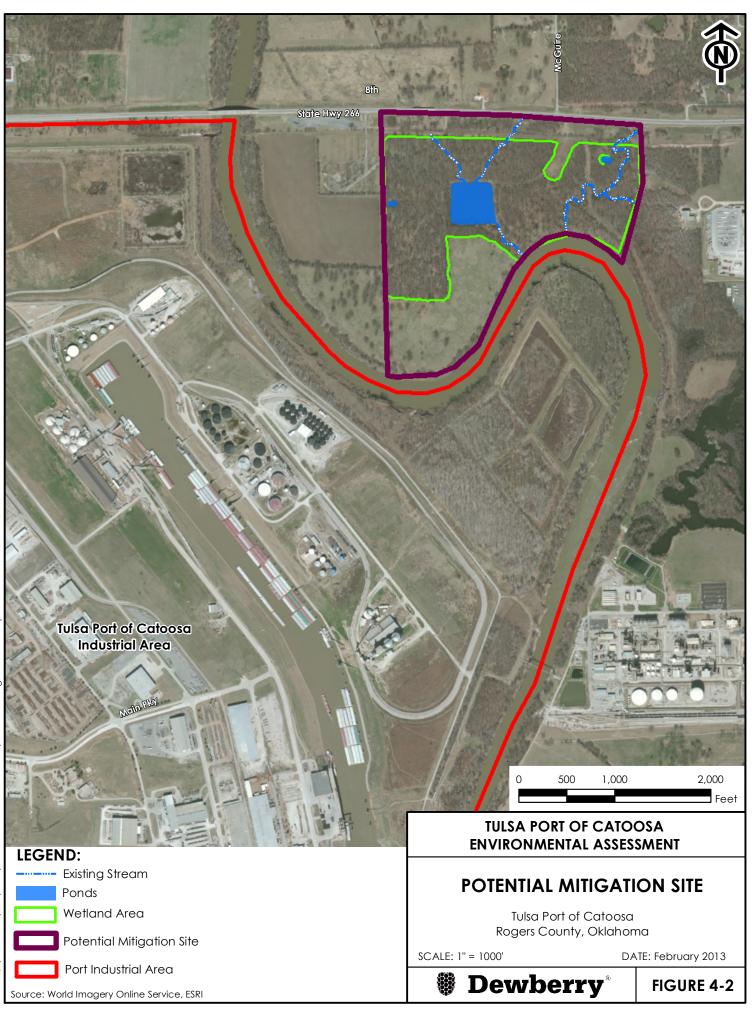
ource: National Wetlands Inventory

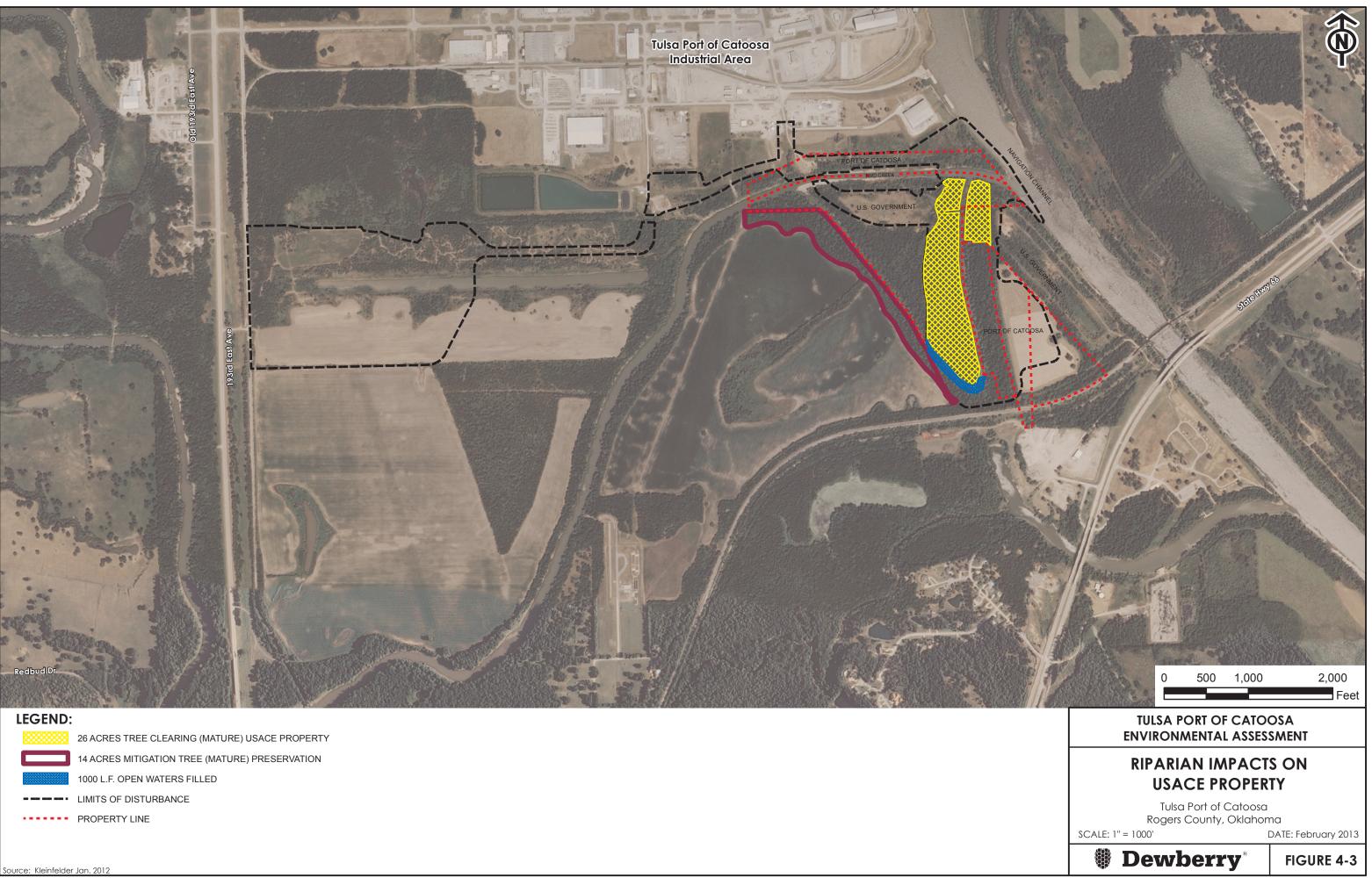








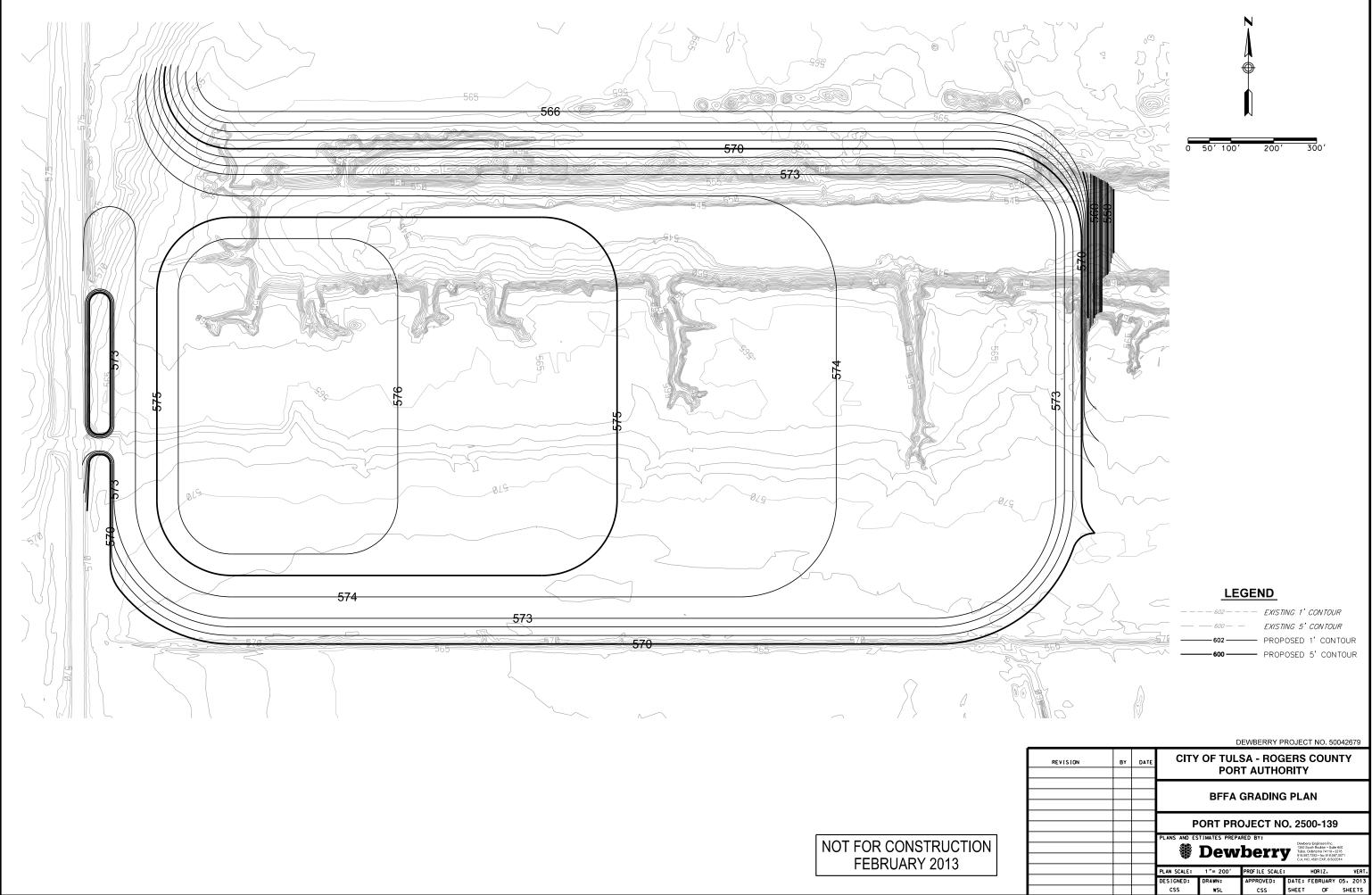






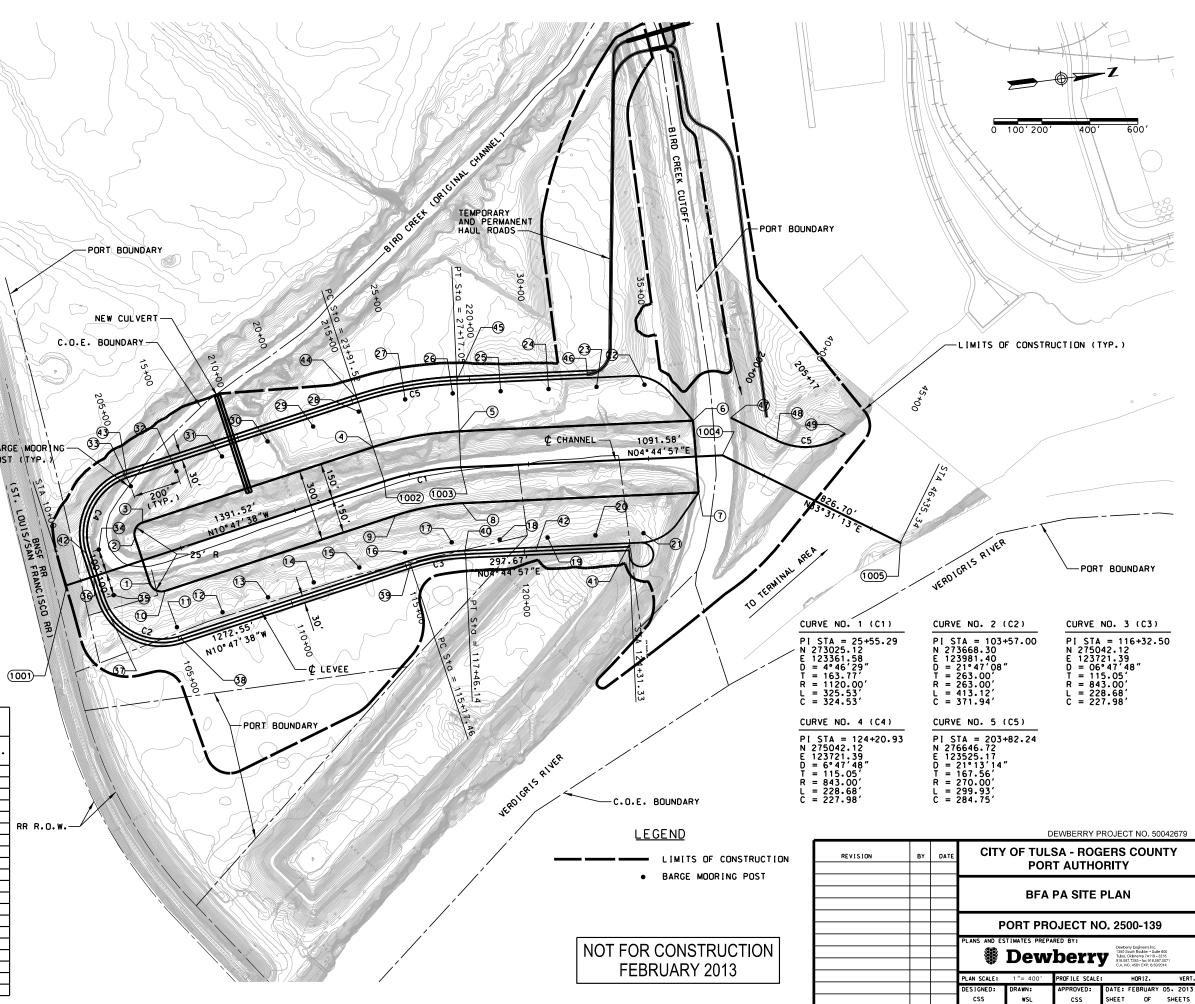
APPENDIX A

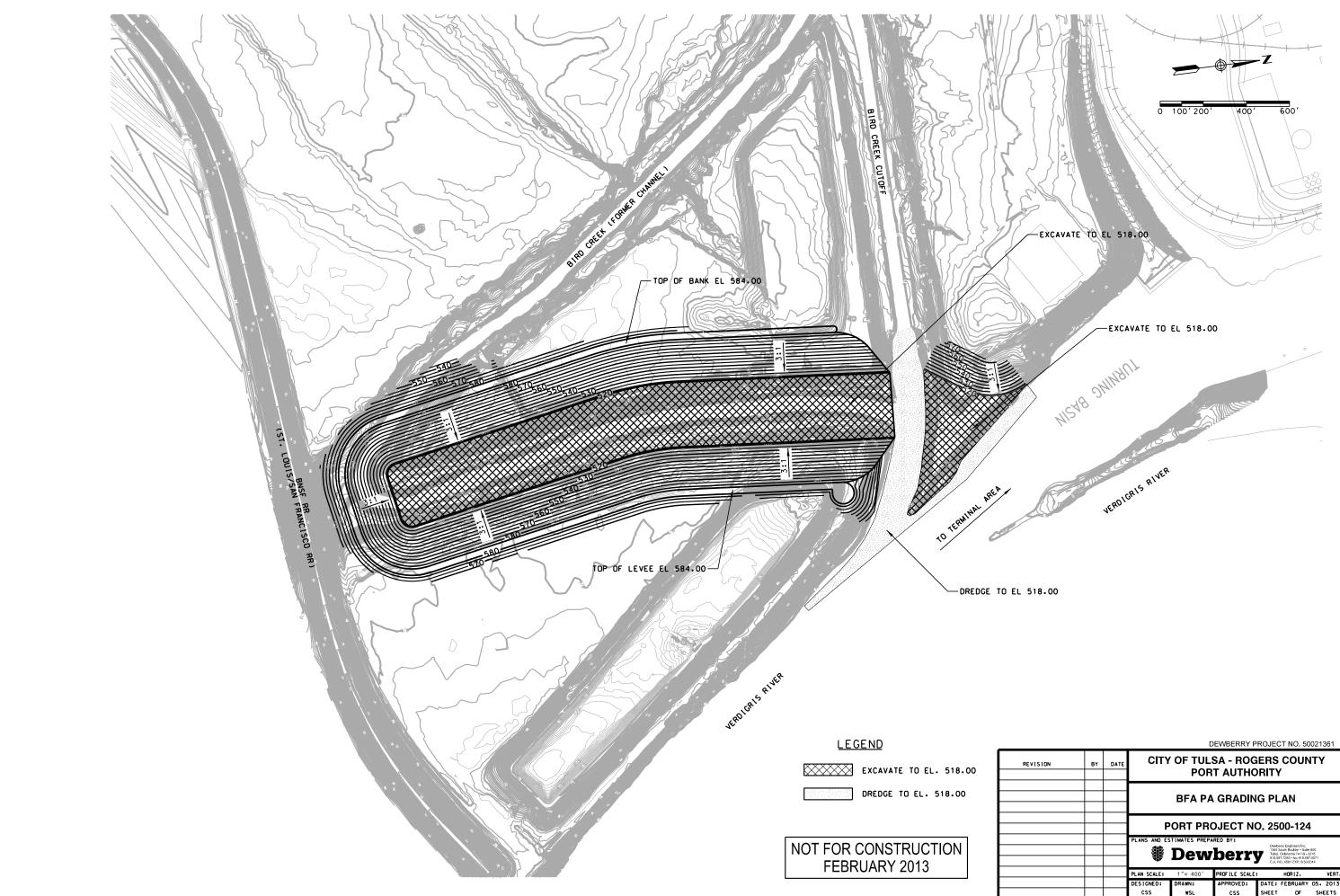
DEPARTMENT OF THE ARMY PERMIT INFORMATION



	PLANS AND ES	TIMATES PREPA	RED BY:	
		Ποτατ	berry	Dewberry Engineers Inc. 1350 South Boulder - Suite 600 Tulsa, Oklahoma 74119 - 3216
	11 A B	DCAA	nerr3	918.587.7283 - fax 918.587.0071 C.A. NO. 4581 EXP. 6/30/2014
	PLAN SCALE:	1 "= 200'	PROFILE SCALE:	HOR1Z.
	DESIGNED:	DRAWN:	APPROVED:	DATE: FEBRUARY 05.
	CSS	WSL	CSS	SHEET OF SHE

POINT NO.	NORTHING	EASTING	DESCR.	
1001	273495.34	123652.85	CHANNEL CI	
1002	274862.25	123392.25	<i>" "</i>	
1003	276274.16	123465.51		
1005	276963.38	123922.04	" "	
1	273839.40	123689.05	CHANNEL TO	
2	273801.94	123492.59	" "	
3	273841.70	123434.11	" "	
4	274834.16	123244.90	" "	
5	275198.75	123225.65	" "	_
6 7	276171.31 276155.97	123306.45	<i>n n</i>	
8	275173.91	123524.62	" "	
9	274890.34	123539.60	" "	
10	273897.88	123728.81	" "	
11	273927.65	123884.99	MOORING POS	T
12	274124.12	123847.54	" "	
13	274320.58	123810.08	" "	
14	274517.04	123772.63	" "	
15	274713.50	123735.17	" "	
16 17	274909.96	123697.72		— I
17	275108.78 275308.20	123695.33	" "	
19	275507.51	123711.89		
20	275706.82	123728.44		
21	275906.14	123745.00	" "	
22	275989.54	123131.80	" "	
23	275790.23	123115.24	" "	
24	275590.91	123098.69	" "	
25	275391.60	123082.13	" "	
26	275192.28	123065.70	" "	
27	274992.42	123064.98	" "	
28	274794.23	123090.65	" "	ВА
29 30	274597.77 274401.30	123128.11	" "	PC
31	274204.84	123203.02		
32	274008.38	123240.47		_
33	273811.92	123277.93		
34	273645.76	123522.37	" "	
35	273683.21	123718.83		
36	273611.44	123630.71	LEVEE CL	
37	273629.04	123723.05	" "	
38	273936.64	123932.14	" "	
39	274929.10	123742.93	" "	_
40	275156.77 275839.61	123730.91	" "	_
41 42	273592.71	123532.48	<i>n n</i>	
42	273801.81	123224.88		\neg
44	274794.27	123035.67	" "	
45	275216.38	123013.38	" "	
46	275758.98	123058.46	" "	
47	276328.05	123314.09	PENINSULA TO	DE
48	276507.03	123432.64	" "	
49	276791.65	123441.07	" "	
-	ADS (CONTROL D	ΔΤΔ	
POINT NO.	NORTHING	EASTING	ELEVATION	DESCR
1 2	276443.86 274137.62	114588.72	581.52	P.P. P.P.
3	272321.81	114596.12	584.16 584.39	P.P.
4	278117.00	119279.96	591.76	P.P.
5	276200.77	119642.89	573.60	P.P.
6	274635.25	118751.70	568.69	P.P.
7	272229.36	119035.31	572.69	P.P.
8	278491.06	122800.34	571.41	P.P.
9	274930.90	122272.11	568.14	P.P.
10	272909.75	122927.38	565.01	P.P.
11	277014.59	124478.62	599.68	P.P.
12	274307.88	126381.07	612.37	P.P.
13 A	272355.79 280385.01	126064.79	564.69	P.P. P.P.
BASE	277140.00	119670.00	607.21 579.28	<u> </u>
C	270195.95	114665.12	590.73	P.P.
D	270436.18	124275.89	624.20	P.P.
PORT1	283463.16	118059.18	593.47	
	278138.05	118150.09	595.44	1
PORT2	210130+05 1	110130.03	555.44	





REVISION	BY	DATE	CITY OF TULSA - ROGERS COUNTY PORT AUTHORITY				
			BFA PA GRADING PLAN				
			PORT PROJECT NO. 2500-124				
			A 14	Dew	berry	Dextorry Engineers Inc. 1350 South Boulder - Suite 600 Tutsa: Oklahoma 74119 - 3216 916.587.738 - fax 916.587.0071 C.A. NO. 4581 EXP. 6/30/2014	
			PLAN SCALE:	1 "= 400'	PROFILE SCALE	HORIZ. VERT.	
			DESIGNED: CSS	DRAWN: WSL	APPROVED: CSS	DATE: FEBRUARY 05, 2013 SHEET OF SHEETS	

DELINEATION OF POTENTIALLY JURISDICTIONAL WATERBODIES REPORT, EVALUATION OF HISTORIC WETLANDS and THREATENED AND ENDANGERED SPECIES POTENTIAL HABITAT

TULSA PORT OF CATOOSA PROJECT ROGERS COUNTY, OKLAHOMA

Portions of Sections 7, 17, and 18 of Township 20 North, Range 15 East Rogers County, Oklahoma

> January 19, 2011 Revised February 25, 2011

Copyright 2011 Kleinfelder All Rights Reserved

UNAUTHORIZED USE OR COPYING OF THIS DOCUMENT IS STRICTLY PROHIBITED BY ANYONE OTHER THAN THE CLIENT FOR THE SPECIFIC PROJECT.

A Report Prepared for:

Dewberry 600 Parsippany Road, Suite 301 Parsippany, NJ 07054-3715

DELINEATION OF POTENTIALLY JURISDICTIONAL WATERBODIES REPORT, EVALUATION OF HISTORIC WETLANDS and THREATENED AND ENDANGERED SPECIES POTENTIAL HABITAT

TULSA PORT OF CATOOSA PROJECT ROGERS COUNTY, OKLAHOMA

Portions of Sections 7, 17, and 18 of Township 20 North, Range 15 East Indian Meridian, Rogers County, Oklahoma

Kleinfelder Project # 114800

Prepared by:

Kimberly a. Shannen

Kim Shannon Environmental Scientist

Reviewed by:

Blai Bah

Blair Baker Senior Environmental Professional

KLEINFELDER 10835 East Independence, Suite 102 Tulsa, Oklahoma 74116 p| 918.627.6161 f| 918.627.6262

eser (

Jason Caskey Environmental Professional

TABLE OF CONTENTS

<u>Chap</u>	er e	<u>Page</u>
1.0	INTRODUCTION	1
2.0	REGULATORY FRAMEWORK 2.1WATERS OF THE U.S.2.2THREATENED, ENDANGERED, AND PROTECTED SPECIES	1
3.0	SETTING 3.1 ECOREGIONS	
4.0	METHODS AND LIMITATIONS	5
5.0	SITE CHARACTERIZATION5.1.SOILS AND DRAINAGE5.2VEGETATION ASSESSMENT (PLANT COMMUNITIES)5.3WILDLIFE ASSESSMENT	8 9
6.0	FINDINGS6.1THREATENED AND ENDANGERED SPECIES6.2POTENTIALLY JURISDICTIONAL WATERBODIES6.3HISTORIC WETLANDS	11 15
7.0	IMPACTS AND MITIGATION7.1BEST MANAGEMENT PRACTICES	
8.0	REFERENCES	26
FIGUI	RES1General Vicinity Map2Aerial Photo Map3USGS Topographic Map4NWI Status Map5Cover Type Map6Level IV Ecoregion Map7NRCS Soils Map8FEMA FIRM9Potentially Jurisdictional Waterbodies Maps (9a and 9b)10Historic Wetlands Map	
TABL	 ES 1. Soil Map Units within Study Areas 2. Flood Zones within Study Areas 3. Plant Species Observed within Study Areas 4. Animal Species Observed within Study Areas 5. Rogers County, OK Listed and Protected Species 6. Potentially Jurisdictional Waterbodies 	
APPE	NDICES	
	A Photographic RecordB Wetland Delineation Forms	

C Historic Aerial Photographs

1.0 INTRODUCTION

Kleinfelder was contracted by Dewberry to conduct an assessment of United States Army Corps of Engineers (USACE) waters of the United States (Waters), including wetlands, and historic wetlands. An assessment was also conducted for the presence of potential habitat for federally threatened or endangered (listed) and protected species within the property of the Tulsa Port of Catoosa, in Rogers County, Oklahoma (Figure 1). The project covers two sites with an approximate 595-acre total environmental study area (study areas). The western study area extends from approximately 1000 feet north of Keystone Avenue (36.228668° N, -95.756277° W) south to a leased agricultural field located on the north side of Bird Creek (36.204703° N, -95.756289° W) and the eastern study area extends from (36.219604° N, -95.728736° W) on the northern end to (36.215102° N, -95.728012° W) at the southern extent (Figure 2). This report documents the results of the delineations for the benefit of Dewberry and the Tulsa Port of Catoosa and may be relied upon by their successors and/or assignees associated with the transaction for which this report was commissioned.

The project is located within portions of: the S 1/2 of Section 7, all but the SE ¼ of Section 18, and the E 1/2 of the NE ¼ of Section 17 of Township 20 North, Range 15 East, Indian Meridian, Rogers County, Oklahoma. The proposed project is mapped on the 1982 photorevised Mingo, OK and the 1980 photorevised Catoosa, OK quadrangles, United States Geological Survey (USGS) 7.5-Minute Series Topographic Maps (Figure 3).

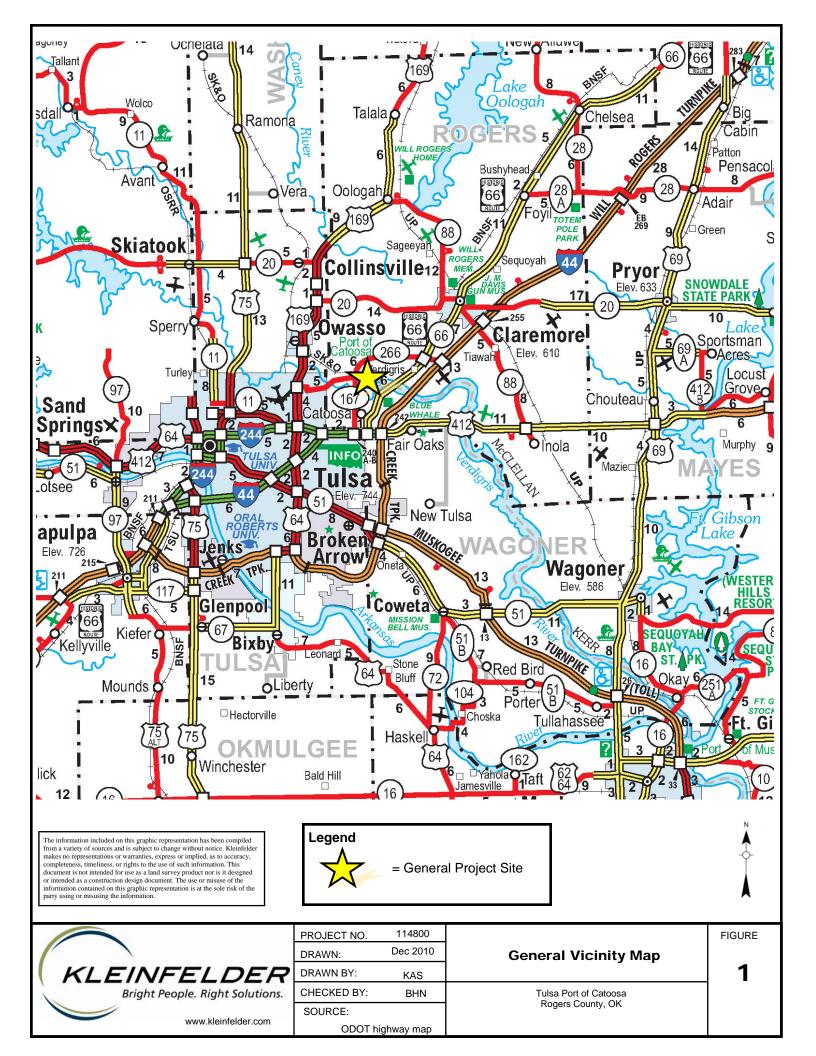
Kleinfelder environmental scientists (Ms. Kim Shannon and Mr. Jason Caskey) conducted the delineations to characterize and map potentially jurisdictional Waters within the study areas. Potentially jurisdictional Waters, including wetlands, were found within the study areas. The survey was conducted on December 8, 9, 14, and 15, 2010 and consisted of a focused pedestrian field survey within the study areas. The study areas were also evaluated for historic wetlands and for the presence of potential habitat for federally threatened or endangered (listed) and protected species for Rogers County, OK. Prior to conducting the field surveys, Kleinfelder reviewed site maps, historic aerial photographs, natural resource database accounts, National Wetlands Inventory (NWI) maps (Figure 4), the U.S. Fish and Wildlife Service (USFWS) list of federally listed species and designated critical habitat areas in Rogers County, Oklahoma, and other relevant scientific literature to determine the potential existence of known wetland features and listed and protected species in the study areas.

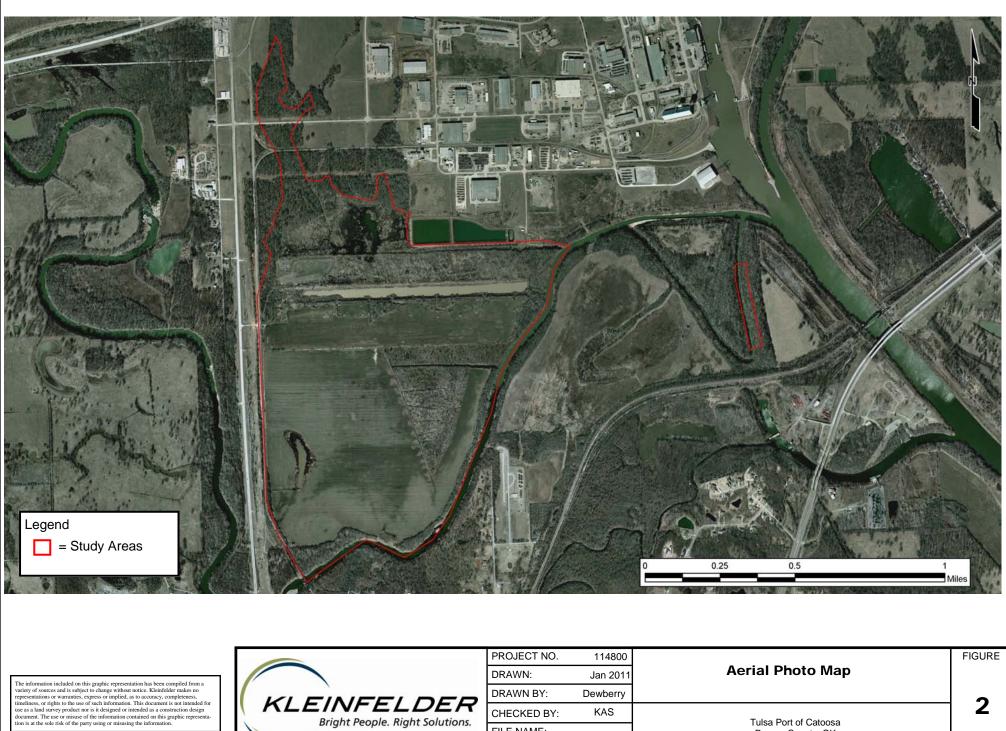
This report is based on knowledge of the special-status resources in the region, a review of relevant background literature, and a focused field survey of the study areas. A discussion of plant and animal species observed on site is included in this report. Information in this report is intended to provide the biological information that is necessary to avoid or minimize impacts to Waters that are potentially jurisdictional. This information may also be used in support of permit applications associated with impacts to these Waters.

2.0 REGULATORY FRAMEWORK

2.1 WATERS OF THE U.S.

The following section provides an overview of the regulatory framework involved with impacts to Waters (including wetlands) associated with the proposed project. Wetlands and riparian communities are considered to have special ecological status and are also considered a declining resource by several regulatory agencies, including the USACE. Wetlands serve significant biological functions by providing nesting, breeding, foraging, and spawning habitat for





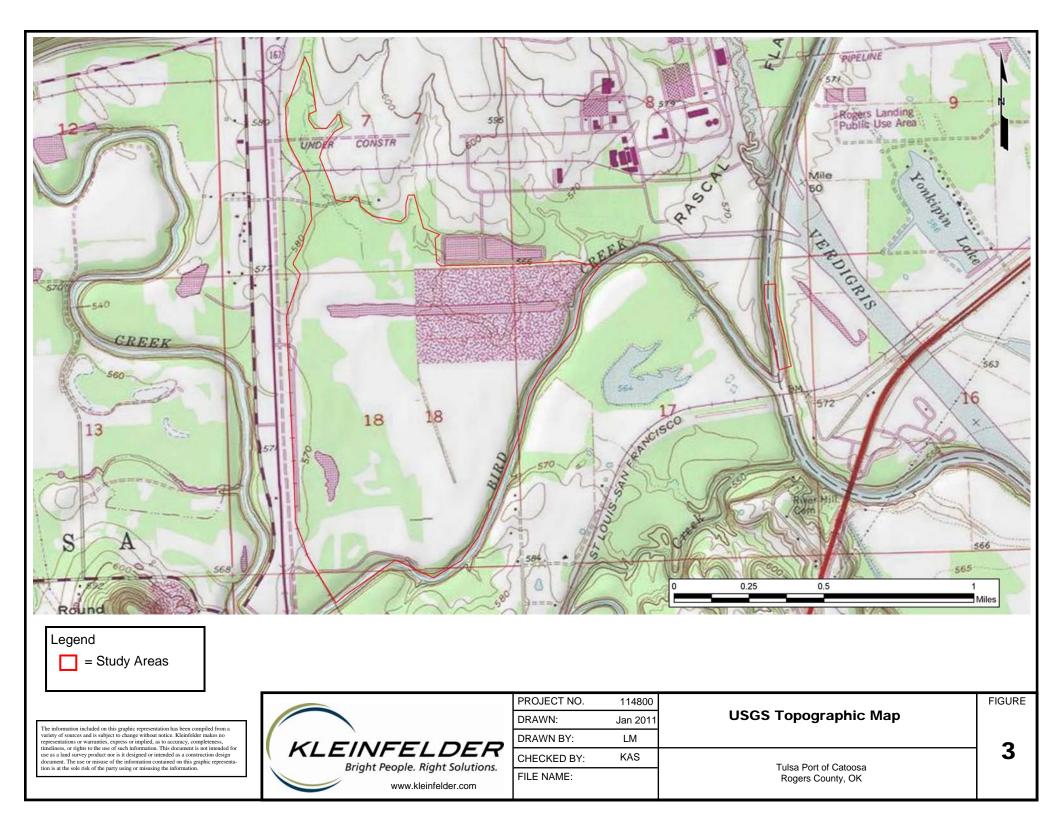
FILE NAME:

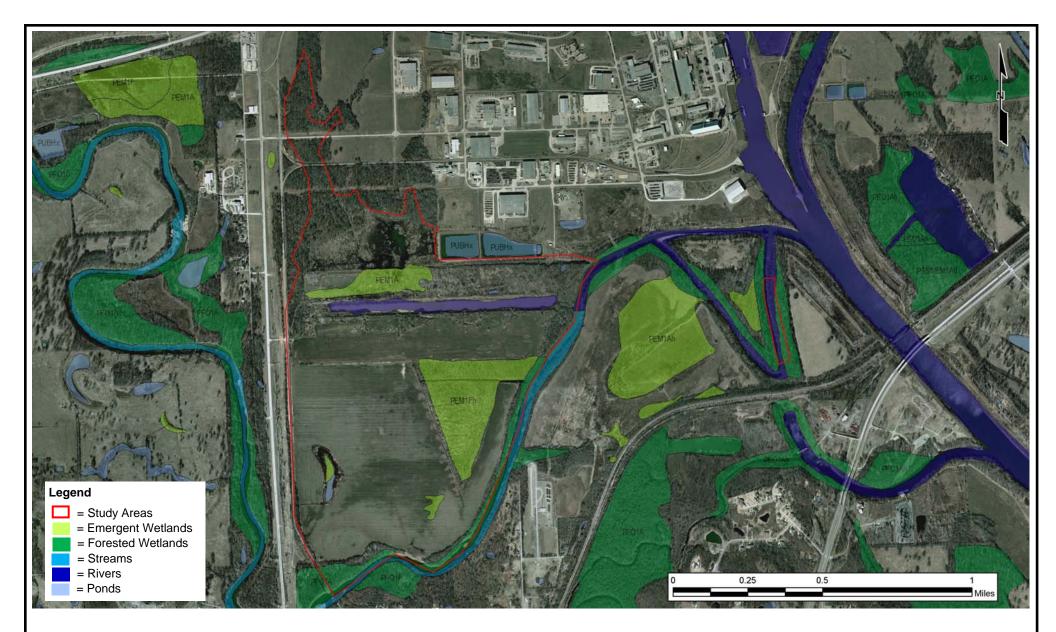
Bright People. Right Solutions.

www.kleinfelder.com

Tulsa Port of Catoosa Rogers County, OK

2





	PROJECT NO.	114800		FIGURE
	DRAWN:	Jan 2011	National Wetlands Inventory Map	
	DRAWN BY:	LM		
KLEINFELDER Bright People. Right Solutions.	CHECKED BY:	KAS	Tules Part of Ostago	4
www.kleinfelder.com	SOURCE: Geospatial wetlands mapper		Tulsa Port of Catoosa Rogers County, OK	

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information. a wide variety of resident and migratory animal species. Wetlands also provide for the movement of water and sediments, nutrient cycling, groundwater recharge, water purification, storage of storm water runoff, recreation and transportation.

According to Section 404 of the Clean Water Act (CWA) of 1977, work (dredging) within navigable waters and the placement of fill material into Waters, including intermittent streams and wetlands, requires authorization by the USACE (EPA, 1972). The type of authorization (e.g., individual permit, nationwide permit, regional permit, or letter of permission from the District Engineer) depends on the acreage, volume, linear distance along a stream course, and purpose of the activity.

Under Section 404 of the CWA, and Section 10 of the Rivers and Harbors Act of 1899, the Environmental Protection Agency (EPA) and the USACE share regulatory authority over Waters. Waters includes all waterbodies that are, have, or may be used for interstate and/or international commerce, including all water that is subject to the ebb and flow of tide; all waters that are rivers, streams, sloughs, lakes, mudflats, sand flats, wetlands, wet meadows, prairie potholes, playa lakes, or natural ponds and the use, degradation, or destruction, of the aforementioned, which could affect interstate and international commerce; all impoundments of above mentioned; all tributaries of above mentioned; territorial seas; and all wetlands adjacent to above mentioned Waters. The width of Waters is defined as that portion which falls within the limits of the ordinary high water mark (OHWM). Field indicators of OHWM are clear and natural lines on opposite sides of the banks, scouring, sedimentary deposits, drift lines, exposed roots, shelving, destruction of terrestrial vegetation, and the presence of litter debris. Typically, the OHWM corresponds to the two-year flood event.

The USACE retains jurisdiction over wetlands that are Waters, and definitions and regulations for the identification and delineation of wetlands were published in the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987). This 1987 manual is the current federal delineation manual used in the CWA Section 404 regulatory program for the identification and delineation of wetlands. The 1987 manual has been clarified and updated through a series of regional supplements, guidance documents and memoranda from the USACE. The Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region is used for southeastern Oklahoma (USAERDC, 2008). The USACE defines wetlands as:

"Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

Thus, the interaction of hydrology, hydrophytic vegetation and hydric soil conditions results in the development of characteristics unique to wetlands. For a wetland to exist, it must have: 1) prevalent hydrophytic vegetation (plants that are adapted to grow, compete, reproduce and persist under anaerobic soil conditions); 2) hydric soils (those that possess characteristics associated with reducing soil conditions); and 3) a source of hydrology (frequently inundated or saturated during the biological growing season). The USACE clearly states, "Except in certain situations defined in this manual, evidence of a minimum of one positive wetland indicator from each parameter (hydrology, soil, and vegetation) must be found in order to make a positive wetland determination."

2.2 THREATENED, ENDANGERED, AND PROTECTED SPECIES

Where activity would require federal authorization or be contingent upon some other federal action, consultation under the Endangered Species Act (ESA) of 1973 is necessary. The ESA prohibits any person from taking, which includes harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, relocating, collecting, or attempting to engage in any such conduct, of any federally listed threatened or endangered species. Significant habitat modification or degradation that results in death or injury to federally protected species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering is also prohibited. Federal agencies are required to comply with the provisions and use their authorities to conserve species. Section 7 of the ESA states that every federal agency taking an action that may affect listed species must consult with the U.S. Department of the Interior, USFWS, or the National Marine Fisheries Service (NMFS). Consultation allows the USFWS to provide their expertise to ensure that the agency is making effective choices to conserve listed species, and that the proposed action would not jeopardize the continued existence of listed species.

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb (USFWS, 1940)."

The Migratory Bird Treaty Act of 1918 decreed that all migratory birds and their parts (including eggs, nests, and feathers) were fully protected. The Migratory Bird Treaty Act (MBTA) is the domestic law that affirms, or implements, the United States' commitment to four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. Each of the conventions protect selected species of birds that are common to both countries (i.e., they occur in both countries at some point during their annual life cycle). A List of Migratory Birds protected by the MBTA is available.

3.0 SETTING

Within the study areas, Kleinfelder understands that current plans involve potentially placing fill from the dredging operations along portions of the Verdigris River/Arkansas River Navigation System. The study areas are primarily rural and forested with agricultural areas dominating the southern half of the western study area.

The western study area has an elevation range of approximately 580 feet above Mean Sea Level (MSL) at the northern end and 561 feet above MSL at the southern end. The eastern study area has an elevation range of approximately 530 feet above MSL at the northern end to 556 feet above MSL at the southern end, as shown on the 1982 photorevised Mingo, OK and the 1980 photorevised Catoosa, OK quadrangles, USGS 7.5-Minute Series Topographic Maps. The average annual precipitation for Rogers County is 43.45 inches, the average annual temperature is 60 degrees Fahrenheit, and the annual growing season is 208 days (OCS, 2010). During 2010 the annual rainfall amount recorded at the Tulsa International Airport

(approximately 7 miles west of the study area) was only 34.47 inches while the annual average for the city of Tulsa, OK is 42 inches (NWS, 2010).

The study areas consist primarily of agricultural, forested, grassland, and developed areas including roads, railroads, and associated right-of-ways (ROW). Cover types within the study areas are comprised of approximately 42.6% forest, 42.3% agricultural, 14.4% grassland, and 0.7% developed (Figure 5).

Habitats within the study areas included mixed-age bottomland forest, mixed-age upland forest, dissected upland dominated by grasses, developed areas, and waterbodies. Within the bottomland forest dominant plant species included Pecan (*Carya illinoensis*), Boxelder (*Acer negundo*), American elm (*Ulmus americana*), Sycamore (*Platanus occidentalis*), Hackberry (*Celtis occidentalis*), Black willow (*Salix nigra*), Deciduous holly (*Ilex decidua*), and Northern red oak (*Quercus rubra*). The forested wetlands are included in this habitat type. Upland forest sites were dominated by Post oak (*Quercus stellata*), Blackjack oak (*Quercus marilandica*), Gum Bully (*Sideroxylon lanuginosum*), Buckbrush (*Symphoricarpos orbiculatus*), Frost flower (*Verbesina virginica*), and Saw Greenbrier (*Smilax bona-nox*). The waterbodies did not have plants specifically associated with them. Introduced and invasive plant species were common in disturbed areas and were observed predominantly within mowed or maintained ROWs. These species included Sericea Lespedeza (*Lespedeza cuneata*), Bermudagrass (*Cynodon dactylon*), and Johnsongrass (*Sorghum halepense*).

Due to headcutting, as a result of the construction of the Arkansas River Navigation System, the bed level of Bird Creek has dropped. This drop has essentially disconnected Bird Creek from the forested areas along its banks (Weins, 2003). While there are still some bottomland forest species present, the banks of Bird Creek are currently dominated by more upland plant species.

3.1 ECOREGIONS

Level 4 Ecoregions of Oklahoma Information

The subject site is located within the Osage Cuestas, a subregion of the Central Irregular Plains ecoregion (#40) of Oklahoma (Figure 6).

40b. Osage Cuestas

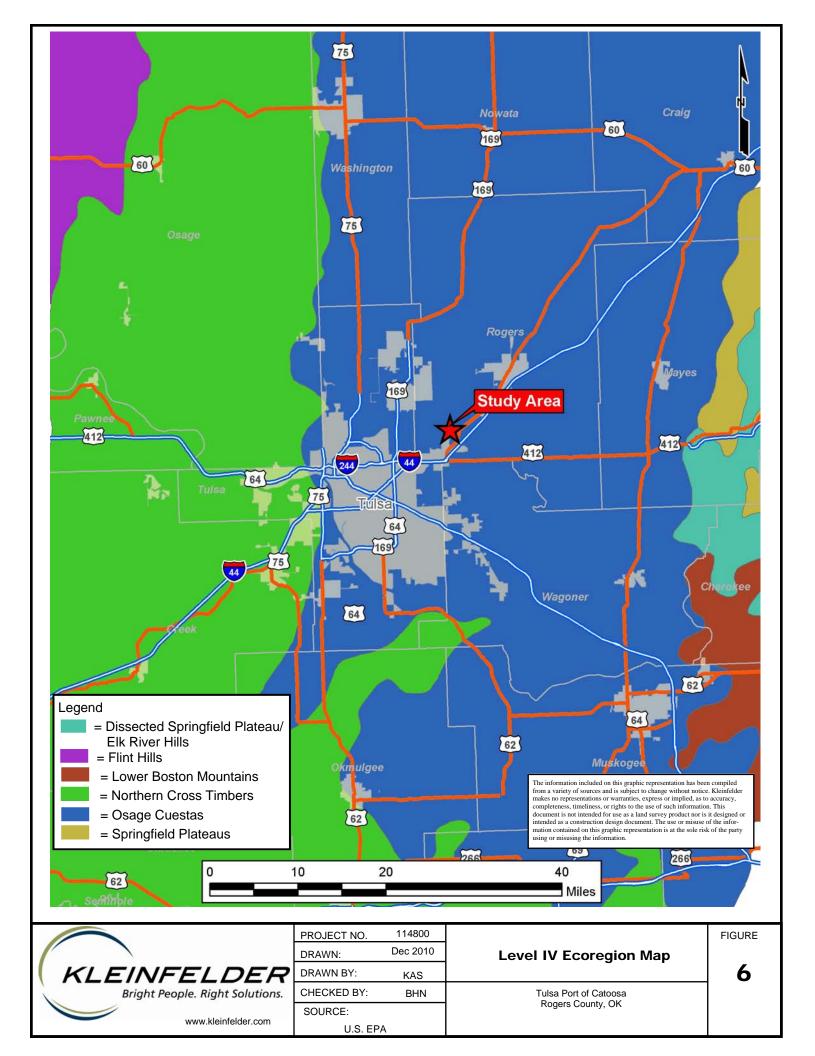
The Osage Cuestas ecoregion is an irregular to undulating plain that is underlain by interbedded, westward-dipping sandstone, shale, and limestone. East-facing cuestas and low hills occur. Topography is distinct from the nearby Flint Hills, Ozark Highlands, and Cherokee Plains ecoregions. Natural vegetation is mostly tall grass prairie, but a mix of tall grass prairie and oak-hickory forest is native to eastern areas. Overall, the mosaic of natural vegetation is unlike the neighboring Cross Timbers and Ozark Highlands ecoregions. Today, rangeland, cropland, riparian forests, and on rocky hills, oak woodland or oak forest occur; cropland is not as common as in the neighboring Cherokee Plains Ecoregion. (Woods et al, 2005).

Potential natural vegetation for this ecoregion consists mostly of tallgrass prairie (dominants: big bluestem, little bluestem, switchgrass, and Indiangrass), grading eastward into a mosaic of tall grass prairie and oak-hickory forest; on rocky hilltops, cross timbers (dominants: blackjack oak, post oak, and little bluestem). Tallgrass prairie is native on deep loams derived from shale or



	PROJECT NO.	114800		FIGURE
	DRAWN:	Jan 2011	Cover Type Map	
	DRAWN BY:	LM		
KLEINFELDER Bright People. Right Solutions.	CHECKED BY:	KAS	Tulas Datt of Cotacas	5
www.kleinfelder.com	FILE NAME:		Tulsa Port of Catoosa Rogers County, OK	

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.



limestone. Bottomland forests are native on floodplains and low terraces. Currently, on rocky hills, dry upland forest and woodland is found. Dry prairie composed of short and tall grasses occurs on shallow, gravelly soils of limestone scarps. In riparian areas are forests containing boxelder, silver maple, bur oak, Shumard oak, American elm, hackberry, pecan, walnut, sycamore, and eastern cottonwood.

Land cover and land use for this ecoregion is a mosaic of rangeland, grassland, cropland, and especially in more rugged areas, woodland. Wooded riparian corridors occur on wettest bottomlands. Wheat, soybeans, grain sorghum, and alfalfa hay are major crops. Livestock (especially cattle) farming is important. Strip mining for coal and oil production have degraded water quality in some streams (Woods et al., 2005).

4.0 METHODS AND LIMITATIONS

The USACE has prescribed methodologies for delineating "waters of the United States" and wetlands pursuant to the CWA of 1977 (EPA, 1972). Determination of Waters is based on definitions and descriptions found in the Code of Federal Regulation (CFR) at 33 CFR 328. Methods for delineating wetlands are detailed in the USACE Wetland Delineation Manual (Environmental Laboratory, 1987) and require that, under normal circumstances, an area possess three technical criteria to be designated as a jurisdictional wetland. Those criteria are: 1) the prevalence of hydrophytic vegetation, 2) the presence of hydric soils, and 3) the presence of wetland hydrology.

The evaluation of any on-site stream features for the jurisdictional determination was conducted in accordance with the policy, practice, and procedures set forth in 33 CFR 328, which determines the extent of jurisdiction of the USACE over Waters. The definitions for jurisdictional determination consist of the following:

- A. The term *"waters of the United States"* means:
 - 1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
 - 2. All interstate waters including interstate wetlands;
 - 3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
 - Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
 - From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
 - Which are used or could be used for industrial purpose by industries in interstate commerce;
 - 4. All impoundments of waters otherwise defined as waters of the United States under the definition;
 - 5. Tributaries of Waters identified in paragraphs (a)(1)-(4) of this section;

- 6. The territorial seas;
- 7. Wetlands adjacent to Waters (other than Waters that are themselves wetlands) identified in paragraphs (a)(1)-(6) of this section.
- 8. Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 123.11(m) which also meet the criteria of this definition) are not Waters of the United States.
- 9. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with the EPA.

Limits of jurisdictional authority are as follows:

- A. *Territorial Seas* The limit of jurisdiction in the territorial seas is measured from the baseline in a seaward direction a distance of three nautical miles. (See 33 CFR 329.12)
- B. *Tidal Waters of the United States* The landward limits of jurisdiction in tidal waters:
 - Extends to the high tide line, or
 - When adjacent non-tidal waters of the United States are present, the jurisdiction extends to the limits identified in paragraph (c) of this section.
- C. *Non-Tidal Waters of the United States* The limits of jurisdiction in non-tidal waters:
 - In the absence of adjacent wetlands, the jurisdiction extends to the ordinary high water mark, or
 - When adjacent wetlands are present, the jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands.
 - When the water of the United States consists only of wetlands the jurisdiction extends to the limit of the wetland.

The wetland assessment and delineation was conducted in accordance with the Corps of Engineers Wetlands Delineation Manual and the Midwest Region supplement (USAERDC, 2008). The delineation form for the Midwest region was used and the wetland assessment consisted of the following:

• A desktop review was undertaken to identify areas that were previously mapped as wetlands, streams, or other waterbodies. A pedestrian survey was conducted at the project site to locate potential jurisdictional waterbodies. When these areas were encountered the routine determination method described in the 1987 USACE Wetland Delineation Manual and Midwest Region supplement was employed, and sample plots were used to determine wetland or non-wetland status. Visual observations were used to identify vegetation, soil, and hydrological characteristics within the vicinity of the sample plots.

- Plant community types in proximity to potential wetland boundaries were identified. Dominant plant species were identified within the visually perceived wetland boundary or until the nearest significant vegetative community change. The biologist selected a representative observation area for each plant community, visually selected the dominant species from each stratum of the community, evaluated the percent cover of plant species in each stratum, and recorded the wetland indicator status of the dominant species. A determination was then made as to whether the vegetation was hydrophytic based on the plant's indicator status and a minimum of two evaluation methods. If no potential jurisdictional waterbodies were observed, upland plant communities were mapped and characterized.
- Hydrophytic vegetation dominates areas where the frequency and duration of inundation or soil saturation exerts a controlling influence on the plant species present. Plant species were assigned wetland indicator status according to the probability of species occurring in wetlands (USFWS, 1988). More than fifty percent of the dominant species must have been hydrophytic to have met the wetland vegetation criterion. Hydrophytic plant indicator status designations conform to the following:
 - OBL Plants that occur almost always (estimated probability >99 percent) in wetlands under natural conditions, but may also occur rarely (estimated probability <1) in non-wetlands.
 - FACW Plants that occur usually (estimated probability >67 percent to 99 percent) in wetlands under natural conditions, but also occur (estimated probability 1 percent to 33 percent) in non-wetlands.
 - FAC Plants with a similar likelihood (estimated probability 33 to 67 percent) of occurring in both wetlands and non-wetlands.
 - FACU Plants that occur sometimes (estimated probability 1 percent to <33 percent) in wetlands, but occur more often (estimated probability >67 percent to 99 percent) in non-wetlands.
 - UPL Plants that occur rarely (estimated probability <1 percent) in wetlands, but almost always occur (estimated probability >99 percent) in non-wetlands under natural conditions.
- Soil pits were dug at sample plots for the potential wetlands being investigated. Munsell Soil Color Charts (MacBeth, 1994) used to evaluate the color, hue, and chroma of representative soils and associated redox features. The redox features were also characterized by their size, distinction, and frequency of occurrence. Soil indicators from the samples were then recorded and it was determined if the soils are hydric. Reducing conditions on site were indicated by the presence of oxidized root channels, positive reaction from Alpha-Alpha Dipyradil, sulfidic odor, or gleyed soils. Also noted were other hydrological indicators, such as soil saturation within the upper 12 inches of the soil, standing water existing within the soil pits, and the depth to inundated or saturated soil. If no hydric soils or potential jurisdictional waterbodies were observed within the project site, no soil pits were dug.

If potential jurisdictional waterbodies are observed, appropriate jurisdictional wetland boundaries would be derived from wetland sampling plot analysis and subsequently recorded using a Trimble GeoXTTM global positioning system (GPS). When satellites cannot be detected by GPS or when there is poor satellite geometry, the boundaries of Waters are marked on aerial photography and field measurements are taken for reference. For areas between sample points, the wetland/upland boundary would be determined by interpolation of the position of vegetation, soil, and hydrologic indicators. This geospatially corrected information would then be digitally

overlaid onto a representative aerial photograph and a topographic map using ArcGIS software to display the cumulative, on-site jurisdictional area. Wetland feature polygons, wetland soil pits, and upland soil pits would be identified on the maps and identified with a corresponding label. Digital photographs were taken to document on-site conditions and are provided in Appendix A.

A variety of data sources were reviewed with regard to the location of historic wetlands within the study areas. These data sources included:

- NRCS historic aerial photographs
- NRCS Web Soil Survey data including:
 - o hydric ratings
 - o soil physical features
 - o flooding frequency
 - o depth to water table
- NRCS 2009 Hydric Soils List for Oklahoma
- Google Earth Pro
- USFWS NWI maps
- USGS Topographic maps

The historic aerial photographs acquired from the NRCS were taken in 1971, 1979, and 1991 and are included in Appendix C. Aerial photos taken prior to 1971 were not available from the NRCS office.

5.0 SITE CHARACTERIZATION

The two study areas can be generally characterized as rural, wooded, agricultural, with small maintained/mowed areas surrounding roads or utility ROWs, with streams, ponded water, and wetlands interspersed throughout. The large site is bordered to the south and east by Bird Creek, by Hwy 167 to the west, and commercial development to the north. The southern half of the large site is dominated by a leased agricultural field including a pond and an associated wetland, while the northern half of the large site is dominated by areas of bottomland forest, wetlands and intermittent streams, limited upland areas, and mowed/maintained ROWs. The smaller site directly to the east is bordered by a former channel of the Verdigris River on the west, an agricultural field to the east, and similar wooded areas to the north and south.

5.1 SOILS AND DRAINAGE

Soils within the two study areas consist mainly of clayey and loamy soils derived from sandstone, shale, or limestone parent material with silty, alluvial soils found along or near waterbodies. The specific soil types for each project area are listed in Table 1 below. Of these soil types, Osage clay and Verdigris clay loam are Oklahoma hydric soils (USDA, 2009) (Figure 7). Portion of the study areas occur within the FEMA-mapped 100-year floodplain of Bird Creek. FEMA Flood Insurance Rate Maps are included (Figure 8). Flood zones are described in Table 2.

Table 1: Soil Map Units within Study Areas						
Map Unit Symbol	Map Unit Map Unit Name Slope Drainage / Hydric					
BarG	Barge silty clay loam	0 to 30 percent	Well drained/not hydric			
ChB	Choteau silt loam	1 to 3 percent	Somewhat poorly drained/not hydric			
DnB	Dennis silt loam	1 to 3 percent	Somewhat poorly drained/not hydric			



See Table One for Soil Types Data (p. 8)

The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or missue of the information contained on this graphic representation is at the sole risk of the party using or missuing the information.

	PROJECT NO.	114800		FIGURE
	DRAWN:	Jan 2011	NRCS Soils Map	
	DRAWN BY:	LM		-
KLEINFELDER Bright People. Right Solutions.	CHECKED BY:	KAS	Tulsa Port of Catoosa	
www.kleinfelder.com	SOURCE: Web Soil S	Survey	Rogers County, OK	

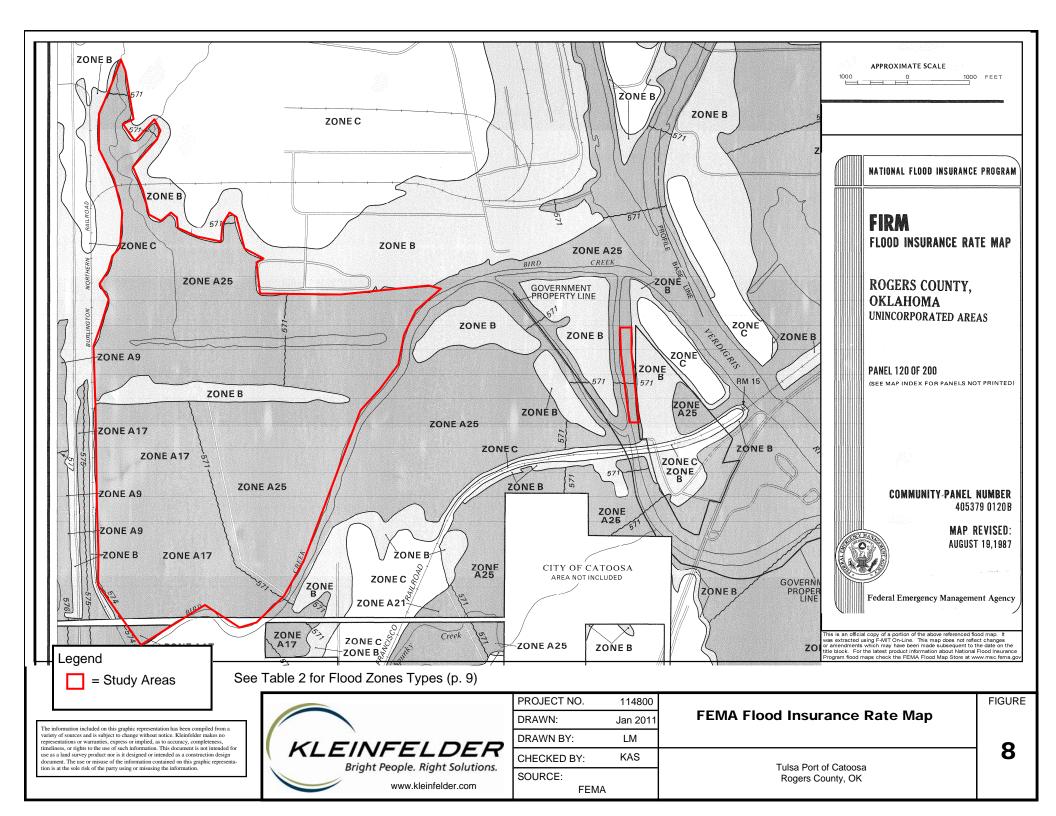


	Table 1: Soil Map Units within Study Areas					
Os Osage clay 0 to 1 percent Poorly drained/hydric						
RvC	Riverton gravelly loam	3 to 5 percent	Well drained/not hydric			
Ve Verdigris clay loam 0 to 1 percent			Occasionally flooded/hydric			
Vf Verdigris silty clay loam 0 to 2 percent Well drained/not hydric						

	Table 2: Flood Zones within Study Areas				
Zone Symbol	Risk Level	Description			
Zone A17	High	Numbered A Zone; base floodplain where FIRM shows an old BFE format.			
Zone A25	High	Numbered A Zone; base floodplain where FIRM shows an old BFE format.			
Zone B	Moderate to Low	Areas usually between limits of 100-yr and 500-yr floods; areas protected by levees from 100-yr floods, or shallow flooding areas with average depths of less than one foot or drainage areas of less than one square mile.			

5.2 VEGETATION ASSESSMENT (PLANT COMMUNITIES)

The dominant plant communities within the study areas include bottomland forest, forested wetland, upland forest, emergent wetland, upland grasslands, and mowed or maintained areas within ROWs and along roads. The table below summarizes the plant species observed within the two study areas.

Table 3: Plant Species Observed within Study Areas					
Common Name	ommon Name Scientific Name		NWI Status		
Amaranth	Amaranthus sp.	h	FAC		
American Elm	Ulmus americana	t	FAC		
American Pokeweed	Phytolacca americana	h	FAC		
American Sycamore	Platanus occidentalis	t	FAC		
Barnyard Grass	Echinochloa crus-galli	h	FACW		
Bermuda Grass	Cynodon dactylon	h	FACU		
Big Bluestem	Andropogon gerardii	h	FACU		
Blackberry	Rubus sp.	h	NI		
Black Oak	Quercus velutina	t	-		
Blackjack Oak	Quercus marilandica	t	-		
Black Willow	Salix nigra	t	FACW		
Boxelder	Acer negundo	t	FACW		
Bristlegrass	Setaria sp.	h	FAC		
Buckbrush	Symphoricarpos orbiculatus	h	FACU		
Buttonbush	Cephalanthus occidentalis	S	OBL		
Carolina Elephantsfoot			FAC		
Curly Top Knotweed	Polygonum lapathifolium	h	FACW		
Eastern Redbud	Cercis canadensis	t	UPL		
Elderberry	Sambucus canadensis	t	FAC		

Table 3: Plant Species Observed within Study Areas					
Common Name	Scientific Name	Vegetation Type	NWI Status		
Frost Flower	Verbesina virginica	h	FACU		
Grape	<i>Vitis</i> sp.	V	FAC		
Giant Goldenrod	Solidago gigantea	h	FAC		
Green Ash	Fraxinus pennsylvanica	t	FACW-		
Gum Bully	Sideroxylon lanuginosum	S	FACU		
Hackberry	Celtis occidentalis	t	FAC		
Hop Sedge	Carex lupulina	h	OBL		
Indianhemp	Apocynum cannabinum	h	FAC		
Indian Woodoats	Chasmanthium latifolium	h	FAC		
Japanese Honeysuckle	Lonicera japonica	V	FAC		
Johnsongrass	Sorghum halepense	h	FACU		
Little Bluestem	Schizachyrium scoparium	h	FACU		
Mulitflora Rose	Rosa multiflora	h	UPL		
Northern Red Oak	Quercus rubra	t	FACU		
Osage Orange	Maclura pomifera	t	UPL		
Pecan	Carya illinoensis	t	FAC		
Plum	Prunus americana	t	NI		
Poison Ivy	Toxicodendron radicans	V	FAC		
Possumhaw	llex decidua	t	FACW		
Post Oak	Quercus stellata	t	NA		
Purpletop	Tridens flavus	h	UPL		
Saw Greenbrier	Smilax bona-nox	V	FAC		
Sericea Lespedeza	Lespedeza cuneata	S	NI		
Shumard Oak	Quercus shumardii	t	FAC		
Silver Maple	Acer saccharinum	t	FAC		
Sugarberry	Celtis laevigata	t	FAC		
Switchgrass	Panicum virgatum	h	FACW		
Virginia Wildrye	Elymus virginicus	h	FAC		
	aceous, v=vine, NI=no indicator,	"-" = not listed			

5.3 WILDLIFE ASSESSMENT

Wildlife species observed during field surveys within the two study areas are summarized in Table 3 below.

Table 4: Animal Species Observed within Study Areas				
Common Name Scientific Name				
Birds (Sibley, 2000)				
American Crow	Corvus brachyrhynchos			
American Goldfinch	Spinus tristis			
Belted Kingfisher	Ceryle alcyon			
Bewick's Wren Thryomanes bewickii				
Blue Jay	Cyanocitta cristata			

Table 4: Animal Species Observed within Study Areas					
Common Name	Scientific Name				
Canada Goose	Branta canadensis				
Carolina Chickadee	Poecile carolinensis				
Cedar Waxwing	Bombycilla cedrorum				
Great Blue Heron	Ardea herodias				
Mallard	Anas platyrhynchos				
Northern Cardinal	Cardinalis cardinalis				
Pileated Woodpecker	Dryocopus pileatus				
Red-tailed Hawk	Buteo jamaicensis				
Tufted Titmouse	Baeolophus bicolor				
White Breasted Nuthatch	Sitta carolinensis				
Unidentified Ducks					
Unidentified Geese					
Mammals (Caire et al., 1989)					
American Beaver	Castor canadensis				
Eastern Cottontail	Sylvilagus floridanus				
Eastern Gray Squirrel	Sciurus carolinensis				
Nine-banded Armadillo	Dasyppus novemcinctus				
White-tailed Deer	Odocoileus virginianus				
Invertebrates	Invertebrates				
Unidentified Crayfish					

6.0 FINDINGS

6.1 Threatened, Endangered and Protected Species

In order to evaluate the subject site for the potential presence of protected species, the USFWS list of federally listed species and designated critical habitat areas in Rogers County, Oklahoma was reviewed (USFWS, 2009). These sources were reviewed to determine if the proposed project has the potential for adverse impacts to listed species or their habitat. Based upon the habitat descriptions of those species that were indicated to occur in Rogers County, a qualitative comparison to the habitat present within the subject site that could increase the potential for listed species to be present or adjacent to the proposed project was made during field reconnaissance efforts. The qualitative comparison was based upon regional and local ecological characteristics including soils, terrain, hydrology, and vegetation. The USFWS was not directly contacted.

Notes were also taken on livestock grazing, development, pollution and other disturbances that could decrease the potential for listed species to be present. Table 4 includes listed and candidate species that are either present, have the potential to be present, or have been observed in the past in Rogers County.

Table 5: Rogers County, Oklahoma Listed and Protected Species						
Common NameScientific NameFederal ListingCritical Habitat						
American Burying Beetle	Nicrophorus americanus	E	No			
Interior Least Tern Sterna antillarum		E	No			
Piping Plover	Charadrius melodus	Т	No			

Table 5: Rogers County, Oklahoma Listed and Protected Species					
Common Name	Scientific Name	Federal Listing	Critical Habitat		
Whooping Crane	nooping Crane Grus americana		No		
Western Prairie Fringed Platanthera praeclara Orchid		Т	No		
Arkansas Darter	Etheostoma cragini	C	No		
Neosho Mucket Mussel	ucket Mussel Lampsilis rafinesaqueana		No		
Bald Eagle Haliaeetus leucocephalus DL* No					
	gered, C = candidate, DL = de nder the Bald and Golden Eag				

No critical habitat has been designated for the eight species listed above in Rogers County, Oklahoma (USFWS Critical Habitat Mapper).

American Burying Beetle: The American Burying Beetle (ABB) is federally listed as endangered. This species is found in 22 counties in eastern Oklahoma. An additional six Oklahoma counties lie within the historic range of the ABB and two others have had unconfirmed sightings since 1992. This insect species is present on less than 10% of its original range. Mature forest is its preferred natural habitat, but it can be found in hedgerows, grasslands, and shrublands. This scavenger needs small vertebrates (from 50-200 grams in size) to feed upon. Habitat requirements for the ABB include areas with loose, well-drained soils with a well-formed litter layer from oak-hickory and oak-pine forests, as well as open native grassland and open native fields along forest edges. According to the USFWS, pastures where native grasses have been displaced by cultivation of Bermuda grass (*Cynodon dactylon*) are not expected to support the ABB. There is no Critical Habitat designated for the ABB in Rogers County (USFWS, 1991).

Findings of Survey Results for ABB: The study areas have potentially suitable habitat for the ABB, excluding the developed urban areas and gravel areas of the existing BNSF ROW. There are approximately **49** acres of forested and upland grassland plant communities that provide potentially suitable ABB habitat within the study areas.

Interior Least Tern: The Interior Least Tern is federally listed as endangered (USFWS, 1985a). The Interior Least Tern is a frequent summer resident that occurs along sand bars within the braided channels of the Canadian, Red, Cimarron, and Arkansas rivers (USFW, 1990). In Oklahoma, the largest populations occur at the Salt Plains National Wildlife Refuge in Alfalfa County. Nesting colonies occur on sparsely vegetated sandbars on large rivers or salt flats with some natural debris. Most nesting occurs in May-June.

Findings of Survey Results for Interior Least Tern: The study areas do not contain sparsely vegetated sandbars on large rivers or salt flats with the natural debris required by the Interior Least Tern for both nesting and feeding. Suitable habitat for the Interior Least Tern was not observed to be present on or in the immediate vicinity of the environmental study areas. Due to the lack of appropriate habitat within the study areas, the project is expected to have no effect on the Interior least tern.

Piping Plover: The Piping Plover is federally listed as endangered within the Great Lakes Region, and threatened in the remainder of its range, including Oklahoma. Preferred habitats include sandy beaches along the ocean or lakes, and bare areas of islands or sandbars along

large rivers. They also nest on the pebbly mud of interior alkali lakes and ponds. This shorebird migrates through Oklahoma each spring and fall. Sight records of migratory Piping Plovers exist for many central and eastern Oklahoma counties. Rogers County is not located in the probable migratory pathway between breeding and winter habitats (USFWS, 1985b).

Findings of Survey Results for Piping Plover: The study areas do not contain sparsely vegetated sandbars on large rivers with the natural debris required by the Piping Plover for both nesting and feeding. No suitable habitat for the Piping Plover was observed to be present on or in the immediate vicinity of the environmental study areas. Nesting Piping Plovers are only known pre-1997, from the Oklahoma panhandle and do not nest in Rogers County (GMSARC, 2009). Due to the limited size of the project, rarity of occurrence, and the lack of foraging habitat in eastern Oklahoma, the project is expected to have no effect on the Piping Plover.

Whooping Crane: The Whooping Crane is federally listed as endangered (USFWS, 1967). Critical Habitat has been designated for this species in Oklahoma at the Salt Plains National Wildlife Refuge (NWR) in northwestern Oklahoma. This wading bird uses marshes and prairie potholes in the summer and in winter they are found in coastal marshes and prairies. The Whooping Crane migrates through western and central Oklahoma in the spring and fall. During migration, Whooping Cranes are sometimes found in Oklahoma outside of the Salt Plains NWR along rivers, grain fields, or in shallow wetlands. There are no records of whooping crane sightings in Rogers County, OK within the last 15 years (ODWC, 2011). There is no critical habitat for the whooping crane in Rogers County, OK.

Findings of Survey Results for Whooping Crane: While the study areas are not located in western Oklahoma, they are located along large streams with associated forested and emergent wetlands and within an agricultural/grain field. The large emergent and open-canopy forested wetlands located within the subject site do provide potentially appropriate habitat for the Whooping Crane. Areas of suitable habitat for the Whooping Crane were present on or in the immediate vicinity of the western study area based on observations. This project may affect but is not likely to adversely affect the Whooping Crane or its associated habitat.

Neosho Mucket Mussel: The Neosho Mucket is federally listed as a candidate species. In Oklahoma, living Neosho muckets were found along 55 miles of the Illinois River from the Oklahoma/Arkansas state line, downstream to the headwaters of Tenkiller Lake, Cherokee County, Oklahoma (Mather, 1990). Vaughn (1997) estimated the population within the Oklahoma portion of the Illinois River (the same reach surveyed by Mather in 1990) at between 500 and 1,000 Neosho muckets. Reproduction and recruitment rates of this species are low and the Neosho muckets is relatively rare in the Fall, Verdigris, Neosho, and North Fork Spring Rivers, and Shoal Creek, in northeastern Oklahoma. There is no critical habitat designated for the Neosho mucket in Rogers County.

Findings of Survey Results for Neosho Mucket Mussel: The subject site does not contain medium-sized or large rivers required by the Neosho mucket mussel. Suitable habitat for the Neosho mucket was not observed to be present on or in the immediate vicinity of the subject site. This project is expected to have no effect on the Neosho mucket mussel or its associated habitat.

Arkansas Darter: The Arkansas Darter is federally listed as a candidate species. It occurs in the Arkansas River drainage from Arkansas to Colorado; numerous viable populations exist, but

recent declines have occurred and many populations are threatened by continuing loss of habitat, especially through dewatering. Historically this fish was never very common. Preferred habitat includes spring-fed creeks with cool, clear water with herbaceous aquatic vegetation, or pools with sand, fine gravel, or organic detritus substrate. Surveys in 1994-1997 in south-central Kansas and adjacent Oklahoma recorded this species from 67 of the 108 localities that were sampled within the general historical range of the species (Eberle and Stark 2000).

Findings of Survey Results for Arkansas Darter: The subject site does not contain spring-fed creeks with cool clear water, aquatic herbaceous vegetation, and gravel bottoms, as required by the Arkansas Darter. Suitable habitat for the Arkansas Darter was not observed to be present on or in the immediate vicinity of the subject site. This project is expected to have no effect on the Arkansas Darter or its associated habitat.

Western Prairie Fringed Orchid: The Western Prairie Fringed Orchid was federally listed as threatened in 1989. No Critical Habitat has been designated for this species. This perennial plant was most often found in high-quality, moist tallgrass prairie or sedge meadow habitats. Historically this orchid was found west of the Mississippi River from extreme southern Canada to northeast Oklahoma. In Oklahoma there are historic records of this plant occurring in Rogers and Craig counties. Currently, it is considered extirpated in Oklahoma (Audubon, 2008).

Findings of Survey Results for Western Prairie Fringed Orchid: The study areas are not within a high quality moist tallgrass prairie or sedge meadow. No suitable habitat for the Western Prairie Fringed Orchid was present on or in the immediate vicinity of the study areas based on observations. This project is expected to have no effect on the Western Prairie Fringed Orchid or its associated habitat.

Bald Eagle: The Bald Eagle is a large predatory bird that occupies large trees along major rivers and streams during their winter distribution (December through March) in Oklahoma. In August 2007, the Bald Eagle was delisted by the USFWS from the Federal List of Endangered and Threatened Wildlife (USFWS, 2007). Since delisting, the Bald Eagle continues to be protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act (USFWS, 1940). Bald Eagles nest in tall trees usually within one or two miles of large rivers, streams and lakes where fish are abundant. Although nesting eagles are concentrated in eastern Oklahoma, their nesting range appears to be expanding. Bald Eagles were not observed during this survey.

Findings of Survey Results for Bald Eagle: There is one perennial stream (Bird Creek) with tall trees within the environmental study areas. Based on information from the G.M. Sutton Avian Research Center, the closest occupied Bald Eagle nest is located approximately four miles northeast of the study areas along the Verdigris River (GMSARC, 2011). No Bald Eagle nests were observed within or adjacent to the study areas. Suitable nesting, roosting, and foraging habitat for the Bald Eagle were observed in the study areas. While suitable nesting, roosting, and foraging habitat is present within the study areas, disturbance would only be associated with temporary construction activities. This project is expected to have no effect on the Bald Eagle or its associated habitat.

6.2 Potentially Jurisdictional Waterbodies

Based on Kleinfelder's assessment, specific locations within the environmental study areas met the technical criteria for jurisdictional wetlands. Following the U.S. Supreme Court's decision in Rapanos v. United States and Carabell v. United States (2006), technical standards have been implemented for determining the limit of Waters. The current technical standards have: 1) rejected the argument that the term "waters of the United States" is limited to only those waters that are navigable in the traditional sense and their abutting wetlands, and 2) asserted that regulatory authority should extend only to "relatively permanent, standing or continuously flowing bodies of water" connected to traditional navigable waters, and to "wetlands with a continuous surface connection to" such relatively permanent waters (USACE, 2007).

The study areas contain 18 waterbodies. Two (2) mapped, blue-line intermittent streams; three (3) unmapped intermittent streams; three (3) mapped wetlands; seven (7) unmapped wetlands; two (2) mapped ponds, and one (1) unmapped pond were observed during field investigations within the environmental study areas (Figures 9a and 9b). Wetland delineation data forms for the wetland features and their coinciding upland features are located in Appendix B. Of these 18 waterbodies, **13 are potentially jurisdictional**. A summary of all Waters for the study areas is shown in Table 6.

	Table 6: Potentially Jurisdictional Waterbodies within the Study Areas						
Water- body	USGS Topo or NWI Classification	Length / Area	Field Observa- tions	Jurisdic- tional	Cowardin Classifi- cation	OHWM / Avg. Width Observed	Comments
Waters 1 (Fig 9a)	Intermittent, mapped, unnamed, blue- line stream	3,533 ft./0.92 acres	Intermittent stream	Yes	R4UB3	11.3 feet	Slow flow, un- consolidated mud bottom, vegetated banks, 0-6" deep
Waters 2 (Fig 9a)	Unmapped	3,056 ft./0.61 acres	Intermittent stream	Yes	R4UB3	8.75 feet	Slow flow, un- consolidated mud bottom, steep, vegetated banks, 0-3" deep
Waters 3 (Fig 9a)	Unmapped	3,309 ft./0.42 acres	Intermittent stream	Yes	R4UB3	5.5 feet	Slow flow, un- consolidated mud bottom, vegetated banks, pooled water 0-3" deep;
Waters 4 (Fig 9a)	Intermittent, mapped, unnamed, blue- line stream	387 ft./0.04 acres	Intermittent stream	Yes	R4UB3	4.5 feet	Slow flow, un- consolidated mud bottom, vegetated banks, pooled water 0-4" deep

Table 6: Potentially Jurisdictional Waterbodies within the Study Areas										
Water- body	USGS Topo or NWI Classification	Length / Area	Field Observa- tions	Jurisdic- tional	Cowardin Classifi- cation	OHWM / Avg. Width Observed	Comments			
Waters 5 (Fig 9a)	Unmapped	462 ft./0.02 acres	Intermittent stream	No	R4UB3	2 feet	Isolated, slow flow, un- consolidated mud bottom, vegetated banks, 0-3" deep			
Wetland 1 (Fig 9a)	PFO1Ah	2.52 acres	Forested Wetland	Yes	PF01Ah	NA	East study area; forested, borders Bird Creek at western edge			
Wetland 2 (Fig 9a)	PEM1FH	33.75 acres	Forested/ Shrub Wetland	Yes	PFOSS1A	NA	Triangular forested/ shrub wetland within Ag field			
Wetland 3 (Fig 9a)	PEM1F	7.94 acres	Emergent Wetland	No	PEM1A	NA	Isolated wetland surrounding Pond 1			
Wetland 4 (Fig 9a)	None	0.99 acres	Emergent Wetland	No	PEM1Ab		Isolated wetland at western boundary of Pond 3			
Wetland 5 (Fig 9b)	None	5.74 acres	Forested Wetland	Yes	PF01Ab	NA	Forested, created and maintained by beavers			
Wetland 6 (Fig 9b)	None	3.03 acres	Emergent Wetland	Yes	PEM1Ab	NA	Emergent, created and maintained by beavers			
Wetland 7 (Fig 9b)	None	15.49 acres	Forested Wetland	Yes	PFO1Ab	NA	Forested, created and maintained by beavers			
Wetland 8 (Fig 9b)	None	4.85 acres	Emergent Wetland	Yes	PEM1Ab	NA	Emergent, created and maintained by beavers			
Wetland 9 (Fig 9b)	None	1.36 acres	Emergent Wetland	Yes	PEM1Ab	NA	Emergent, created and maintained by beavers			
Wetland 10 (Fig 9b)	None	0.34 acres	Forested Wetland	Yes	PFO1Ab	NA	Forested, created and maintained by beavers			
Pond 1	PUBH	2.30 acres	Freshwater Pond	No	PUB3H	NA	Isolated pond within Ag field			

Table 6: Potentially Jurisdictional Waterbodies within the Study Areas											
Water- body	USGS Topo or NWI Classification	Length / Area	Field Observa- tions	Jurisdic- tional	Cowardin Classifi- cation	OHWM / Avg. Width Observed	Comments				
Pond 2	None	3.83 acres	Freshwater Pond	Yes	PUB3Hb		Pond maintained by beavers				
Pond 3	L1UBhx	12.4 acres	Freshwater Pond	No	PUB3Hh		Abandoned private project				
Approx. Totals		10,747 Linear Feet / 76.01 Acres of Wetland; 18.53 Acres Ponds		13 jurisdic- tional							

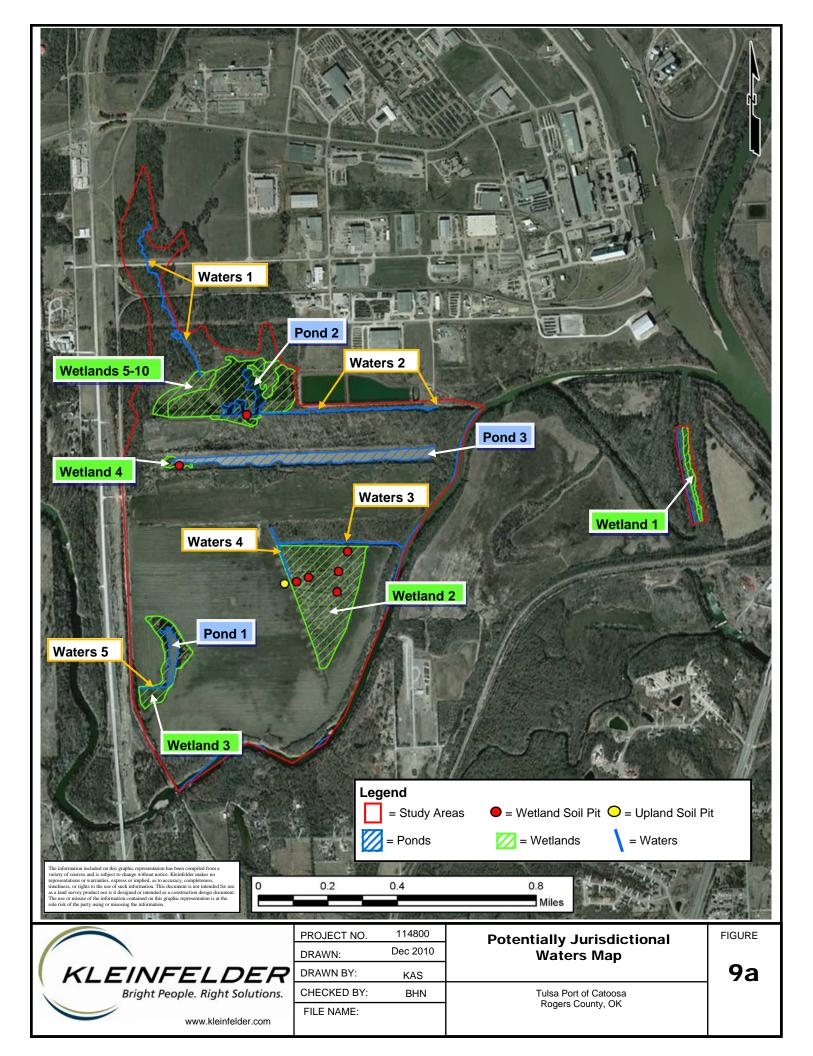
Three wetlands and two ponds were identified on current NWI maps. Approximately **96.55** acres of potentially jurisdictional Waters (**2.01 acres** of Waters, **76.01 acres** of forested/emergent wetland, and **18.53 acres** of pond) were identified and are located within the study areas and may potentially be impacted by the construction of the proposed project (Figures 9a and 9b).

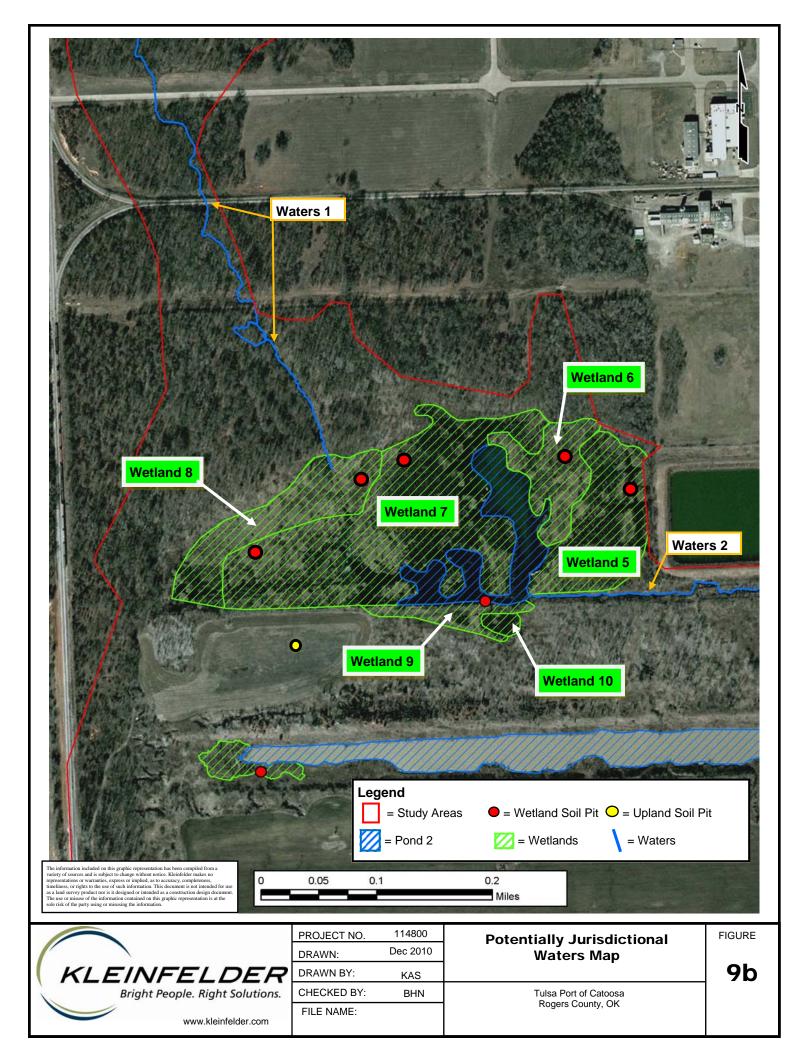
Waters 1 – (3,533 linear feet) This waterbody is located within the west study area and begins at the north end of the study area. It is a mapped intermittent, blue-line stream that flows from the northwest to the southeast and is a secondary tributary to a mapped perennial stream (Bird Creek). This waterbody has an unconsolidated mud bottom with bare or vegetated banks. At the time of the survey, the stream was dry with a few pooled areas of water that were up to six (6) inches deep. Dominant vegetation associated with this waterbody included Hackberry, American elm, Northern red oak, Post oak, Cottonwood, Pecan, and Buckbrush (Figure 9a).

This intermittent blue-line stream may be subject to jurisdiction of the USACE due to its hydrologic connection to Bird Creek. Impacts to Waters 1 associated with the dredge project may require mitigation pursuant to USACE guidelines.

Waters 2 – (3,056 linear feet) This waterbody is centrally located within the west study area. It is an unmapped, unnamed intermittent stream that flows from west to east and is a primary tributary to a mapped perennial stream (Bird Creek). This waterbody has an unconsolidated mud bottom with steep, bare or vegetated banks. At the time of the survey the stream was mostly dry with a few pooled areas that measure up to three (3) inches deep. Dominant vegetation associated with this waterbody included Hackberry, Green ash, American elm, Greenbrier, Buckbrush, and Poison ivy (Figure 9a).

This intermittent blue-line stream may be subject to jurisdiction of the USACE due to its hydrologic connection to Bird Creek. Impacts to Waters 2 associated with the dredge project may require mitigation pursuant to USACE guidelines.





Waters 3 – (3,309 linear feet) This waterbody is located within the southern half of the west study area. It is an unmapped, unnamed intermittent stream that flows from west to east and is a primary tributary to a mapped perennial stream (Bird Creek). The waterbody has an unconsolidated mud bottom with bare or vegetated banks that are steep at the eastern extent. At the time of the survey the stream was mostly dry with a few pooled areas that were up to three (3) inches deep. Dominant vegetation associated with this waterbody included Black Willow, Boxelder, American Elm, and Greenbriar (Figure 9a).

This unnamed intermittent blue-line stream may be subject to jurisdiction of the USACE due to its hydrologic connection to Bird Creek. Impacts to Waters 3 associated with the dredge project may require mitigation pursuant to USACE guidelines.

Waters 4 – (387 linear feet) This waterbody is located within the southern half of the west study area and is perpendicular to Waters 3. It is a mapped, unnamed intermittent, blue-line stream that flows from northwest to southeast and is a secondary tributary to a mapped perennial stream (Bird Creek). The waterbody has an unconsolidated mud bottom with vegetated banks. At the time of the survey the stream was mostly dry with scattered pooled areas that measured up to three (3) inches deep. Dominant vegetation associated with this waterbody included Pecan, Plum, Hackberry, American elm, Buckbrush, and Wildrye (Figure 9a).

This unnamed intermittent blue-line stream may be subject to jurisdiction of the USACE due to its hydrologic connection to Bird Creek. Impacts to Waters 4 associated with the dredge project may require mitigation pursuant to USACE guidelines.

Waters 5 – (462 linear feet) This waterbody is located in the southern end of the west study area in an agricultural field. It is an unmapped, unnamed intermittent stream that flows from east to west and is associated with Pond 1. This waterbody has an unconsolidated mud bottom with vegetated banks. At the time of the survey, the stream was completely dry. Dominant vegetation associated with this waterbody included Hackberry, Honey locust, Indianhemp, Hop sedge, and Goldenrod (figure 9a).

This intermittent stream is potentially isolated and may not be subject to USACE jurisdiction because it has no direct hydrologic connection with Waters. Impacts to Waters 5 associated with the dredge project may not require mitigation pursuant to USACE guidelines.

Wetland 1 – (2.52 acres) Wetland 1 is located within the east study area. Based on attributes seen during the field investigation, the wetland is classified as PFO1A (palustrine, forested, broad-leaved deciduous, temporarily flooded) wetland (Cowardin, 1979). Wetland 1 is mapped on the NWI map. The plant community was dominated by hydrophytic species that included Black willow, Boxelder, and American sycamore. Hydrologic indicators consisted of drift deposits and saturated soil beginning at zero inches. From 0-3 inches the soil matrix color was 10YR 3/4 with redox features of 10YR 2/1 and 10YR 4/4 in color when compared to Munsell color charts, and are classified as hydric. From 3-9 inches the soil matrix color was 10YR 5/4 with redox features of 10YR 3/2 and from 9-16 inches the soil matrix color was 10YR 5/4 with redox features of 10YR 3/1, and 2.5YR 3/4 in color when compared to Munsell color charts, and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 9a).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (Bird Creek). Impacts to Wetland 1 associated with the dredge project may require mitigation pursuant to USACE guidelines.

Wetland 2 – (33.75 acres) Wetland 2 is triangular shaped and is located within the west study area in the southeast portion of the site. Based on attributes seen during the field investigation, the wetland is classified as a PFOSS1A (palustrine, scrub-shrub, forested, broad-leaved deciduous, temporarily flooded) wetland (Cowardin, 1979). Wetland 2 is mapped on the NWI map. The plant community was dominated by hydrophytic species that included Pecan, Hackberry, Deciduous holly, Boxelder, American elm, and Giant goldenrod. Hydrologic indicators consisted of drift deposits and saturated soil beginning at zero inches. From 0-16 inches, the soil matrix was 7.5YR 4/1 with a redox feature of 7.5YR 4/6 in color when compared to Munsell color charts and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 9a).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (Bird Creek). Impacts to Wetland 2 associated with the dredge project may require mitigation pursuant to USACE guidelines.

Wetland 3 – (7.94 acres) Wetland 3 is located within the west study area in the southwest portion of the site. Based on attributes seen during the field investigation, the wetland is classified as a PEM1A (palustrine, emergent, broad-leaved deciduous, temporarily flooded) wetland (Cowardin, 1979). Wetland 3 is mapped on the NWI map. The plant community was dominated by hydrophytic species that included Hop Sedge, Indianhemp, and Knotweed. Hydrologic indicators consisted of drift deposits, water-stained leaves and saturated soil beginning at three inches. From 0-16 inches, the soil matrix was 7.5YR 4/1 with a redox feature of 7.5YR 4/6 in color when compared to Munsell color charts and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a wetland. At this wetland the depth to the water table ranges between 15cm to more than 200cm, it is isolated from hydrologic connections with Waters and may not be jurisdictional (Figure 9a).

This wetland is potentially isolated and may not be subject to USACE jurisdiction because it has no direct hydrologic connection with Waters. Impacts to Wetland 3 associated with the dredge project may not require mitigation pursuant to USACE guidelines.

Wetland 4 – (0.99 acres) Wetland 4 is centrally located within the west study area and is associated with Pond 3. Based on attributes seen during the field investigation, the wetland is classified as a PEM1Ab (palustrine, emergent, broad-leaved deciduous, temporarily flooded, beaver) wetland (Cowardin, 1979). Wetland 4 is unmapped on the NWI map. The plant community was dominated by hydrophytic species that included Black Willow, Wildrye, and Poison ivy. Hydrologic indicators consisted of surface water, inundation visible on aerial imagery, water-stained leaves, and saturated soil beginning at zero inches. From 0-16 inches, the soil matrix was 7.5YR 4/1 with a redox feature of 7.5YR 4/6 in color when compared to Munsell color charts and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland. At this wetland the depth to the water table is greater than 200cm, it is isolated from hydrologic connections with Waters and may not be jurisdictional (Figure 9a).

This wetland is potentially isolated and may not be subject to USACE jurisdiction because it has no direct hydrologic connection with Waters. Impacts to Wetland 4 associated with the dredge project may not require mitigation pursuant to USACE guidelines.

Wetland 5 – (5.74 acres) Wetland 5 is located within the west study area in the northern portion of the site. Based on attributes seen during the field investigation, the wetland is classified as a PFO1Ab (palustrine, forested, broad-leaved deciduous, temporarily flooded, beaver) wetland (Cowardin, 1979). Wetland 5 is unmapped on the NWI map. The plant community was dominated by hydrophytic species that included Black Willow, Hackberry, and Hop Sedge. Hydrologic indicators consisted of drift deposits, surface water, aquatic fauna (including beaver, fish, crayfish, and waterfowl), drift deposits, inundation visible on aerial imagery, water-stained leaves, drainage patterns and saturated soil beginning at zero inches. From 0-3 inches, the soil matrix was 7.5YR 4/6 with a redox feature of GLEY1 410Y and from 3-16 inches the soil matrix was GLEY1 410Y in color when compared to Munsell color charts and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 9b).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (Bird Creek). Impacts to Wetland 5 associated with the dredge project may require mitigation pursuant to USACE guidelines.

Wetland 6 – (3.03 acres) Wetland 6 is located within the west study area in the northern portion of the site. Based on attributes seen during the field investigation, the wetland is classified as a PEM1Ab (palustrine, emergent, broad-leaved deciduous, temporarily flooded, beaver) wetland (Cowardin, 1979). Wetland 6 is unmapped on the NWI map. The plant community was dominated by hydrophytic species that included Black Willow, Knotweed, and Hop sedge. Hydrologic indicators consisted of drift deposits, surface water, aquatic fauna, drift deposits, inundation visible on aerial imagery, water-stained leaves, drainage patterns and saturated soil beginning at zero inches. From 0-3 inches, the soil matrix was 7.5YR 4/6 with a redox feature of GLEY1 410Y and from 3-16 inches the soil matrix was GLEY1 410Y in color when compared to Munsell color charts and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 9b).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (Bird Creek). Impacts to Wetland 6 associated with the dredge project may require mitigation pursuant to USACE guidelines.

Wetland 7 – (15.49 acres) Wetland 7 is located within the west study area in the northern portion of the site. Based on attributes seen during the field investigation, the wetland is classified as a PFO1Ab (palustrine, forested, broad-leaved deciduous, temporarily flooded, beaver) wetland (Cowardin, 1979). Wetland 7 is unmapped on the NWI map. The plant community was dominated by hydrophytic species that included Black Willow, Hackberry, and Hop sedge. Hydrologic indicators consisted of drift deposits, surface water, aquatic fauna, drift deposits, inundation visible on aerial imagery, water-stained leaves, drainage patterns and saturated soil beginning at zero inches. From 0-3 inches, the soil matrix was 7.5YR 4/6 with a redox feature of GLEY1 410Y and from 3-16 inches the soil matrix was GLEY1 410Y in color when compared to Munsell color charts and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 9b).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (Bird Creek). Impacts to Wetland 7 associated with the dredge project may require mitigation pursuant to USACE guidelines.

Wetland 8 – (4.85 acres) Wetland 8 is located within the west study area in the northern portion of the site. Based on attributes seen during the field investigation, the wetland is classified as a PEM1Ab (palustrine, emergent, broad-leaved deciduous, temporarily flooded, beaver) wetland (Cowardin, 1979). Wetland 8 is unmapped on the NWI map. The plant community was dominated by hydrophytic species that included Black Willow, Knotweed, and Hop sedge. Hydrologic indicators consisted of drift deposits, surface water, aquatic fauna, drift deposits, inundation visible on aerial imagery, water-stained leaves, drainage patterns and saturated soil beginning at zero inches. From 0-3 inches, the soil matrix was 7.5YR 4/6 with a redox feature of GLEY1 410Y and from 3-16 inches the soil matrix was GLEY1 410Y in color when compared to Munsell color charts and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 9b).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (Bird Creek). Impacts to Wetland 8 associated with the dredge project may require mitigation pursuant to USACE guidelines.

Wetland 9 – (1.36 acres) Wetland 9 is located within the west study area in the northern portion of the site. Based on attributes seen during the field investigation, the wetland is classified as a PEM1Ab (palustrine, forested, broad-leaved deciduous, temporarily flooded, beaver) wetland (Cowardin, 1979). Wetland 9 is unmapped on the NWI map. The plant community was dominated by hydrophytic species that included Black Willow, Knotweed, and Hop sedge. Hydrologic indicators consisted of drift deposits, surface water, aquatic fauna, drift deposits, inundation visible on aerial imagery, water-stained leaves, drainage patterns and saturated soil beginning at zero inches. From 0-3 inches, the soil matrix was 7.5YR 4/6 with a redox feature of GLEY1 410Y and from 3-16 inches the soil matrix was GLEY1 410Y in color when compared to Munsell color charts and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 9b).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (Bird Creek). Impacts to Wetland 9 associated with the dredge project may require mitigation pursuant to USACE guidelines.

Wetland 10 – (0.34 acres) Wetland 10 is located within the west study area in the northern portion of the site. Based on attributes seen during the field investigation, the wetland is classified as a PFO1Ab (palustrine, forested, broad-leaved deciduous, temporarily flooded, beaver) wetland (Cowardin, 1979). Wetland 10 is unmapped on the NWI map. The plant community was dominated by hydrophytic species that included Black Willow, Hackberry, and Hop sedge. Hydrologic indicators consisted of drift deposits, surface water, aquatic fauna, drift deposits, inundation visible on aerial imagery, water-stained leaves, drainage patterns and saturated soil beginning at zero inches. From 0-3 inches, the soil matrix was 7.5YR 4/6 with a redox feature of GLEY1 410Y and from 3-16 inches the soil matrix was GLEY1 410Y in color when compared to Munsell color charts and are classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 9b).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (Bird Creek). Impacts to Wetland 10 associated with the dredge project may require mitigation pursuant to USACE guidelines.

Pond 1 – (2.30 acres) Pond 1 is located within the west study area in the southwestern portion of the site. Based on attributes seen during the field investigation, the pond is classified as a PUB3H (palustrine, unconsolidated bottom, mud, permanently flooded) pond (Cowardin, 1979). Pond 1 is mapped on the NWI map.

This pond collects localized water flow and is potentially isolated and may not be subject to USACE jurisdiction because it has no direct hydrologic connection with Waters. Impacts to Pond 1 associated with the dredge project may not require mitigation pursuant to USACE guidelines.

Pond 2 – (3.83 acres) Pond 2 is located within the west study area in the northern portion of the site. Based on attributes seen during the field investigation, the pond is classified as a PUB3Hb (palustrine, unconsolidated bottom, mud, permanently flooded, beaver) pond (Cowardin, 1979). Pond 2 is unmapped on the NWI map.

The pond is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (Bird Creek). Impacts to Pond 2 associated with the dredge project may require mitigation pursuant to USACE guidelines.

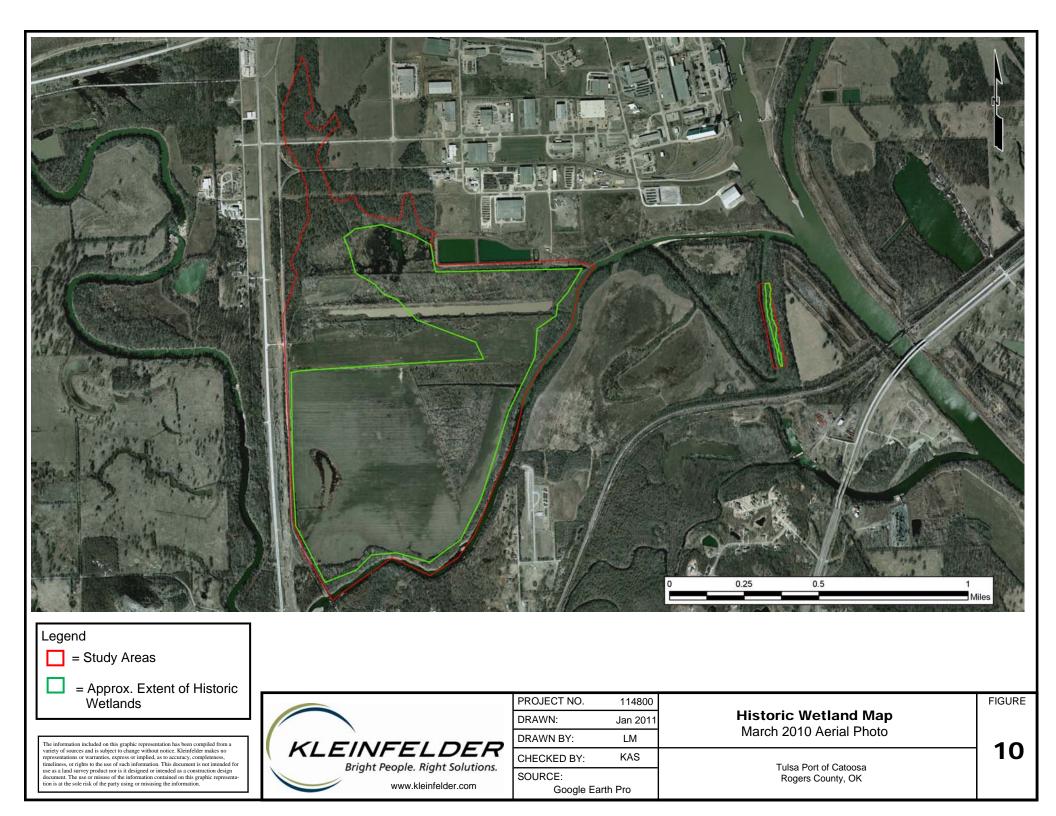
Pond 3 – (12.4 acres) Pond 3 is centrally located within the west study area. It was created originally as a private project as an extension to the Port, but was not completed or connected to Waters. Based on attributes seen during the field investigation, the pond is classified as a PUB3Hh (palustrine, unconsolidated bottom, mud, permanently flooded, diked/impounded) pond (Cowardin, 1979). Pond 3 is mapped on the NWI map.

The pond collects localized water flow, is potentially isolated, and may not be subject to USACE jurisdiction because it has no direct hydrologic connection with Waters. Impacts to Pond 3 associated with the dredge project may not require mitigation pursuant to USACE guidelines.

6.3 Historic Wetlands

The approximate extent of historic wetlands was based on the review of NRCS historic aerial photographs, NRCS Web Soil Survey data, Oklahoma counties hydric soils list, Google Earth Pro, NWI maps, USGS Topographic maps, and field reconnaissance. Along with the previously stated factors, a key feature in determining the approximate extent of the historic wetlands was the 1971 NRCS aerial photograph. This photo shows a primary tributary to Bird Creek that has since been filled. The presence of this former waterbody, in combination with currently existing streams and the presence of hydric soils over large portions of the west study area were used to determine that a majority of the west study area could have been historically classified as either forested or emergent wetlands (see Figure 10 and Appendix C).

Historically the southern Ag field would have been subject to flooding from two different sources; via the former streams/creeks that were located at the northeast portion of the Ag field and via Bird Creek. The relocation and channelization of the former streams minimizes the portions of the site that are subject to routine flooding, as does the drop of the bed level of Bird Creek.



7.0 IMPACTS AND MITIGATION

Based on Kleinfelder observations and analysis of preliminary development plans, Kleinfelder concludes that the proposed project will impact Waters, including wetlands, within the environmental study areas that may be subject to the jurisdiction of the USACE.

The USACE requires that discharged dredged or fill material into Waters be minimized or avoided to the maximum extent practicable. The USACE also requires consideration of feasible alternatives to avoid or minimize potential impacts to Waters. If impacts can be avoided, under the guidance of Best Management Practices (BMPs), then no formal action or permitting is required. If impacts can be minimized and conform to certain requirements then the proposed development activities may qualify for a General Permit such as a Nationwide Permit (NWP). NWP's are designed to apply to categories of discharge activities that are similar in nature and will cause only minimal adverse environmental effects. A pre-construction notification (PCN) may also be required by the USACE. The NWP program streamlines the permitting process, usually affording a significant reduction in time and costs. If the proposed development activities cannot feasibly meet the conditions for a NWP, the project will require an Individual Permit from the USACE to authorize the project.

USACE guidelines require that a permit applicant justify project-related impacts to Waters, including wetlands, and provide mitigation for unavoidable impacts. In order of preference, these include avoidance, minimization, and compensation. Three types of compensatory mitigation exist, including wetland enhancement, wetland restoration, and wetland creation. Generally, with the incorporation of a sensitive project design and the adherence of BMPs, potential impacts to Waters can be avoided or minimized.

7.1 BEST MANAGEMENT PRACTICES (BMPs)

A brief discussion of proposed BMPs for the proposed development activities is presented in the following section. Inspections of the BMPs and storm water control practices should take place before and after storm events to ensure that each BMP or control is functioning properly. Project BMPs should be constructed such that sediment and other pollutants are contained within the project site.

- Install and maintain silt fences, sediment traps, or straw bale dikes around all areas with disturbed or exposed soil. A silt fence sediment barrier is required at a distance of 30 feet around the perimeter of all jurisdictional wetlands, in order to create an impact buffer zone. Hay bales may be used where continuous relocation of the silt fence would otherwise be necessary.
- Store construction equipment at the off-site staging areas at the end of each work period. Divert concentrated runoff around equipment, vehicle, and materials storage areas. Diversion of concentrated runoff should be accomplished through shallow earthen swales and methods described above.
- Minimize the amount of construction materials stored on-site.

- Designate areas of the site for the delivery and removal of construction materials. Construction materials should not be stored beyond the silt fence.
- Store materials in a manner that limits exposure to precipitation and controls stormwater runoff.
- Handle construction materials (e.g., concrete) in a manner that minimizes direct discharges into jurisdictional wetlands and drainage channels. The discharge or creation of potential discharge of any soil material including concrete, cement, silts, clay, sand, or any other materials to the Waters of the United States is prohibited.
- Provide pallets or secondary containment areas for chemicals, drums, or bagged materials. Should material spills occur, materials and/or contaminants should be cleaned from the project site and recycled or disposed to the satisfaction of the Oklahoma Department of Environmental Quality.
- Cover waste dumpsters with plastic sheeting at the end of each workday and during storm events. All sheeting should be carefully secured to withstand weather conditions.
- Train or instruct on-site personnel in spill prevention practices, and provide spill containment materials near all storage areas. All contractors are responsible for familiarizing their personnel with the information contained in the Storm Water Pollution Prevention Plan (SWPPP).
- Separate wastes and recycle or dispose of them in compliance with regulations.
- Spray water on earth fill and disturbed ground surfaces as necessary to minimize windblown dust.

The following controls or BMP's should also be implemented to minimize the potential for releases or spills of pollutants into Waters of the United States during the operation of construction equipment:

- Maintain all construction equipment to prevent oil or fluid leaks.
- Use drip pans or other secondary containment measures beneath vehicles during storage.
- Regularly inspect all equipment and vehicles for fluid leaks.
- Place wastes (e.g., grease, oil or oil filters, antifreeze, cleaning solutions, batteries, and hydraulic or transmission fluid) in proper containers, store the containers in designated storage areas, and ultimately recycle the materials.
- Fuel and wash vehicles and equipment at an off-site location.

Spill prevention and control practices should be implemented throughout construction activities. Workers should be trained in techniques to reduce the chance for spills, contain and clean-up spills, and properly dispose of spill materials for the potential pollutants that are relevant to each contractor or subcontractor activity. Where applicable, materials should be stored in covered containers to minimize the chance for spills. Cleanup materials should be readily available to the

employees of each contractor or subcontractor for immediate response, should a spill occur on the site.

Equipment used to make and pour concrete should be washed at an off-site location. Concrete fine material or aggregate should not be allowed to wash into the jurisdictional wetlands or other associated drainage channels. Concrete application equipment must be parked over drip pans or absorbent material at all times. Any bare ground created by materials storage should be restored following construction.

8.0 REFERENCES

Audubon. 2008. Watch List. Available at: http://audubon2.org/watchlist/viewSpecies.jsp?id=214.

- Borror, D.J., and R. E. White. 1970. The Peterson Field Guide Series, A Field Guide to the Insects of America North of Mexico. Houghton Mifflin Company, Boston.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31, U.S. Fish and Wildlife Service, Washington, DC.103pp.
- Eberle, M. E., and W. S. Stark. 2000. Status of the Arkansas darter in south-central Kansas and adjacent Oklahoma. Prairie Naturalist 32:103-113.
- Environmental Laboratory. 1987. Corps of Engineers Wetland Delineation Manual. Technical Report Y-87-1, U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.
- G.M.Sutton Avian Research Center (GMSARC). 2011. Personal communication (email) with Alan Jenkins regarding the location and proximity of occupied Bald Eagle within or near the Tulsa Port of Catoosa study areas.
- MacBeth Division, Kollmorgen Instruments Corporation (MacBeth). 1994. *Munsell Soil Color Charts*. Baltimore, Maryland.
- Mather, C. 1990. Status survey of the western fanshell and the Neosho mucket in Oklahoma. Final Report to the Oklahoma Department of Wildlife Conservation. Project No. E-7, Oklahoma. 22 pp.
- National Weather Service (NWS). 2010. Tulsa, Oklahoma Total Monthly and Yearly Rainfall, 1888 to 2010. Accessed at: http://www.srh.noaa.gov/tsa/?n=climo_tulyearrain
- Oklahoma Climatological Survey (OCS). 2010. Rogers County Climate Summary, accessed at: <u>http://climate.mesonet.org/county_climate/Products/QuickFacts/Rogers.pdf</u>.
- Oklahoma Department of Wildlife Conservation (ODWC). 2011. Personal Email correspondence with Mark Howery regarding Whooping Crane occurrences in Rogers County, OK
- Sibley, David A. 2000. National Audubon Society *The Sibley Guide to Birds*. First Edition. Chanticleer Press, Inc. New York.
- U.S. Army Corps of Engineers (USACE). 2007. Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States. Accessed at: http://www.usace.army.mil/cw/cecwo/reg/cwa_guide/rapanos_guide_memo.pdf.
- U.S. Army Engineer Research and Development Center (USAERDC). 2008. Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region. Available at: <u>http://el.erdc.usace.army.mil/elpubs/pdf/trel08-27.pdf</u>.
- U.S. Department of Agriculture, NRCS (USDA). 2009. PLANTS Database (http://plants.usda.gov, 24 September 2009). National Plant Data Center, Baton Rouge,

LA 70874-4490 USA.

- U.S. Department of Agriculture (USDA). 2008. Soil Survey for Rogers County, Oklahoma. Natural Resources Conservation Service in Cooperation with Oklahoma Agricultural Experiment Station. Available at: <u>http://websoilsurvey.nrcs.usda.gov</u>.
- U.S. Environmental Protection Agency (EPA). 1972. Clean Water Act (amended 1977 and 1987). 33 U.S.C. §§ 1251-1387.
- U.S. Fish and Wildlife Service (USFWS). 2009. Oklahoma Ecological Services Field Office. County Occurrences of Oklahoma Federally-Listed Endangered, Threatened, Proposed and Candidate Species. Accessed at: http://www.fws.gov/southwest/es/oklahoma.
- U.S. Fish and Wildlife Service (USFWS). 2007. Endangered and Threatened Wildlife and Plants; Removing the Bald Eagle in the Lower 48 States. From the List of Endangered and Threatened Wildlife. Federal Register 72(130): 37345-37372.
- U.S. Fish and Wildlife Service (USFWS). 1990. Recovery Plan for the Interior Population of the Least Tern (Sterna antillarum). Grand Island, Nebraska. 95pp.
- U.S. Fish and Wildlife Service (USFWS). 1992. Western Prairie Fringed Orchid (*Platanthera praeclara*) Fact Sheet. Accessed at: http://www.fws.gov/southwest/es/oklahoma/orchid1.htm.
- U.S. Fish and Wildlife Service (USFWS). 1991. American Burying Beetle (*Nicrophorus americanus*) Recovery Plan. Newton Corner, Massachusetts. 80 pp.
- U.S. Fish and Wildlife Service (USFWS). 1988. 1988 National List of Plant Species that Occur in Wetlands. Available at: http://www.fws.gov.nwi/bha.download.1988region2.txt.
- U.S. Fish and Wildlife Service (USFWS). 1985a. Interior Population of Least Tern Determined to be Endangered. Federal Register 50:21784-21792.
- U.S. Fish and Wildlife Service (USFWS). 1985b. Determination of Endangered and Threatened Status for the Piping Plover: Final Rule. Federal Register 50(238): 50726-50734.
- U.S. Fish and Wildlife Service (USFWS). 1940. Bald and Golden Eagle Protection Act. 16 U.S.C. §§ 668-668d, as amended 1959, 1962, 1972, and 1978.
- Vaughn, C.C. 1997. Determination of the status and habitat preference of the Neosho mucket in Oklahoma. Annual Performance Report submitted to Oklahoma Department of Wildlife Conservation, Oklahoma City, Oklahoma.
- Weins, K., and Roberts, T. (Weins). 2003. "Effects of headcutting on the bottomland hardwood wetlands adjacent to the Wolf River, Tennessee," WRP Technical Notes Collection (ERDC TN-WRP-HS-CP-2.1), U.S. Army Engineer Research and Development Center, Vicksburg, MS. <u>www.wes.army.mil/el/wrtc/wrp/tnotes/tnotes.html</u>
- Woods, A.J., Omernik, J.M., Butler, D.R., Ford, J.G., Henley, J.E., Hoagland, B.W., Arndt, D.S., and Moran, B.C., 2005, Ecoregions of Oklahoma (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,250,000).

APPENDIX A PHOTOGRAPHIC RECORD



Photo 1 – *View north; south end of Wetland 1.*



Photo 3 – Soil sample from the Wetland 1.



Photo 2 – View east; Bird Creek from south end of Wetland 1.



Photo 4– View north, central region of Wetland 1.

KLEINFELDER Bright People. Right Solutions.

Project Number: 114800 Photos Taken December 2010 Tulsa Port of Catoosa Rogers County, Oklahoma

Site Photographs

Appendix

Α



Photo 5 – View east, Bird Creek from Waters 1.



Photo 7 – View west, central region of Waters 1.



Photo 6 – View west, east end of Waters 1.



Photo 8 – View south, central region of Waters 2..



Project Number: 114800 Photos Taken December 2010 Port of Catoosa; Catoosa, OK Rogers County, Oklahoma

Site Photographs





Photo 9 – View east, west central edge of Wetland 2.



Photo 11 – Buttressed tree trunk within Wetland 2.



Photo 10 – View east, central region of Wetland 2.



Photo 12 – Soil sample from Wetland 2.



Photos Taken December 2010

Tulsa Port of Catoosa Rogers County, Oklahoma

Site Photographs

Appendix

Α



Photo 13 – View west, agriculture field west of Wetland 1.



Photo 15 – View west; central region of Wetland 1.



Photo 14 – View north, edge of Wetland 1 and agriculture field on west side.



Photo 16 – View west, central region of Wetland 1.



Project Number: 114800 Photos Taken December 2010 Tulsa Port of Catoosa Rogers County, Oklahoma

Site Photographs

Appendix

Α



Photo 17 – View north, northern region of Waters 4.



Photo 19 – View north, northern region of Waters 4.



Photo 18 – View south, northern region of Waters 4.



Photo 20 – View east, northern region of Waters 4.



Project Number: 114800 Photos Taken December 2010 Tulsa Port of Catoosa Rogers County, Oklahoma

Site Photographs

Appendix

Α



Photo 21 – View south, south region of Waters 4.



Photo 23 – View southeast; central region of Wetland 8.



Photo 22 – View south, northwest edge of Wetland 8.



Photo 24 – View northwest, south region of Wetland 9.



Project Number: 114800 Photos Taken December 2010 Tulsa Port of Catoosa Rogers County, Oklahoma

Site Photographs





Photo 25 – View northeast, southeast side of Pond 2.



Photo 27 – View north, southwest side of Pond 2.



Photo 26 – Soil sample taken from Wetland 9.



Photo 28 – View west, beaver dam on east side of Pond 2.



Project Number: 114800 Photos Taken December 2010 Tulsa Port of Catoosa Rogers County, Oklahoma

Site Photographs





Photo 29 – View south, central region of Wetland 6.



Photo 31 – View west; central region of Wetland 7.



Photo 30 – View south, east edge of Wetland 5.



Photo 32 – View east, west side Pond 3.



Project Number: 114800 Photos Taken December 2010 Tulsa Port of Catoosa Rogers County, Oklahoma

Site Photographs





Photo 33 – View south, north side of Wetland 10.



Photo 35 – View northeast; open field between Wetland 9 and 10.



Photo 34 – View north, south side of Wetland 10.



Photo 36 – View south, north bank of Pond 3.



Project Number: 114800 Photos Taken December 2010 Tulsa Port of Catoosa Rogers County, Oklahoma

Site Photographs

Appendix A



Photo 37 – View east, central region of isolated emergent Wetland 3.



Photo 39 – View south; north side of Wetland 3.



Photo 38 – View north, south bank of isolated Pond 1 within Wetland 3.



Photo 40 – View southeast, north side of Wetland 3



Project Number: 114800 Photos Taken December 2010 Tulsa Port of Catoosa Rogers County, Oklahoma

Site Photographs

Appendix

Α

APPENDIX B WETLAND DELINEATION FORMS

Wet 1

WETLAND DET	ERMINATIO	N DATA FORM	– Midwest Region
Project/Site: POC East	Cit	y/County: <u>Kor</u>	nM Cu Sampling Date: 12/8
Applicant/Owner: PCC			State: Sampling Point: East 2
	Se	ction, Township, Ra	
Landform (hillslope, terrace, etc.):			· / / / · · · · · · · · · · · · · · · ·
Slope (%): 0-3 Lat:			Datum: NAD83
	s cilles e	kuy loam	NWI classification:PFOTA
Are climatic / hydrologic conditions on the site typical for t	· · · · ·	1	a
Are Vegetation, Soil, or Hydrology	-		"Normal Circumstances" present? Yes No
Are Vegetation, Soil, or Hydrology			eeded, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site ma	p showing si	ampling point i	ocations, transects, important features, etc.
Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present? Remarks: Hydrophytic Vegetation Present? Yes V Yes V	No No No	Is the Sampled within a Wetlan	nd? Yes <u>/ No</u>
DeRin	a on c	unnual ra	in sall
VEGETATION – Use scientific names of plan	s.		
Tree Stratum (Plot size:)		ominant Indicator pecies? Status	Dominance Test worksheet:
1. Salix Nigra	30	FACM	Number of Dominant Species 3 (A)
2. Platanus occidentalis	20	FAC	
3. Acer Sacharum	<u>s un</u>	FAC	Total Number of Dominant Species Across All Strata:3(B)
4. Acer nervindo	<u> 25 </u>	FAKW	
5. Ulmus american		<u> </u>	Percent of Dominant Species That Are OBL, FACW, or FAC:00(A/B)
Sapling/Shrub Stratum (Plot size:)	<u> 83 </u> =	Fotal Cover	Prevalence Index worksheet:
1. ALET NEAVINGO	¢	FACN	Total % Cover of: Multiply by:
2			$\frac{1}{OBL \text{ species } O} = \frac{1}{x + 1} = \frac{1}{x + 1}$
3			FACW species $55 \times 2 = 110$
4.			FAC species x 3 = 2.64
5			FACU species x 4 =
	=`	Total Cover	UPL species $O_{3} = x5 = \overline{O}$
Herb Stratum (Plot size:) 1. Chasmanthym latafolium	40	Fac	Column Totals:(4)314 (B)
2. Chesmathyum sp.	15 -	FAC	Prevalence Index = B/A = 29
3. Elymus Virginius		FAC	Hydrophytic Vegetation Indicators:
4		· · · · · · · · · · · · · · · · · · ·	Dominance Test is >50%
5			Prevalence index is ≤3.0 ¹
6			Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
7			Problematic Hydrophytic Vegetation ¹ (Explain)
8			
9			¹ Indicators of hydric soil and wetland hydrology must
10		Fotal Cover	be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:)	<u></u> =		
1			Hydrophytic
2			Vegetation Present? Yes <u>No</u> No
	·=	Fotal Cover	
Remarks: (Include photo numbers here or on a separat	e sheet.)		

; *

D 41-						or confir	m the absence	
Depth (inches)	Matrix Color (moist)	%	Color (moist)	ox Feature %	s Type ¹	Loc ²	Texture	Remarks
	104 3/4	65	10YR 2/1	- <u>~</u>				
		. 42		- <u> </u>	·	<u> </u>	loaving Sand	
	INO EL		101R 4/4	34	·	<u> </u>		
	104R 5/4	80	104R 3/2	70		M		
9-16	10YR 54	68 93	2.51× 3/4	2.		pĻ		Organic material
			1011 4/1	- 4		Ň		3
	,		10YR 311	1	·	M		
								· · · · · · · · · · · · · · · · · · ·
			Deduced Methy O		. <u> </u>		21	
Hydric Soil Ind	icators:	etion, RM=	Reduced Matrix, C	S=Covered	d or Coate	a Sand C		ation: PL=Pore Lining, M=Matrix. for Problematic Hydric Soils ³ :
Histosol (A			Sandy	Gloved Ma	triv (SA)			•
Histic Epipe	•		Sandy	Gleyed Ma Redox (S5				Prairie Redox (A16) anganese Masses (F12)
Black Histic			Strippe					Explain in Remarks)
Hydrogen S			•••	Mucky Mir	*		Onloi (LAplain in Remarksy
Stratified La				Gleyed Ma				
2 cm Muck				ed Matrix (I				
	elow Dark Surface	∋ (A11)		Dark Surfa	-			
Thick Dark	Surface (A12)			ed Dark Su)	³ Indicators	of hydrophytic vegetation and
Sandy Muc	ky Mineral (S1)			Depressio				hydrology must be present,
	y Peat or Peat (S3						unless	disturbed or problematic.
Restrictive Lay	/er (if observed):							
Type:								
· / [' · · ·								
	Jar K		e layer at	bittom	of snm	pe	Hydric Soil	Present? Yes No
Depth (inche Remarks:	Jark		: layer at	bottom	of sam	pe	Hydric Soil	Present? Yes No
Depth (inche Remarks:	Jark		e layer at	bottom	of snm	y e	Hydric Soil	Present? Yes No
Depth (inche Remarks: IYDROLOG) Wetland Hydro	Jark 1 logy Indicators:	organic			of snm	pe		
Depth (inche Remarks: IYDROLOG) Wetland Hydro Primary Indicato	Jark / logy Indicators: prs (minimum of or	organic	ed; check all that ap	oply)		pe	Seconda	ry Indicators (minimum of two requ
Depth (inche Remarks: HYDROLOG) Wetland Hydro Primary Indicato Surface Wa	Jark / logy Indicators: prs (minimum of or ater (A1)	organic	ed; check all that an Water-Sta	oply}	es (B9)	ye 	<u>Seconda</u>	ry Indicators (minimum of two requ ace Soli Cracks (B6)
Depth (inche Remarks: HYDROLOG) Wetland Hydro Primary Indicato Surface Wa High Water	Jark Iogy Indicators: prs (minimum of or ater (A1) Table (A2)	organic	ed: check all that an Water-Sta Aquatic Fa	oply) ined Leave auna (B13)	es (B9)	ye 	<u>Seconda</u> Surfa Drain	ry Indicators (minimum of two required ace Soli Cracks (B6) hage Patterns (B10)
Depth (inche Remarks: HYDROLOG) Wetland Hydro Primary Indicato Surface Wa High Water Saturation (Jark Iogy Indicators: ors (minimum of or ater (A1) Table (A2) (A3)	organic	ed: check all that an Water-Sta Aquatic Fa True Aqua	oply) lined Leave auna (B13) atic Plants	es (B9)) (B14)	pe 	<u>Seconda</u> Surfa Drair Dry-3	ry Indicators (minimum of two requ ace Soli Cracks (B6) nage Patterns (B10) Season Water Table (C2)
Depth (inche Remarks: IYDROLOG) Wetland Hydro Primary Indicato Surface Wa High Water Saturation (Water Mark	Jark Iogy Indicators: ors (minimum of or ater (A1) Table (A2) (A3) (A3) (S (B1)	organic	ed: check all that an Water-Sta Aquatic Fa True Aqua Hydrogen	oply) lined Leave auna (B13) atic Plants Sulfide Oc	es (B9)) (B14) dor (C1)		<u>Seconda</u> Surfa Drair Dry-3 Cray	ry Indicators (minimum of two requ ace Soli Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8)
Depth (inche Remarks: IYDROLOG) Wetland Hydro Primary Indicato Surface Wa High Water Saturation (Water Mark Sediment D	Jark logy Indicators: ors (minimum of or ater (A1) Table (A2) (A3) (A3) (A3) (A3) So (B1) Deposits (B2)	organic	ed; check all that an Water-Sta Aquatic Fa True Aqua Hydrogen Oxldized F	oply) lined Leave auna (B13) atic Plants Sulfide Oc Rhizospher	es (B9)) (B14) dor (C1) res on Liv	ing Roots	<u>Seconda</u> Surfa Drair Dry-3 Cray (C3) Satu	ry Indicators (minimum of two requ ace Soll Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C
Depth (inche Remarks: IYDROLOG) Wetland Hydro Primary Indicato Surface Wa Surface Wa Surface Wa Saturation (Sediment D Drift Depos	Jark logy Indicators: ors (minimum of or ater (A1) Table (A2) (A3) (A3) (A3) (A3) (A3) (B1) Deposits (B2) its (B3)	organic	ed; check all that an Water-Sta Aquatic Fa True Aqua Hydrogen Oxidized F Presence	oply) lined Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce	es (B9)) (B14) dor (C1) res on Liv d iron (C4	ing Roots	<u>Seconda</u> Surfa Drain Dry-3 Cray (C3) Satu Stun	ry Indicators (minimum of two requ ace Soll Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C ted or Stressed Plants (D1)
Depth (inche Remarks: IYDROLOG) Wetland Hydro Primary Indicato Surface Wa Surface Wa Surface Wa Saturation (Sediment D Drift Depos Algal Mat o	Jark logy Indicators: ors (minimum of or ater (A1) Table (A2) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3)	organic	ed; check all that an Water-Sta Aquatic Fa True Aquatic True Aqua Hydrogen Oxidized F Presence Recent Inc	oply) ined Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce on Reductio	es (B9)) (B14) dor (C1) res on Liv d Iron (C4 on in Tilleo	ing Roots	<u>Seconda</u> Surfa Drair Dry Cray (C3) Satu Stun 6) Geor	ry Indicators (minimum of two requ ace Soll Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C ted or Stressed Plants (D1) morphic Position (D2)
Depth (inche Remarks: IYDROLOG) Wetland Hydro Primary Indicato — Surface Wa — High Water — Saturation (— Water Mark — Sediment D — Drift Depos — Algal Mat o — Iron Deposi	Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Constant Con	organic	ed; check all that an Water-Sta Aquatic Fa True Aquatic True Aqua Hydrogen Oxidized F Presence Recent Inc Thin Muck	oply) lined Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce on Reductions Surface (es (B9)) (B14) dor (C1) res on Liv d Iron (C4 on in Tilleo C7)	ing Roots	<u>Seconda</u> Surfa Drair Dry Cray (C3) Satu Stun 6) Geor	ry Indicators (minimum of two requ ace Soll Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C ted or Stressed Plants (D1)
Depth (inche Remarks: IYDROLOG) Wetland Hydro Primary Indicato — Surface Wa — High Water — Saturation (— Water Mark — Sediment D — Drift Depos — Algal Mat o — Iron Deposi — Inundation (Lion K Liogy Indicators: ors (minimum of or ater (A1) Table (A2) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A) (A) (A) (A) (A) (A) (A) (A	or gaining	ed: check all that ar Water-Sta Aquatic Fa True Aquatic Fa True Aquatic Fa Crue Aquati	oply) ined Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce on Reduction Surface (Well Data	es (B9)) (B14) dor (C1) res on Liv d Iron (C4 on in Tilleo C7) (D9)	ing Roots	<u>Seconda</u> Surfa Drair Dry Cray (C3) Satu Stun 6) Geor	ry Indicators (minimum of two requ ace Soll Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C ted or Stressed Plants (D1) morphic Position (D2)
Depth (inche Remarks: IYDROLOG) Wetland Hydro Primary Indicato 	Jor K logy Indicators: ors (minimum of or ater (A1) Table (A2) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3)	or gaining	ed; check all that an Water-Sta Aquatic Fa True Aquatic True Aqua Hydrogen Oxidized F Presence Recent Inc Thin Muck	oply) ined Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce on Reduction Surface (Well Data	es (B9)) (B14) dor (C1) res on Liv d Iron (C4 on in Tilleo C7) (D9)	ing Roots	<u>Seconda</u> Surfa Drair Dry Cray (C3) Satu Stun 6) Geor	ry Indicators (minimum of two requ ace Soll Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C ted or Stressed Plants (D1) morphic Position (D2)
Depth (inche Remarks: APPROLOG Wetland Hydro Primary Indicato Surface Wa High Water Saturation (Water Mark Sediment D Drift Depos Algal Mat o Iron Deposi Inundation Sparsely Vo Field Observat	Jark logy Indicators: ors (minimum of or ater (A1) Table (A2) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3)	organic ne is require magery (B7) Surface (B	ed: check all that ar Water-Sta Aquatic Fa True Aquatic Fa Hydrogen Oxidized F Presence Recent Inc Thin Muck Gauge or 8) Other (Exp	oply) ined Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce on Reduction c Surface (Well Data plain in Re	es (B9)) (B14) dor (C1) res on Liv d Iron (C4 on in Titleo C7) (D9) marks)	ing Roots i) 3 Soils (C	<u>Seconda</u> Surfa Drair Dry Cray (C3) Satu Stun 6) Geor	ry Indicators (minimum of two requ ace Soll Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C ted or Stressed Plants (D1) morphic Position (D2)
Depth (inche Remarks: IYDROLOG) Wetland Hydro Primary Indicato — Surface Wa — High Water — Saturation (— Water Mark — Sediment D — Drift Depos — Algal Mat o — Inundation — Sparsely Ve Field Observat Surface Water F	Jark logy Indicators: ors (minimum of or ater (A1) Table (A2) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3)	organic ne is require nagery (B7) Surface (B	ed: check all that an Water-Sta Aquatic Fa True Aquatic True Aquatic Hydrogen Oxidized F Presence Recent Irc Thin Muck) Gauge or 8) Other (Exp Io Depth (in	oply) ined Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce on Reductie c Surface (Well Data plain in Re ches):	es (B9)) (B14) dor (C1) res on Liv d Iron (C4 on in Tilleo C7) (D9) marks)	ing Roots i) d Soils (C	<u>Seconda</u> Surfa Drair Dry Cray (C3) Satu Stun 6) Geor	ry Indicators (minimum of two requ ace Soll Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C ted or Stressed Plants (D1) morphic Position (D2)
Depth (inche Remarks: IYDROLOG) Wetland Hydro Primary Indicato Surface Water Saturation (Water Mark Sediment D Drift Deposi Algal Mat o Vater Deposi Inundation Sparsely Vo Field Observat Surface Water F	Corr K Corr K Corr (minimum of or ater (A1) Table (A2) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A) (A) (A) (A) (A) (A) (A) (A	ne is require magery (B7) Surface (B es N es N	ed; check all that ar Water-Sta Aquatic Fa True Aquatic Fa True Aquatic Fa Collision Collisio	oply) ined Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce on Reduction Surface (Well Data plain in Re ches): ches):	es (B9)) (B14) dor (C1) res on Liv d Iron (C4 on in Tilleo C7) (D9) marks)	ing Roots i) d Soils (C	<u>Seconda</u> Surfa Drair Dry Cray (C3) Satu Stun 6) Geor FAC	ry Indicators (minimum of two requ ace Soll Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C ted or Stressed Plants (D1) morphic Position (D2) •Neutral Test (D5)
Depth (inche Remarks: IYDROLOGY Wetland Hydro Primary Indicato — Surface Water — Saturation (— Water Mark — Sediment D — Jorift Depos — Algal Mat o — Iron Deposi — Inundation — Sparsely Vo Field Observat Surface Water F Water Table President	Jark logy Indicators: ors (minimum of or ater (A1) Table (A2) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (A3) (C) (C) (C) (C) (C) (C) (C) (C	ne is require magery (B7) Surface (B es N es N	ed: check all that an Water-Sta Aquatic Fa True Aquatic True Aquatic Hydrogen Oxidized F Presence Recent Irc Thin Muck) Gauge or 8) Other (Exp Io Depth (in	oply) ined Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce on Reduction Surface (Well Data plain in Re ches): ches):	es (B9)) (B14) dor (C1) res on Liv d Iron (C4 on in Tilleo C7) (D9) marks)	ing Roots i) d Soils (C	<u>Seconda</u> Surfa Drair Dry Cray (C3) Satu Stun 6) Geor FAC	ry Indicators (minimum of two requ ace Soll Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C ted or Stressed Plants (D1) morphic Position (D2) -Neutral Test (D5)
Depth (inche Remarks: IYDROLOG) Wetland Hydro Primary Indicato Surface Wa High Water Saturation (Water Mark Sediment D Drift Depos Algal Mat o Iron Deposi Inundation Sparsely We Field Observat Surface Water F Water Table Press (includes capilla	Constant of the second	organic ne is require Surface (B7) Surface (B ss N es N	ed; check all that ar Water-Sta Aquatic Fa True Aquatic Fa True Aquatic Fa Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collision Collisio	oply) ined Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce on Reduction Surface (Well Data plain in Re ches): ches):	es (B9)) (B14) dor (C1) res on Liv d Iron (C4 on in Titleo C7) (D9) marks)	ing Roots } d Soils (C	Seconda Surfa Surfa Drain Dry-1 Cray (C3) Satu (C3) Satu (C3) Satu (C3) FAC Iand Hydrology	ry Indicators (minimum of two requ ace Soll Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C ted or Stressed Plants (D1) morphic Position (D2) •Neutral Test (D5)
Depth (inche Remarks: IYDROLOG) Wetland Hydro Primary Indicato 	Constant of the second	organic ne is require Surface (B7) Surface (B ss N es N	ed: check all that an Water-Sta Aquatic Fa True Aquatic Hydrogen Oxidized F Presence Recent Irc Thin Muck) Gauge or 8) Other (Exp 10 Depth (in 10 Depth (in	oply) ined Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce on Reduction Surface (Well Data plain in Re ches): ches):	es (B9)) (B14) dor (C1) res on Liv d Iron (C4 on in Titleo C7) (D9) marks)	ing Roots } d Soils (C	Seconda Surfa Surfa Drain Dry-1 Cray (C3) Satu (C3) Satu (C3) Satu (C3) FAC Iand Hydrology	ry Indicators (minimum of two requ ace Soll Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C ted or Stressed Plants (D1) morphic Position (D2) •Neutral Test (D5)
Depth (inche Remarks: IYDROLOG) Wetland Hydro Primary Indicato Surface Wa High Water Saturation (Water Mark Sediment D Drift Depos Algal Mat o Iron Deposi Inundation Sparsely We Field Observat Surface Water F Water Table Press (includes capilla	Constant of the second	organic ne is require Surface (B7) Surface (B ss N es N	ed: check all that an Water-Sta Aquatic Fa True Aquatic Hydrogen Oxidized F Presence Recent Irc Thin Muck) Gauge or 8) Other (Exp 10 Depth (in 10 Depth (in	oply) ined Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce on Reduction Surface (Well Data plain in Re ches): ches):	es (B9)) (B14) dor (C1) res on Liv d Iron (C4 on in Titleo C7) (D9) marks)	ing Roots } d Soils (C	Seconda Surfa Surfa Drain Dry-1 Cray (C3) Satu (C3) Satu (C3) Satu (C3) FAC Iand Hydrology	ry Indicators (minimum of two requ ace Soll Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C ted or Stressed Plants (D1) morphic Position (D2) •Neutral Test (D5)

			– Midwest Regio		
Project/Site: Port of Calorsa	Z	//County: <u>Ro</u> :	pers Co	Sampling Date:	2/8
Applicant/Owner: Pac Dautory		1 ₄₀₀	State: CK	_ Sampling Point: _L	PL cast
Investigator(s): Joskaly K. Shady	ru/î Se	ction, Township, Rai	nae: SPC 1	7 TONIR	15E
Landform (hillslope, terrace, etc.):	•				
Slope (%): Lat:					
Soil Map Unit Name:					.
Are climatic / hydrologic conditions on the site typical for					
Are Vegetation, Soil, or Hydrology					NO
Are Vegetation, Soil, or Hydrology	_ naturally proble	matic? (If ne	eded, explain any ans	wers in Remarks.)	
SUMMARY OF FINDINGS – Attach site ma	p showing sa	ampling point lo	ocations, transec	ts, important feat	ures, etc.
Hydrophytic Vegetation Present? Yes		Is the Sampled	Area		
Hydric Soil Present? Yes		within a Wetlar		No/_	
Wetland Hydrology Present? Yes	No <u>le la </u>				
Remarks: ag field					-
VEGETATION – Use scientific names of plan	ts.				
		ominant Indicator	Dominance Test wo	orksheet:	
Tree Stratum (Plot size:)		pecies? <u>Status</u>	Number of Dominant		
1 2			HIALAIG ODL, FAOY	V, or FAC:	~~
3			Total Number of Don Species Across All S		(B)
4			Openes Adoss All o		
5.			Percent of Dominant That Are OBL, FACV	Species V, or FAC:	(A/B)
	=	Total Cover	Prevalence Index w		
Sapling/Shrub Stratum (Plot size:)				f: Multiply b	
1				x1=	1
2				x2=	ſ
3				x3 =	
5.			1 .	x 4 =	
···		Total Cover		x5 ≃	
Herb Stratum (Plot size:)				(A)	
1			Prevalence Ind	ex = B/A =	
2			Hydrophytic Vegeta		
3			Dominance Test		
45			Prevalence Inde		
5 6			Morphological A	daptations ¹ (Provide su arks or on a separate sh	ipporting
7			1	rophytic Vegetation ¹ (E	
8					
9				soil and wetland hydrol	
10.			be present, unless di	isturbed or problematic	
Woody Vine Stratum (Plot size:)					
1			Hydrophytic		
2			Vegetation Present?	Yes No	
	=	Total Cover			

Remarks: (Include photo numbers here or on a separate sheet.)

plowed ag field

Sampling Point: UPL COST

Profile Description: (Describe to the dep	oth needed to document the indicator or	confirm the absence of inc	licators.)
Depth <u>Matrix</u>	Redox Features	,	
(inches) Color (moist) %		Loc ² <u>Texture</u>	Remarks
0-16 7.57R4/3_100)		
· · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · ·			
		• • • • • • • • • • • • • • • • •	
¹ Type: C=Concentration, D=Depletion, RM	=Reduced Matrix, CS=Covered or Coated	Sand Grains. ² Location:	PL=Pore Lining, M=Matrix.
Hydric Soil Indicators:			oblematic Hydric Soils ³ :
Histosol (A1)	Sandy Gleyed Matrix (S4)		Redox (A16)
Histic Epipedon (A2)	Sandy Redox (S5)		ese Masses (F12)
Black Histic (A3)	Stripped Matrix (S6)		n in Remarks)
Hydrogen Sulfide (A4)	Loamy Mucky Mineral (F1)		
Stratified Layers (A5)	Loamy Gleyed Matrix (F2)		
2 cm Muck (A10)	Depleted Matrix (F3)		
Depleted Below Dark Surface (A11) Thick Dark Surface (A12)	Redox Dark Surface (F6)	³ Indiantana af huu	Jacoba dia ana ang dadi ang ang d
Sandy Mucky Mineral (S1)	Depleted Dark Surface (F7) Redox Depressions (F8)	-	drophytic vegetation and blogy must be present,
5 cm Mucky Peat or Peat (S3)			bed or problematic.
Restrictive Layer (if observed):			, v v v v v v v v v v v v v v v v v v v
Туре:			
Depth (inches):		Hydric Soil Prese	nt? Yes No
Remarks:			
Komana,			
HYDROLOGY			
Wetland Hydrology Indicators:			
Primary Indicators (minimum of one is requi	red; check all that apply)	Secondary Ind	cators (minimum of two required)
Surface Water (A1)	Water-Stained Leaves (B9)	Surface So	bil Cracks (B6)
High Water Table (A2)	Aquatic Fauna (B13)	Drainage F	Patterns (B10)
Saturation (A3)	True Aquatic Plants (B14)	Dry-Seaso	n Water Table (C2)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)	Crayfish B	
Sediment Deposits (B2)	Oxidized Rhizospheres on Living	Roots (C3) Saturation	Visible on Aerial Imagery (C9)
Drift Deposits (B3)	Presence of Reduced Iron (C4)		Stressed Plants (D1)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled S		ic Position (D2)
Iron Deposits (B5)	Thin Muck Surface (C7)	FAC-Neutr	al Test (D5)
Inundation Visible on Aerial Imagery (B			_
Sparsely Vegetated Concave Surface (B8) Other (Explain in Remarks)		•
Field Observations:			
	No Depth (inches):		
	No Depth (inches):		
	No Depth (inches):	Wetland Hydrology Pres	ent? Yes No
(includes capillary fringe) Describe Recorded Data (stream gauge, mo	onitoring well, aerial photos, previous inspe	tions) if available:	
Beesino Recorded Data (allean gauge, int	entering went denter protos, previous inspe	1010/j, il availabio.	
Remarks:			
i contanto.			
k hini	0		
Now	a guilt a start		

WETLAND DETE	RMINATION	DATA FORM	– Midwest Region
Project/Site: POC	Citv/C	ounty: Cato	1950, Rogers Sampling Date: East 1
Applicant/Owner: Poc. / Durburs	0, M_		State: _OK Sampling Point: 128 4
Investigator(s): K. Shaunun & Car	Mu Sectio	on, Township, Rar	IGE: SEC 18 TRON RISE
Landform (hillslope, terrace, etc.):	6	Local relief ((concave, convex, none): COLOVC.
Slope (%): 0-2, Lat:			Datum: DATD \$3
			NWI classification:
Are climatic / hydrologic conditions on the site typical for this			
Are Vegetation, Soil, or Hydrology s			Normal Circumstances" present? Yes No
Are Vegetation, Soil, or Hydrology n			eded, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map			
Remarks:	o	Is the Sampled within a Wetlan	d? YesNo
hydrology gen		u ; i	schind on annual rainfall
VEGETATION – Use scientific names of plants.	1		
Tree Stratum (Plot size: , 30)	Absolute Dom % Cover Spe	ninant Indicator cies? Status	Dominance Test worksheet:
	10.00.05	FAKW	Number of Dominant Species That Are OBL, FACW, or FAC: (A)
2. Celtis	45	<u> </u>	Total Number of Dominant
3. Minus americana		FAC	Species Across All Strata: (B)
4			Percent of Dominant Species
5	90 = Tota		That Are OBL, FACW, or FAC:(A/B)
Sapling/Shrub Stratum (Plot size:)		al Cover	Prevalence Index worksheet:
1. Acer negunalo		FACW	Total % Cover of: Multiply by:
2. Chinese privet		UPL	OBL species x 1 =
3			FACW species $\frac{90}{100}$ x 2 = $\frac{180}{100}$
4			FAC species 196 x3 = 588
5			FACU species $0 \times 4 = 0$
Herb Stratum (Plot size: 10m)	$\underline{0}$ = Tota	al Cover	UPL species $2 \times 5 = 10$ Column Totals: 288 (A) 778 (B)
1. Elymys virginicus	95	FAC	
2. Schedonatus phoenix		676	Prevalence Index = B/A = <u>2.7</u>
3. <u>Solidayo Sp. gigantea</u>		<u> </u>	Hydrophytic Vegetation Indicators:
4. Rosa ser multiflorg	·	<u><u> </u></u>	\checkmark Dominance Test is >50% \checkmark Prevalence Index is $\leq 3.0^1$
5		·	 Prevalence index is \$3.0 Morphological Adaptations¹ (Provide supporting
6			data in Remarks or on a separate sheet)
7. <u>~~</u> 8			Problematic Hydrophytic Vegetation ¹ (Explain)
9			4
10			¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size: 10m)	97 = Tota	al Cover	·
Woody Vine Stratum (Plot size: <u>ICM</u>) 1. Smilax bong Nox	Ċ	FAC	Hydrophytic
2. grape/ Vitis se	15	FAC	Vegetation
~ <u>J~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ </u>	<u> </u>	al Cover	Present? Yes <u>No</u>
Remarks: (Include photo numbers here or on a separate s	·····		
i romano. Tuonga hugo ngunere nere or on a sabarare s	51601.7		
	-		

US Army Corps of Engineers

a - 21

Sampling	Point:	E)

Depth <u>Matrix</u>		rm the absence of indicators.)
	Redox Features	
(inches) Color (moist) %	<u>Color (moist) % Type¹ Loc²</u>	Texture Remarks
0-16_10.94R8/299		
0-16	7.5YR5/ 1 RM M	Clay lam
-		0
	······	
<u></u>		······································
· · · · · · · · · · · · · · · · · · ·		
¹ Type: C=Concentration, D=Depletion, RM	=Reduced Matrix, CS=Covered or Coated Sand	Grains. ² Location: PL=Pore Lining, M=Matrix.
Hydric Soil Indicators:		Indicators for Problematic Hydric Solls ³ :
Histosol (A1)	Sandy Gleyed Matrix (S4)	Coast Prairie Redox (A16)
Histic Epipedon (A2)	Sandy Redox (S5)	Iron-Manganese Masses (F12)
Black Histic (A3)	Stripped Matrix (S6)	Other (Explain in Remarks)
Hydrogen Sulfide (A4)	Loamy Mucky Mineral (F1)	
Stratified Layers (A5)	Loamy Gleyed Matrix (F2)	
2 cm Muck (A10) Depleted Below Dark Surface (A11)	Depleted Matrix (F3)	
Thick Dark Surface (A12)	Redox Dark Surface (F6) Depleted Dark Surface (F7)	³ Indicators of hydrophytic vegetation and
Sandy Mucky Mineral (S1)	Redox Depressions (F8)	wetland hydrology must be present,
5 cm Mucky Peat or Peat (S3)		unless disturbed or problematic.
Restrictive Layer (if observed):		
Туре:		
Depth (inches):		Hydric Soll Present? Yes No
Remarks:		
HYDROLOGY		
Wetland Hydrology Indicators:		
Primary Indicators (minimum of one is requi	red; check all that apply)	Secondary Indicators (minImum of two required)
Primary Indicators (minimum of one is requi Surface Water (A1)	red; check all that apply) Water-Stained Leaves (B9)	<u>Secondary Indicators (minimum of two required)</u> Surface Soil Cracks (B6)
Surface Water (A1)	Water-Stained Leaves (B9)	Surface Soil Cracks (B6)
Surface Water (A1) High Water Table (A2)	Water-Stained Leaves (B9) Aquatic Fauna (B13)	Surface Soil Cracks (B6) Drainage Patterns (B10)
Surface Water (A1) High Water Table (A2) Saturation (A3)	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14)	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8)
 Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) 	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) 	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8)
 Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) 	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Root 	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) s (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) C6) Geomorphic Position (D2)
 Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) 	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Root Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) 	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) s (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1)
 Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B 	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Root Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) 	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) s (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) C6) Geomorphic Position (D2)
 Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B' Sparsely Vegetated Concave Surface (1) 	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Root Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) 	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) s (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) C6) Geomorphic Position (D2)
 Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B) Sparsely Vegetated Concave Surface (1) 	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Root Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) 	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) s (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) C6) Geomorphic Position (D2)
 Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B) Sparsely Vegetated Concave Surface (1) Field Observations: Surface Water Present? Yes 	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Root Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) B8) Other (Explain in Remarks) 	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) s (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) C6) Geomorphic Position (D2)
 Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B) Sparsely Vegetated Concave Surface (1) Field Observations: Surface Water Present? Yes Water Table Present? Yes 	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Root Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) B8) Other (Explain in Remarks) No Depth (inches): No Depth (inches):	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) s (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) C6) Geomorphic Position (D2) FAC-Neutral Test (D5)
 Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B) Sparsely Vegetated Concave Surface (1) Field Observations: Surface Water Present? Yes Water Table Present? Yes Saturation Present? Yes 	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Root Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) B8) Other (Explain in Remarks) No Depth (inches): No Depth (inches):	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) s (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) C6) Geomorphic Position (D2)
 Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B) Sparsely Vegetated Concave Surface (1) Field Observations: Surface Water Present? Yes Water Table Present? Yes Saturation Present? Yes Saturation Present? Yes 	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Root Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) B8) Other (Explain in Remarks) No Depth (inches): No Depth (inches): We	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) s (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) C6) Geomorphic Position (D2) FAC-Neutral Test (D5)
 Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B) Sparsely Vegetated Concave Surface (1) Field Observations: Surface Water Present? Yes Water Table Present? Yes Saturation Present? Yes Saturation Present? Yes 	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Root Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) B8) Other (Explain in Remarks) No Depth (inches): No Depth (inches):	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) s (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) C6) Geomorphic Position (D2) FAC-Neutral Test (D5)
Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B Sparsely Vegetated Concave Surface (Field Observations: Surface Water Present? Yes Water Table Present? Yes Saturation Present? Yes (includes capillary fringe) Describe Recorded Data (stream gauge, mo	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Root Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) B8) Other (Explain in Remarks) No Depth (inches): No Depth (inches): We	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) s (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) C6) Geomorphic Position (D2) FAC-Neutral Test (D5)
Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Iron	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Root Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) B8) Other (Explain in Remarks) No Depth (inches): No Depth (inches): We ponitoring well, aerial photos, previous inspections	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) s (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) C6) Geomorphic Position (D2) FAC-Neutral Test (D5)
Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Iron	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Root Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) B8) Other (Explain in Remarks) No Depth (inches): No Depth (inches): We	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) s (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) C6) Geomorphic Position (D2) FAC-Neutral Test (D5)

Wet 2.

WETLAND DETERM	INATION	DATA FORM	 Midwest Region 	
Project/site: Port of Cadoosa	City/	County: <u>Poc</u>	ers Co	Sampling Date: 12/9/2010
Applicant/Owner:POC / Dewberry			State:	Sampling Point: <u>A wetlaw</u>
Investigator(s): K Shannon Maskle	Sect	ion, Township, Rai	nge: <u>Sec 18</u>	TOON PISE
Landform (hillslope, terrace, etc.):				
Slope (%): 0-3 Lat:	Lonę	j:		Datum: <u></u>
Soil Map Unit Name:OS Dsage Charp		hydric	NWI classific	ation: PEMIFH
Are climatic / hydrologic conditions on the site typical for this tim				
Are Vegetation, Soil, or Hydrology signif	ficantly distu	rbed? Are "	Normal Circumstances" p	present? Yes <u>/</u> No
Are Vegetation, Soil, or Hydrology natur	ally problem	atic? (If ne	eded, explain any answe	rs in Remarks.)
SUMMARY OF FINDINGS – Attach site map sho	owing sa	npling point lo	ocations, transects	, important features, etc.
Hydrophytic Vegetation Present? Yes No Hydric Soil Present? Yes No Wetland Hydrology Present? Yes No Remarks: Dehind ON annual va		Is the Sampled within a Wetlan		No
Dennia on annual ra	(mai)			
VEGETATION – Use scientific names of plants.				
1. <u>Carya illinoensis</u> 2. <u>Celtis occidentatis</u> 3. <u>Ulmus americanas</u> 4. <u>Fraximus pernisy heunica</u> 5. <u>Lex deciduas</u> <u>Sapling/Shrub Stratum</u> (Plot size:)	20 30 25 10 10 1 2 1 1 2 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1		Number of Dominant Sy That Are OBL, FACW, of Total Number of Domin Species Across All Stra Percent of Dominant Sy That Are OBL, FACW, of Prevalence Index worl Total % Cover of: OBL species 7 FACW species 20	or FAC: (A) ant (B) becies (B) or FAC: (D) (A/B) ksheet:
5		· ·	FACU species	x4= ()
	17 = то	tal Cover	UPL species 🛛 📿	
<u>Herb Stratum</u> (Plot size:) 1. <u>Centex</u> (upa))ince	10	1 Exc	Column Totals: _ みず	Ц (A) <u>В26</u> (B)
	<u>но </u>	FAC	Prevalence Index	= B/A =
2. <u>Solidago gigantea</u>			Hydrophytic Vegetatio	
4			V Dominance Test is	>50%
5			Y Prevalence Index is	
6			Morphological Adap data in Remarks	otations ¹ (Provide supporting or on a separate sheet)
7				hytic Vegetation ¹ (Explain)
8 9				
10	• • • • • • • • • • • • • • • • • • • •		¹ Indicators of hydric soil be present, unless distu	and wetland hydrology must
	<u>до </u> =то	tal Cover	ba present, uness dista	roed of problematic.
1. Tox rad	10	FAC	Hydrophytic Vegetation	
2	10 = To	tal Cover	Present? Yes	₃ <u> </u>
Remarks: (Include photo numbers here or on a separate sheet	t.)			

.

Sampling Point:

Profile Desc	ription: (Describ	e to the dept	th needed to docur	nent the	indicator	or confirm	the absence of	of indicators.)
Depth	Matrix			x Feature	s			
(inches)	Color (moist)	%	Color (moist)	%		Loc ²	<u>Texture</u>	Remarks
<u>D-16</u>	7.5 YR.4/1	95	7.5NR.4/6	_5_	<u>KM</u>	<u> </u>	<u>clay</u>	
<u> </u>							<u>.</u>	· · · · · · · · · · · · · · · · · · ·
••••••••••••••••••••••••••••••••••••••	L	••••••••••••••••••••••••••••••••••••••		·	·		·	
		<u> </u>						
							·	
¹ Type: C=C	oncentration, D=De	pletion, RM=	Reduced Matrix, CS	S=Covere	d or Coate	d Sand Gr	ains. ² Loca	ation: PL=Pore Lining, M=Matrix.
Hydric Soil		, ,						for Problematic Hydric Soils ³ :
Histosol	(A1)		Sandy (Sleyed Ma	atrix (S4)		Coast F	Prairie Redox (A16)
Histic E	pipedon (A2)		Sandy F	Redox (S5	5)		Iron-Ma	inganese Masses (F12)
	stic (A3)			l Matrix (S	-		Other (I	Explain in Remarks)
	en Sulfide (A4)				neral (F1)			
	d Layers (A5)			Gleyed M				
_	ıck (A10) d Below Dark Surfa	00 (811)		d Matrix (Dork Surfe				
·	ark Surface (A12)	09 (ATT)		Dark Surfa d Dark Su	ace (F0) Irface (F7)		³ Indicators	of hydrophytic vegetation and
	lucky Mineral (S1)			Depressio				hydrology must be present,
	icky Peat or Peat (53)						disturbed or problematic.
	Layer (if observed							· · ·
Type:								
Depth (in	ches):						Hydric Soil I	Present? Yes V No
Remarks:								
	<u>Os</u> =	hyd						
HYDROLO	GY							
Wetland Hy	drology Indicators) :						
Primary India	cators (minimum of	one is requir	ed; check all that ap	ply)			Secondar	ry Indicators (minimum of two required)
Surface	Water (A1)		Water-Stal	ned Leav	'es (B9)		Surfa	ace Soil Cracks (B6)
High Wa	ter Table (A2)		Aquatic Fa	una (B13)		Drain	nage Patterns (B10)
Saturatio	on (A3)		True Aqua	tic Plants	(B14)		Dry-8	Season Water Table (C2)
Water M	larks (B1)		Hydrogen	Sulfide O	dor (C1)		Cray	fish Burrows (C8)
Sedimer	nt Deposits (B2)		Oxidized F	Rhizosphe	res on Livi	ng Roots ((C3) Satu	ration Visible on Aerial Imagery (C9)
🖌 Drift Dep	posits (B3)		Presence	of Reduce	ed Iron (C4)	Stunt	ted or Stressed Plants (D1)
-	at or Crust (B4)		Recent Iro			l Soils (C6	•	norphic Position (D2)
	oosits (B5)		Thin Muck				FAC-	Neutral Test (D5)
	on Visible on Aeria							
	/ Vegetated Conca	ve Surface (E	38) Other (Exp	lain in Re	emarks)			
Field Obser								
Surface Wat			No Depth (in			-		
Water Table			No Depth (in					
Saturation P		Yes 1	No Depth (in	ches):		_ Wetla	and Hydrology	Present? Yes V No
(includes cap Describe Re	corded Data (streat	n gauge, mo	nitoring well, aerial	photos, pr	evious ins	pections),	if available:	
		• • •						
Remarks:								
	b. 11-			a 14 4				
	puttress	sed 7	tree tru	1 600				

	Midwest Region
Are climatic / hydrologic conditions on the site typical for this time of year? Yes No No Are Vegetation, Soil, or Hydrology significantly disturbed? Are "No Are Vegetation, Soil, or Hydrology naturally problematic? (If need SUMMARY OF FINDINGS – Attach site map showing sampling point loc Hydrophytic Vegetation Present? Yes No Is the Sampled Attach within a Wetland? Hydric Soil Present? Yes No No Is the Sampled Attach	e:
behind on annual vainfall	
Tree Stratum (Plot size:) % Cover Species? Status 1 1.	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: (A) Total Number of Dominant Species Across All Strata: (B) Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B) Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B) Prevalence Index worksheet: (A/B) Total % Cover of: Multiply by: OBL species x 1 = FACW species x 2 = FACU species x 3 = FACU species x 5 = Column Totals: (A) UPL species x 5 = Column Totals: (A) Prevalence Index = B/A = (B) Prevalence Index is <3.01

SOIL

~

Profile Description: (Describe to the depth i	needed to document the indicator o	r contirm	the absence of h	noicators.j
Depth <u>Matrix</u>	Redox Features			
(inches) Color (moist) %	Color (moist) % Type ¹	Loc ²	<u> </u>	Remarks
0-16 T.SYR4/1 90_			<u>clay</u> _	tilled
0-167	SYRY/ 10 RM	M	· · · · · · · · · · · · · · · · · · ·	
	··· · · · · · · · · · ·	•		
			• • • • • • • • • • • • • • • • • • •	
		•	·	
		<u> </u>	,	
¹ Type: C=Concentration, D=Depletion, RM=Re	duced Matrix, CS=Covered or Coated	I Sand Gra	ains. ² Locatio	n: PL=Pore Lining, M=Matrix.
Hydric Soil Indicators:				Problematic Hydric Soils ³ :
Histosol (A1)	Sandy Gleyed Matrix (S4)		Coast Prai	rie Redox (A16)
Histic Epipedon (A2)	Sandy Redox (S5)			anese Masses (F12)
Black Histic (A3)	Stripped Matrix (S6)		Other (Exp	lain in Remarks)
Hydrogen Sulfide (A4)	Loamy Mucky Mineral (F1)			
Stratified Layers (A5)	Loamy Gleyed Matrix (F2)			
2 cm Muck (A10) Depleted Below Dark Surface (A11)	Depleted Matrix (F3)			
Thick Dark Surface (A12)	Redox Dark Surface (F6) Depleted Dark Surface (F7)		³ Indicators of h	ydrophytic vegetation and
Sandy Mucky Mineral (S1)	Redox Depressions (F8)			drology must be present,
5 cm Mucky Peat or Peat (S3)	(),		•	urbed or problematic.
Restrictive Layer (if observed):				
Туре:	_			· · · ·
Depth (inches):			Hydric Soll Pres	sent? Yes <u>V</u> No
Remarks:			-	
مااندا	A call			
TIC	d soil			
HYDROLOGY Wetland Hydrology Indicators:				
Wetland Hydrology Indicators:	check all that apply)		Secondary Ir	udicators (minimum of two required)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;				dicators (minimum of two required)
Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required;</u> Surface Water (A1)	Water-Stained Leaves (B9)		Surface	Soil Cracks (B6)
Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required;</u> <u>Surface Water (A1)</u> High Water Table (A2)	Water-Stained Leaves (B9) Aquatic Fauna (B13)		Surface Drainage	Soil Cracks (B6) ∋ Patterns (B10)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; Surface Water (A1) High Water Table (A2) Saturation (A3)	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14)		Surface Drainage Dry-Sea	Soil Cracks (B6) e Patterns (B10) son Water Table (C2)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1)	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) 	a Roots (Surface Drainage Dry-Sea Crayfish	Soil Cracks (B6) e Patterns (B10) son Water Table (C2) Burrows (C8)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livin		Surface Drainage Dry-Sea Crayfish C3) Saturatio	Soil Cracks (B6) e Patterns (B10) son Water Table (C2) Burrows (C8) on Visible on Aerial Imagery (C9)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livin Presence of Reduced Iron (C4) 		Surface Drainage Dry-Sea Crayfish C3) Saturatio Stunted	Soil Cracks (B6) Patterns (B10) son Water Table (C2) Burrows (C8) on Visible on Aerial Imagery (C9) or Stressed Plants (D1)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livin Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled 		Surface Drainage Dry-Sea Crayfish C3) Saturatio Stunted ∕ Geomorp	Soil Cracks (B6) e Patterns (B10) son Water Table (C2) Burrows (C8) on Visible on Aerial Imagery (C9) or Stressed Plants (D1) phic Position (D2)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livin Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Thin Muck Surface (C7) 		Surface Drainage Dry-Sea Crayfish C3) Saturatio Stunted ∕ Geomorp	Soil Cracks (B6) Patterns (B10) son Water Table (C2) Burrows (C8) on Visible on Aerial Imagery (C9) or Stressed Plants (D1)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livin Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Thin Muck Surface (C7) Gauge or Well Data (D9) 		Surface Drainage Dry-Sea Crayfish C3) Saturatio Stunted ∕ Geomorp	Soil Cracks (B6) e Patterns (B10) son Water Table (C2) Burrows (C8) on Visible on Aerial Imagery (C9) or Stressed Plants (D1) phic Position (D2)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livin Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Thin Muck Surface (C7) Gauge or Well Data (D9) 		Surface Drainage Dry-Sea Crayfish C3) Saturatio Stunted ∕ Geomorp	Soil Cracks (B6) e Patterns (B10) son Water Table (C2) Burrows (C8) on Visible on Aerial Imagery (C9) or Stressed Plants (D1) phic Position (D2)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livin Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain In Remarks) 		Surface Drainage Dry-Sea Crayfish C3) Saturatio Stunted ∕ Geomorp	Soil Cracks (B6) e Patterns (B10) son Water Table (C2) Burrows (C8) on Visible on Aerial Imagery (C9) or Stressed Plants (D1) phic Position (D2)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livin Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain In Remarks) 	Soils (C6)	Surface Drainage Dry-Sea Crayfish C3) Saturatio Stunted ∕ Geomorp	Soil Cracks (B6) e Patterns (B10) son Water Table (C2) Burrows (C8) on Visible on Aerial Imagery (C9) or Stressed Plants (D1) phic Position (D2)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livin Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): Depth (inches): 	Soils (C6)	Surface Dreinage Dry-Sea Crayfish C3) Saturatio Stunted Geomory FAC-Net	Soil Cracks (B6) e Patterns (B10) son Water Table (C2) Burrows (C8) on Visible on Aerial Imagery (C9) or Stressed Plants (D1) phic Position (D2) utral Test (D5)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livin Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain In Remarks) 	Soils (C6)	Surface Drainage Dry-Sea Crayfish C3) Saturatio Stunted _↓⁄ Geomory FAC-Net	Soil Cracks (B6) e Patterns (B10) son Water Table (C2) Burrows (C8) on Visible on Aerial Imagery (C9) or Stressed Plants (D1) phic Position (D2)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livin Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain In Remarks) 	Soils (C6)	Surface Drainage Dry-Sea Crayfish C3) Saturatio Stunted _↓⁄ Geomory FAC-Net	Soil Cracks (B6) e Patterns (B10) son Water Table (C2) Burrows (C8) on Visible on Aerial Imagery (C9) or Stressed Plants (D1) phic Position (D2) utral Test (D5)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livin Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain In Remarks) 	Soils (C6)	Surface Drainage Dry-Sea Crayfish C3) Saturatio Stunted _↓⁄ Geomory FAC-Net	Soil Cracks (B6) e Patterns (B10) son Water Table (C2) Burrows (C8) on Visible on Aerial Imagery (C9) or Stressed Plants (D1) phic Position (D2) utral Test (D5)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livin Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain In Remarks) 	Soils (C6)	Surface Drainage Dry-Sea Crayfish C3) Saturatio Stunted _↓⁄ Geomory FAC-Net	Soil Cracks (B6) e Patterns (B10) son Water Table (C2) Burrows (C8) on Visible on Aerial Imagery (C9) or Stressed Plants (D1) phic Position (D2) utral Test (D5)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livin Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): Depth (inches): Depth (inches): Depth (inches): 	Soils (C6)	Surface Drainage Dry-Sea Crayfish C3) Saturatio Stunted _↓⁄ Geomory FAC-Net	Soil Cracks (B6) e Patterns (B10) son Water Table (C2) Burrows (C8) on Visible on Aerial Imagery (C9) or Stressed Plants (D1) phic Position (D2) utral Test (D5)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livin Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): Depth (inches): Depth (inches): Depth (inches): 	Soils (C6)	Surface Drainage Dry-Sea Crayfish C3) Saturatio Stunted _↓⁄ Geomory FAC-Net	Soil Cracks (B6) e Patterns (B10) son Water Table (C2) Burrows (C8) on Visible on Aerial Imagery (C9) or Stressed Plants (D1) phic Position (D2) utral Test (D5)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livin Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): Depth (inches): Depth (inches): Depth (inches): 	Soils (C6)	Surface Drainage Dry-Sea Crayfish C3) Saturatio Stunted _↓⁄ Geomory FAC-Net	Soil Cracks (B6) e Patterns (B10) son Water Table (C2) Burrows (C8) on Visible on Aerial Imagery (C9) or Stressed Plants (D1) phic Position (D2) utral Test (D5)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Livin Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): Depth (inches): Depth (inches): Depth (inches): 	Soils (C6)	Surface Drainage Dry-Sea Crayfish C3) Saturatio Stunted _↓⁄ Geomory FAC-Net	Soil Cracks (B6) e Patterns (B10) son Water Table (C2) Burrows (C8) on Visible on Aerial Imagery (C9) or Stressed Plants (D1) phic Position (D2) utral Test (D5)

Wet-3

WETLAND DETERMINATION D	ATA FORM – Midwest Region
Project/Site: POC Demberry City/Con	unty: Catasa / Rogers Sampling Date: 12/14
Applicant/Owner: POC	State: <u>0K</u> Sampling Point: <u>Say</u> Point
Investigator(s): K. Shannon J. Caskey Section	
	_ Local relief (concave, convex, none):
Slope (%): Lat: Long:	Locartelier (concave, convex, none)
Solf Map Unit Name: OS Osage Clay	Datum: <u>MAD83</u> Hyd.nicNWI classification:PEMI
Are climatic / hydrologic conditions on the site typical for this time of year? Yes	Construction of the second
Are Vegetation, Soil, or Hydrology significantly disturbe	
Are Vegetation, Soil, or Hydrology naturally problemati SUMMARY OF FINDINGS – Attach site map showing samp	
	s the Sampled Area
Hydric Soil Present? Yes No Wetland Hydrology Present? Yes No	vithin a Wetland? Yes No
Pomorke:	
dry; behind on rainfall for	previous month / year
VEGETATION – Use scientific names of plants.	
Absolute Domin <u>Tree Stratum</u> (Plot size: 20 кд % Cover Specie	ant Indicator Dominance Test worksheet: es? Status Number of Deminant Species O
$\frac{11 \text{ (For size.} - 1)}{1. \text{ (Sa. 1)} \text{ (For size.} - 1)}$	$\frac{4 \times 3}{4 \times 3}$ Number of Dominant Species 3 (A)
2. Out Quercus putton Shumatonii	CArw
3. Ulmus americana	Total Number of Dominant <u>FAC</u> Species Across All Strata: <u>3</u> (B)
4,	Percent of Dominant Species
5	That Are OBL, FACW, or FAC: (A/B)
Sapling/Shrub Stratum (Plot size:? DM)= Total	Cover Prevalence Index worksheet:
1. Buttonbush - Cephalanthus occidentilis 5	Total % Cover of: Multiply by:
2. Salix miara	FACV OBL species X1 = 30
3	FACW species x 2 = 98
4	FAC species X3 = Y9
5	FACU species x 4 =
Herb Stratum (Plot size: 15m)	
1. Telescon churther Carex Invaline 25	Ob] Column Totals: <u>12</u> (A) <u>227</u> (B)
2. Solidaço Gigentea	FAC Prevalence Index = B/A =
3. Panicom Virg atum 10	FA(W Hydrophytic Vegetation Indicators:
4. Approximum connibingin 355	Dominance Test is >50%
5. Polygonian Japathifolium 254_	FACW Prevalence Index is ≤3.0 ¹
6. <u>Eleusine indicas</u>	Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
7	Problematic Hydrophytic Vegetation (Explain)
8	
9	Indicators of hydric soil and welland hydrology must
= Total	20 prototili, annos anomena el prototilitati
Woody Vine Stratum (Plot size:)	
1	Vegetation
2	
Remarks: (Include photo numbers here or on a separate sheet.)	COVER
Nomano. (molude photo numbers note of on a separate sites.)	
	new for the second s
US Army Corps of Engineers	Midwest Region – Interim Version
Construction of the second sec	

e011

nling Doint

SOIL								Sampling Point:
Profile Dese	cription: (Describe f	o the dept	needed to docum	nent the	ndicator	or confirm	n the absence o	f Indicators.)
Depth	 Matrix			k Feature				·
(inches)	Color (moist)	%	Color (moist)	. %	Type ¹	Loc ²	Texture	Remarks
0-16	7.5YR 4/1	95	7.5YR 4/6	5	RM	P\$	clay	
(<u> </u>			
		<u> </u>		<u></u>	·	<u> </u>		
					·	<u> </u>		
					. <u> </u>			
¹ Type: C=C	oncentration, D=Depl	ation RM=	Reduced Matrix CS	=Covere	d or Coate	d Sand G		tion: PL=Pore Lining, M=Matrix.
Hydric Soil			veduced mains, co		a or coate	u Sanu G		or Problematic Hydric Solis ³ :
•			Condu O		4.4.4 (04)			-
Histosol			Sandy G	ledox (S5				rairie Redox (A16) nganese Masses (F12)
	pipedon (A2) istic (A3)			Matrix (S	•			xplain in Remarks)
	en Sulfide (A4)				neral (F1)			
	d Layers (A5)			Sleyed Ma	• •			
	uck (A10)			i Matrix (
	d Below Dark Surface	e (A11)	Redox D		-			
	ark Surface (A12)	(···)			rface (F7)		³ Indicators o	of hydrophytic vegetation and
·	/lucky Mineral (S1)		Redox D	epressio	ns (F8)			hydrology must be present,
	ucky Peat or Peat (S3	i)						isturbed or problematic.
Restrictive	Layer (if observed):						T	
Туре:								
Depth (in	ches):						Hydric Soil P	resent? Yes No
Remarks:						·····		
i torritantor								
HYDROLO	IGY							
-	drology Indicators:							
Primary India	cators (minimum of or	ne is require	/					v Indicators (minimum of two required)
Surface	Water (A1)		🗹 Water-Stali				1_Surfa	ce Soil Cracks (B6)
High Wa	ater Table (A2)		Aquatic Fa	una (B13)		<u> </u>	age Patterns (B10)
Saturati	on (A3)		I True Aquat	ic Plants	(B14)		Dry-S	eason Water Table (C2)
Water M	farks (B1)		Hydrogen S	Sulfide O	dor (C1)		Crayfi	sh Burrows (C8)
Sedimer	nt Deposits (B2)		Oxidized R	hizosphe	res on Livi	ing Roots	(C3) Satura	ation Visible on Aerial Imagery (C9)
L Drift De	posits (B3)		Presence of	of Reduce	d Iron (C4)	Stunte	ed or Stressed Plants (D1)
*	at or Crust (B4)		Recent Iror	n Reducti	on in Tilleo	Soils (Ce	6) Geom	orphic Position (D2)
	posits (B5)		Thin Muck	Surface (C7)	•		Neutral Test (D5)
	on Visible on Aerial I	magery (B7)					_	
	y Vegetated Concave							
Field Obser			-/ (····		
Surface Wat		es N	o 🔨 Depth (inc	heel				
			*			-		1
Water Table			o Depth (inc		16中 11	-		
Saturation P		es <u>/</u> N	o <u> </u>	:hes):	t Øri	_ Wetl	and Hydrology	Present? Yes <u>V</u> No
	pillary fringe) corded Data (stream	aalide mor	itoring well, serial n	ihotos pr	evious ins	l pections)	if available.	
2000100110	oordou Data Jonedin	90090, mol	manua non conci h		- 11003 1113	poono(10),		
	······································							
			1	1		<i>a</i> .	. 11 11	7
		ଦ୍ରଠା	nd in c	esnt	X : 0)per	n Mac	/
		. I)	ł		

١

WETLAND DETERMINATION DATA FOR	RM – Midwest Region
Project/Site: Port of Cataosa City/County: R	CORCY S Sampling Date: 12/14
Applicant/Owner: POC/Deuberry	State: CK Sampling Point: S PONOL UPL
Investigator(s): KShannon JCackey Section, Township,	Range: 18 TZONI, RISE
Landform (hillslope, terrace, etc.): Local rel	
Slope (%): Lat: Long:	
Soil Map Unit Name:	
Are climatic / hydrologic conditions on the site typical for this time of year? Yes No	
	re "Normal Circumstances" present? Yes V. No
	f needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing sampling poin	it locations, transects, important leatures, etc.
Hydrophytic Vegetation Present? Yes No Is the Samp within a Weil Hydric Soil Present? Yes No Is the Samp within a Weil Wetland Hydrology Present? Yes No Is the Samp within a Weil Remarks: behind on annual rainfall	led Area tland? Yes No
VEGETATION – Use scientific names of plants.	
Absolute Dominant Indicate Tree Stratum (Plot size:) % Cover Species?	
1 (Plot size) <u>76 CoverSpecies7Statu</u>	Number of Dominant Species Image: That Are OBL, FACW, or FAC: (A)
2	
3	Total Number of Dominant Species Across All Strata: (B)
4	- Percent of Dominant Species
5	
Sapling/Shrub Stratum (Plot size:) = Total Cover	Prevalence Index worksheet:
1	Total % Cover of: Multiply by:
2	OBL species x 1 =
3	FACW species x 2 =
4,	FAC species x 3 =
5	FACU species x 4 =
Herb Stratum (Plot size:) = Total Cover	UPL species x 5 = Column Totals: (A) (B)
1	
2	Prevalence index = B/A =
3	Hydrophytic Vegetation Indicators: Dominance Test is >50%
4	Prevalence Index is ≤3.0 ¹
5	Morphological Adaptations ¹ (Provide supporting
6	data in Remarks or on a separate sheet)
8	Problematic Hydrophytic Vegetation ¹ (Explain)
9	¹ Indicators of hydric soil and wetland hydrology must
10	- be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:) = Total Cover	
1	Hydrophytic
2	Vegetation — Present? Yes No V
= Total Cover	
Remarks: (Include photo numbers here or on a separate sheet.)	
no plants disted fie	1d

.

Sampling Point: <u>SpaveLUP</u>

Profile Description: (Describe to the dept	h needed to document the indicator or c	onfirm the absence of indicators.)
Depth Matrix	Redox Features	
(inches) Color (moist) %		DC ² Texture Remarks
0-16 7,5YR.4/1 85	7.54R4/6 15 AM 1	M clay
		· · · · · · · · · · · · · · · · · · ·
·		· · · · · · · · · · · · · · · · · · ·
¹ Type: C=Concentration, D=Depletion, RM=	Reduced Matrix, CS=Covered or Coated Sa	
Hydric Soil Indicators:		Indicators for Problematic Hydric Solls ³ :
Histosol (A1)	Sandy Gleyed Matrix (S4)	Coast Prairie Redox (A16)
Histic Epipedon (A2)	Sandy Redox (S5)	Iron-Manganese Masses (F12)
Black Histic (A3) Hydrogen Sulfide (A4)	Stripped Matrix (S6) Loamy Mucky Mineral (F1)	Other (Explain in Remarks)
Stratified Layers (A5)	Loamy Gleyed Matrix (F2)	
2 cm Muck (A10)	Depleted Matrix (F3)	
Depleted Below Dark Surface (A11)	Redox Dark Surface (F6)	
Thick Dark Surface (A12)	Depleted Dark Surface (F7)	³ Indicators of hydrophytic vegetation and
Sandy Mucky Mineral (S1)	Redox Depressions (F8)	wetland hydrology must be present,
5 cm Mucky Peat or Peat (S3) Restrictive Layer (if observed):		unless disturbed or problematic.
Туре:		
Depth (inches):		Hydric Soil Present? Yes V No
Remarks:		
(
YDROLOGY		
Wetland Hydrology Indicators:		
Primary Indicators (minimum of one is requir	ed; check all that apply)	Secondary Indicators (minimum of two required)
Surface Water (A1)	Water-Stained Leaves (B9)	Surface Soil Cracks (B6)
High Water Table (A2)	Aquatic Fauna (B13)	Drainage Patterns (B10)
Saturation (A3)	True Aquatic Plants (B14)	Dry-Season Water Table (C2)
Water Marks (B1)	Hydrogen Sulfide Odor (C1) Ovidized Bhizeenheree on Living F	Crayfish Burrows (C8)
Sediment Deposits (B2) Drift Deposits (B3)	Presence of Reduced Iron (C4)	Roots (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled So	
Iron Deposits (B5)	Thin Muck Surface (C7)	FAC-Neutral Test (D5)
Inundation Visible on Aerial Imagery (B7		
Sparsely Vegetated Concave Surface (E		
Field Observations:		
Surface Water Present? Yes !	No Depth (inches):	
Water Table Present? Yes I	lo Depth (inches):	
Saturation Present? Yes I (includes capillary fringe) Describe Recorded Data (stream gauge, mo	No Depth (inches):	Wetland Hydrology Present? Yes No
Describe Recorded Data (stream gauge, mo	nitoring well, aerial photos, previous inspect	ions), ir available:
Remarks:	/25	· · · · · · · · · · · · · · · · · · ·
	nal flooding	
Starse	in incomy	

				Wa
				– Midwest Region
Project/Site: POC/Denvery				- Midwest Region Sampling Date: <u>12/14</u> State: <u>0K</u> Sampling Point: <u>Fake</u>
				nge: Sec 18 TAON RISE
andform (hillslope, terrace, etc.): <u>hills ope</u> Slope (%): <u>3-10</u> Lat:				
soil Map Unit Name: Pour (NWI classification:
are climatic / hydrologic conditions on the site typical for the vegetation, Soil, or Hydrology are Vegetation, Soil, or Hydrology SUMMARY OF FINDINGS – Attach site mag	_ significantly	disturbed? blematic?	Are "i (If ne	Normal Circumstances" present? Yes <u>Marria</u> No eded, explain any answers in Remarks.)
Hydric Soil Present? Yes	No No No	with	e Sampled in a Wetlan	
/EGETATION – Use scientific names of plant	Absolute	Dominant Species?		Dominance Test worksheet:
1. <u>Sa lix Nigra</u> . 2 3 4 5			<u> </u>	Number of Dominant Species 4 (A That Are OBL, FACW, or FAC: 4 (A Total Number of Dominant 4 (B Species Across All Strata: 100 (A Percent of Dominant Species 100 (A That Are OBL, FACW, or FAC: 100 (A
Sapling/Shrub Stratum (Plot size:)		= Total Cov	L."	Prevalence Index worksheet:
1. Salix nigra. 2. <u>Cephalanthus occidentalis</u> 3. Tex read. 4.	_ 20_	•	<u>TANU</u> <u>CAL</u> FAC	Total % Cover of:Multiply by:OBL species 30 $x 1 = 30$ FACW species 35 $x 2 = 70$ FAC species 67 $x 3 = 20$
5			······································	FACU species x 4 = UPL species x 5 =
<u>Herb Stratum</u> (Plot size:) 1. <u>Ehanvs canadaris</u> 2. Setaria	<u>35</u>	<u> </u>	FAC.	Column Totals: <u>\32</u> (A) <u>301</u> (Prevalence Index = B/A = <u>2.28</u>
2. <u>Artocypum</u> cannibinum 5	2	_N	OBL	Hydrophytic Vegetation Indicators: Dominance Test is >50% Prevalence Index is <3.0 ¹
6 7 8		·	. <u> </u>	Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation ¹ (Explain)
9		·		¹ Indicators of hydric soil and wetland hydrology mus be present, unless disturbed or problematic.
<u>Woody Vine Stratum</u> (Plot size:) 1				Hydrophytic Vegetation
2				Present? Yes No

SOIL

Sampling Point:

Profile Des	cription: (Describe t	o the depth n	eeded to docun	nent the i	ndicator	or confirm	the absence	of indicators.)
Depth	Matrix			<pre>c Features</pre>	3	<u> </u>		
(inches)	Color (moist)	_%(Color (moist)	%	Type ¹	<u>Loc²</u>	<u> </u>	Remarks
	7.54841	<u> </u>						
	7.57R-4/6							
	*				• • • • • • • •			
•								•
<u> </u>		<u> </u>	<mark>.</mark>				<u> </u>	<u>···</u>
	B	·		. <u> </u>	<u> </u>			
					·		•	
					<u></u>			
¹ Type: C=C	oncentration, D=Depl	etion, RM=Red	luced Matrix, CS	=Covered	l or Coate	d Sand Gr	ains. ² Loo	ation: PL=Pore Lining, M=Matrix.
Hydric Soil	Indicators:						Indicators	for Problematic Hydric Solis ³ :
Histosol	• •			ileyed Ma				Prairie Redox (A16)
	pipedon (A2)			edox (S5				anganese Masses (F12)
	istic (A3)			Matrix (S	-		Other (Explain in Remarks)
	en Sulfide (A4) d Layers (A5)			/lucky Min Sleyed Ma				
2 cm Mu	• • •			i Matrix (F				
	d Below Dark Surface	e (A11)		ark Surfa	-			
	ark Surface (A12)				rface (F7)		³ Indicators	of hydrophytic vegetation and
Sandy N	/lucky Mineral (S1)		Redox D	epression	ns (F8)		wetland	hydrology must be present,
	ucky Peat or Peat (S3)					unless	disturbed or problematic.
Restrictive	Layer (if observed):							
Туре:								
Depth (in	ches):		-				Hydric Soil	Present? Yes No
Remarks:								
HYDROLO	GY							
Wetland Hy	drology Indicators:							
Primary Indi	cators (minimum of or	ne is required;	check all that ap	oly)			Seconda	ry Indicators (minimum of two required)
🖌 Surface	Water (A1)		🖌 Water-Stair	ned Leave	es (B9)		Surfa	ace Soll Cracks (B6)
High Wa	ater Table (A2)		Aquatic Fa	una (B13)			📈 Draii	nage Patterns (B10)
Saturati	on (A3)		True Aquat	ic Plants	(B14)		Dry-	Season Water Table (C2)
1 Water M			Hydrogen S	Sulfide Oc	lor (C1)		Cray	fish Burrows (C8)
	nt Deposits (B2)		Oxidized R	-			-	rration Visible on Aerial Imagery (C9)
	posits (B3)		Presence c			•		ited or Stressed Plants (D1)
	at or Crust (B4)		Recent Iror			Soils (C6		morphic Position (D2)
· · · ·	posits (B5)		Thin Muck		-		FAC	-Neutral Test (D5)
	on Visible on Aerial Ir		Gauge or V					
Field Obser	y Vegetated Concave	Sunace (D8)	Other (Exp	am m Ke	marks)		•	
Surface Wat			Depth (inc	h00)				
						ł		
Water Table			✓ Depth (inc ✓ Depth (inc					· Due a su (O. Mara Ma
Saturation P (includes car	resent? Ye pillary fringe)	es No _	Depth (inc	nes):			and Hydrology	/ Present? Yes No
	corded Data (stream	gauge, monito	ring well, aerial p	hotos, pre	evious insp	pections),	if available:	
Remarks:				. (o Waters
		isolo	ted r	or	CON	NEU	real 1	U UNAINS
		1~~) -					

Wet6

WEILAND DEIE	RMINATION DAT	Fa form -	 Midwest Re 	egion
Project/Site: Part of Catoas Applicant/Owner: PCC / Dewbern	City/Count			Sampling Date: 12/15 Kampling Point: beaver ewer
Investigator(s): J Caskey K. Shank				
Landform (hillslope, terrace, etc.):				-
	Long:			6
Soil Map Unit Name: <u>W Uxtfer</u>			-	classification:
Are climatic / hydrologic conditions on the site typical for thi				
Are Vegetation, Soil, or Hydrology s				ances" present? Yes No
Are Vegetation, Soil, or Hydrology r		•	•	y answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map	showing samplin	ng point lo	cations, trar	isects, important features, etc.
Hydric Soil Present? Yes V	o wit	he Sampled / hin a Wetland		es No
VEGETATION Use scientific names of plants				
	Absolute Dominan	t Indicator	Dominance Te	est worksheet:
Tree Stratum (Plot size:)	<u>% Cover</u> Species?	<u>Status</u>	Number of Don That Are OBI	ninant Species <u>3</u> (A)
2.			Total Number of	
3			Species Across	· · · · · · · · · · · · · · · · · · ·
4			Percent of Don	
5	= = Total Co		That Are OBL,	FACW, or FAC: (A/B)
Sapling/Shrub Stratum (Plot size:)	<u></u>			dex worksheet:
1. Ceptalanthis outpentallis		<u>_08L</u>	<u>Total % Co</u> OBL species	$\frac{\text{Dver of:}}{100} = \frac{\text{Multiply by:}}{100}$
3.			FACW species	
4			FAC species	
5			FACU species	
Herb Stratum (Plot size:)	= Total Co	over	UPL species Column Totals:	$\frac{O}{UD} \times 5 = \frac{O}{RO} $ (B)
1. Typha latifolia	<u>60 Y</u>	DBL		
2. Echinochina arts-galii	-10 N	-FACW		ce Index = B/A = <u>1.28</u> /egetation Indicators:
3. Carex jupallina 4. Polyconim poathifolium	- 30 1	- OBL FACW		e Test is >50%
4. Polygonin poethitolium		<u> </u>	Prevalence	e Index is ≤3.0 ¹
6			Morpholog	ical Adaptations ¹ (Provide supporting Remarks or on a separate sheet)
7				ic Hydrophytic Vegetation ¹ (Explain)
8				
9			¹ Indicators of h	ydric soil and wetland hydrology must less disturbed or problematic.
	<u>]35</u> = Total C	over	oo prosent, un	
Woody Vine Stratum (Plot size:)			Hydrophytic	
			Vegetation Present?	Yes V No
	= Total C	over	r16261117	169 <u>F</u> 100
1				

Sampling Point:

SUIL								Sampling Point:
Profile Desc	ription: (Describe t	o the depth i	needed to docu	ment the i	ndicator	or confirm	n the abse	ence of indicators.)
Depth	Matrix		Redo	x Features	3			
(inches)	Color (moist)		Color (moist)	%	Type ¹	_Loc ²	<u> </u>	e Remarks
0-16	715YR4/1	10 1.	54R.4/6	10	PM	M	<u>cla</u>	¥
			•				1	
· · · · · · ·	• · · · · · · · · · · · · · · · · · · ·							
	•	<u> </u>			·	·	<u>.</u>	
<u> </u>								
						<u></u>		
·								
		<u></u>						
. <u> </u>		.			·			<u></u>
	oncentration, D=Depl	etion, RM=Re	educed Matrix, C	S=Covered	or Coate	ed Sand Gr		² Location: PL=Pore Lining, M=Matrix.
Hydric Soll	indicators:							tors for Problematic Hydric Soils ³ :
Histosol				Gleyed Ma				oast Prairie Redox (A16)
	pipedon (A2)			Redox (S5)				on-Manganese Masses (F12)
	stic (A3)			d Matrix (S	•		_ 0	ther (Explain in Remarks)
	n Sulfide (A4)			Mucky Min				
	l Layers (A5)			Gleyed Ma				
2 cm Mu Depictor	i Below Dark Surface	(A11)		ed Matrix (F Dark Surfa				
	ark Surface (A12)			d Dark Suna	• •	•	³ Indic	ators of hydrophytic vegetation and
	lucky Mineral (S1)		·	Depression	•	,		atland hydrology must be present,
	icky Peat or Peat (S3))						nless disturbed or problematic.
	ayer (if observed):							
Type:								
	ches):						Hydric	Soli Present? Yes // No
							Inguno	
Remarks:								
HYDROLO	GY							
	drology Indicators:							
							C • •	and a ladianta a fairing a film a sulla d
	ators (minimum of or	ie is required						condary Indicators (minimum of two required)
	Water (A1)		Water-Sta					Surface Soil Cracks (B6)
	ter Table (A2)		Aquatic Fa					Drainage Patterns (B10)
🗹 Saturatio			True Aqua					Dry-Season Water Table (C2)
🖌 Water M			Hydrogen					Crayfish Burrows (C8)
,	nt Deposits (B2)		Oxidized I	Rhizospher	res on Liv	ing Roots (•••==	Saturation Visible on Aerial Imagery (C9)
🖌 Drift Dep	oosits (B3)			of Reduce	•			Stunted or Stressed Plants (D1)
Algai Ma	at or Crust (B4)		Recent Irc	on Reductio	on in Tille	d Soils (C6	5) <u> </u>	Geomorphic Position (D2)
Iron Dep	osits (B5)		Thin Mucl	c Surface (C7)		—	FAC-Neutral Test (D5)
Inundati	on Visible on Aerial In	nagery (B7)	Gauge or	Well Data	(D9)			
Sparsely	Vegetated Concave	Surface (B8)	Other (Ex	plain in Re	marks)			
Field Obser	vations:							
Surface Wat	er Present? Ye	sNo	Depth (in					
Water Table			Depth (in					
Saturation P			Depth (in			Weth	and Hydro	ology Present? Yes <u>Mo</u> No
(includes cap	oillary fringe)							·
	corded Data (stream	gauge, monit	oring well, aerial	photos, pre	evious ins	pections),	if available	e:
Remarks:			1.375					

Wet 7

WETLAND DETER				n
Project/Site: Port of Catooca	City/C	ounty: <u>Rm</u> a	ers Co	Sampling Date: 12/15
Applicant/Owner: Pac / Dewbern/		J	State:K	Sampling Point: Utt-Leave
Investigator(s): J Caskey K Shannon		n, Township, Rar	198: <u>Sec 7</u>	TOON RISE
Landform (hillslope, terrace, etc.):				
				Datum: <u>11AD83</u>
				sification:
Are climatic / hydrologic conditions on the site typical for this ti			-	
Are Vegetation, Soil, or Hydrology sign				
Are Vegetation, Soil, or Hydrology nati			eded, explain any ans	
SUMMARY OF FINDINGS – Attach site map sh			cations transe	ts important features etc.
SUMMART OF FINDINGS - Attach site map si	iowing sam	ping point it		
Hydric Soil Present? Yes <u>V</u> No Wetland Hydrology Present? Yes <u>V</u> No Remarks:		Is the Sampled within a Wetlan		No
behind on annual	(varing			
VEGETATION – Use scientific names of plants.				
<u>Tree Stratum</u> (Plot size:) <u>9</u> 1. <u>Salix Nigra</u>	<u>% Cover</u> <u>Spec</u>	inant Indicator <u>cies? Status</u>	Dominance Test w Number of Dominar That Are OBL, FAC	it Species 🤿
2. Acer negundo	30 >	FACW	Total Number of Do	
3. Fraxinic pennsylvenica. 4. Cettis occidentalis	15 <u>h</u>	V FAON V FAC	Species Across All \$	Strata:(B)
4. <u>CANS addwind p</u>		- the	Percent of Dominan	
D	85 = Tota	al Cover	That Are OBL, FAC	W, or FAC: <u>100</u> (A/B)
Sapling/Shrub Stratum (Plot size:)	· · · · · ·		Prevalence Index v	
1. CEAtralanthus occidentalis	<u>15 - N</u>	<u>DBL</u>	Total % Cover	and the second s
2. <u>Salix Nigra</u>	<u> </u>	<u>FACW</u>	OBL species	$\frac{15}{95} \times 1 = \frac{75}{190}$
3			FACW species	$\frac{1}{10} \times 3 = \frac{210}{210}$
4			FACU species	O x4= O
0	20 = Tot	al Cover	UPL species	0 x5= 0
Herb Stratum (Plot size:)	<u> </u>		Column Totals:	240 (A) 475 (B)
1. Carex Jupallina.	$b \rightarrow$	OBL		dex = B/A = <u>1197</u>
2. Polygonum lapathicolium	<u>10 N</u>	<u> </u>	Prevalence In Hydrophytic Veget	tex = B/A =/
3. POLYSONIM PENNAMILIONICUM.	5	<u>FACW</u>	Dominance Tes	
4			Prevalence Ind	
5			Morphological /	Adaptations ¹ (Provide supporting
6			data in Rem	arks or on a separate sheet)
8			Problematic Hy	drophytic Vegetation ¹ (Explain)
9			Indicators of hurden	soil and wetland hydrology must
10				disturbed or problematic.
	<u></u> = Tot	al Cover		
Woody Vine Stratum (Plot size:)			Hydrophytic	
1			Vegetation	Yes No
	≍ Tot		Present?	185 <u>v</u> NO
1			<u> </u>	
Remarks: (Include photo numbers here or on a separate sh	66LJ			
		AN		

.

uct7

SOIL								Sampling Point:
Profile Desc	ription: (Describe	to the dep	th needed to docur	nent the i	indicator	or confirm	n the absence of i	indicators.)
Depth	Matrix			x Feature				
(inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	<u> </u>	Remarks
9-16	7.5YR4/1	90	7.57R.4/1	10	RM	_M	clau _	
· ·								
				·			······································	
·				·	·			
	• • • • • • • • • • • • • • • • • • • •				·			
•					·		<u> </u>	
		_						
	ncentration D=Der		Reduced Matrix, CS		d or Coate	d Sand G		on: PL=Pore Lining, M=Matrix.
Hydric Soil I		AGUOTI, MAR	-Reduced Matrix, oc			u Sanu O		Problematic Hydric Soils ³ :
Histosol			Sandy (Sleyed Ma	trix (S4)			irie Redox (A16)
	vipedon (A2)			Redox (S5				anese Masses (F12)
Black Hi				Matrix (S				plain in Remarks)
Hydroge	n Sulfide (A4)			Mucky Mir				
	l Layers (A5)		-	Gleyed Ma				
2 cm Mu				d Matrix (I	•			
	Below Dark Surfac	æ (A11)		Dark Surfa			3	
	urk Surface (A12)				irface (F7)	I		hydrophytic vegetation and rdrology must be present,
	lucky Mineral (S1) cky Peat or Peat (S	3)	Redux L	Depressio	ns (ro)		•	turbed or problematic.
	ayer (if observed)							
Type:	, (,	•						
Depth (inc	hee).						Hydric Soil Pre	esent? Yes // No
Remarks:		******					Inyune doir ne	
HYDROLO	GY							
	Irology Indicators:			-1-3			O	
		ne is requi	red; check all that ap		(D.0.)			ndicators (minimum of two required)
V Surface			Vater-Stal					Soil Cracks (B6)
	ter Table (A2)		Aquatic Fa					e Patterns (B10)
✓ Saturatio			True Aqua					ason Water Table (C2)
	it Deposits (B2)		Hydrogen		•••	na Pooto	_ ,	n Burrows (C8) on Visible on Aerial Imagery (C9)
Gedinier ✓ Drift Dep			Presence	•			· · —	or Stressed Plants (D1)
	t or Crust (B4)		Recent Iro		•	•		rphic Position (D2)
	osits (B5)		Thin Muck					eutral Test (D5)
	on Visible on Aerial	imadery (B			-			
	Vegetated Concav		·					
Field Observ	•	(
Surface Wate		'es V	No Depth (ind	ches):	Ø			
Water Table			No Depth (inc		•	-		
Saturation Pr	resent? Y		No Depth (ind		0	Wetl	and Hydrology Pr	resent? Yes 📈 No
(includes cap	oillary fringe)		onitoring well, aerial p	hotos	ovinue las	nections)	if available:	
Describe Rec	Jordeu Data (stream	rgauge, mu	nitoning weit, aenar	notos, pr	evious ins	hections)	li avallable.	
Remarks:				·····				

wet 8

Project/Site: POC / Devidenty City/County: Rogers (o) Sampling Date: 12/15 Applicant/Owner: Poc State: OK Sampling Point: S. Pot Investigator(s): F-Shawwon J.ccwsKey Section, Township, Range: Sec. 7 T 200/ R 15E Landform (hillstope, terrace, etc.): Flood plaum Local relief (concave, convex, none): CO NCOWE Stope (%): D=1 Lat: Long: Datum: NIAD 83 Soil Map Unit Name: W Investigator for this time of year? Yes No NWI classification: No Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, No Is the Sampled Area within a Wetland? Yes No	
Applicant/Owner: Pot State: OK Sampling Point: Section Investigator(s): F-Shawwon J.c.45Key Section, Township, Range: Sec. 7 T 20W R15E Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): CO ACOWE Slope (%): D-1 Lat: Long: Datum: NAD 83 Soil Map Unit Name: M Inxetter NWI classification: MI Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.) Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, No Is the Sampled Area within a Wetland? Yes No	
Investigator(s): F - Shawmon J. c uskley Section, Township, Range: Sec. 7 _ T 20N R 15E Landform (hillstope, terrace, etc.): <u>floodplaun</u> Local relief (concave, convex, none): <u>CO NCAWE</u> Slope (%): <u>D-1</u> Lat: Long: Datum: <u>NAD 83</u> Soil Map Unit Name: W <u>Uxater</u> NWI classification:	
Landform (hillslope, terrace, etc.): <u>Llocdp/ain</u> Local relief (concave, convex, none): <u>CONCAWE</u> Slope (%): <u>D-1</u> Lat: Long: Datum: <u>NAD 83</u> Soil Map Unit Name: , W <u>Locatex</u> NWI classification:	
Slope (%): D-1 Lat: Long: Datum: NAD 83 Soil Map Unit Name: MULATEX NWI classification:	
Soil Map Unit Name: W Luxater NWI classification: Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.) Are Vegetation , Soil , or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.) SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, Hydrophytic Vegetation Present? Yes No Hydric Soil Present? Yes No Is the Sampled Area within a Wetland? Yes No	
Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.) Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No Are Vegetation, Soil, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.) SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, Hydrophytic Vegetation Present? Yes No Is the Sampled Area within a Wetland? Yes No	
Are Vegetation, Soil, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.) SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, Hydrophytic Vegetation Present? Yes No Hydric Soil Present? Yes No Is the Sampled Area within a Wetland? Yes No	
SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, Hydrophytic Vegetation Present? Yes No Hydric Soil Present? Yes No Is the Sampled Area within a Wetland? Yes	ato
Hydrophytic Vegetation Present? Yes No Is the Sampled Area Hydric Soil Present? Yes No within a Wetland? Yes No	ote
Hydric Soil Present? Yes No within a Wetland? Yes No	
Wetland Hydrology Present? Yes No Remarks:	
VEGETATION – Use scientific names of plants.	
Absolute Dominant Indicator Dominance Test worksheet: Tree Stratum (Plot size:) % Cover Species? Status	
Kulliber of Dominant Opecies	A)
2 U Total Number of Dominant 7	
	в)
4 Percent of Dominant Species	
5 That Are OBL, FACW, or FAC:OO (A/B)
Sapling/Shrub Stratum (Plot size:)	
1. Cephalanthus accidentatis 58 N OBL Total & Cover of: Multiply by:	
2. Salix nigra 15 N BACW OBL species 95 x1= 95	
3.	-
5 FACU species (V x4= 0 = Total Cover UPL species (V x5= 0	
Herb Stratum (Plot size:)	(B)
1. Carex Inpalina 40 7 1990 275 570	n7
2. Solidayo giganteg 10 N FAC Prevalence Index = B/A = 2007 2.1	
3. Astr Sp. Symphiotricham name- 4050 Y FACW Hydrophytic Vegetation Indicators:	
4. Echind chiba crus-galli alghe 10 N FACW V Dominance Test is >50% 5. $\frac{1}{2}$ N FAC V Prevalence Index is <3.0 ¹	
6. Morphological Adaptations ¹ (Provide supportin	g
data in Remarks or on a separate sheet)	-
8 Problematic Hydrophytic Vegetation ¹ (Explain)	
9 ¹ Indicators of hydric soil and wetland hydrology mu	at
10 hidrators of hydre solvand wearing hydrology ind be present, unless disturbed or problematic.	51
Woody Vine Stratum (Plot size:) = Total Cover	
1. Hydrophytic	
2 Vegetation Present? Yes No	
= Total Cover	
i l	
Remarks: (Include photo numbers here or on a separate sheet.)	

US Army Corps of Engineers

Midwest Region ~ Inten

SOII

SUL										Sampling Point:		
Profile Desc	ription: (Describe	to the dep	oth needed	to docur	nent the i	ndicator	or confir	m the absence	of indicators.)		
Depth		Matrix				x Feature						
(inches)	Color	(moist)	%	Color (%	Type ¹	Loc ²	Texture	Remarks		
0-16	15TR	4/1	<u> </u>	7-546	2 4/6	5	RM	Μ	Clay			
							·		·	· · · · · · · · · · · · · · · · · · ·		
·			·			·			•			
a									• •			
. <u></u>												
			·				·					
·				.				•	·			
	. <u> </u>		<u> </u>			<u> </u>	.		<u> </u>	•••••		
¹ Type: C=Co	oncentratio	in, D≂Dep	letion, RM	=Reduced I	Matrix, CS	=Covered	d or Coate	d Sand G	Grains. ² Loc	cation: PL=Pore Lining, M=Matrix.		
Hydric Soil	Indicators	:								for Problematic Hydric Soils ³ :		
Histosol	(A1)				Sandy G	leyed Ma	trix (S4)		Coast	Prairie Redox (A16)		
Histic Ep	pipedon (A	2)			-	edox (S5				anganese Masses (F12)		
Black Hi	stic (A3)					Matrix (S				(Explain in Remarks)		
Hydroge	n Sulfide (A4)			Loamy M	Aucky Min	eral (F1)					
Stratified	l Layers (A	(5)			Loamy C	Gleyed Ma	atrix (F2)					
2 cm Mu	• •				Deplete	d Matríx (F	-3)					
	i Below Da		e (A11)			ark Surfa)			<u>^</u>			
Thick Dark Surface (A12) Depleted Dark Surface (F7)					l		of hydrophytic vegetation and					
	_ Sandy Mucky Mineral (S1) Redox Depressions (F8)						d hydrology must be present,					
	cky Peat o		-						uniess	disturbed or problematic.		
Restrictive L	ayer (it of	oservea):										
Туре:												
Depth (inc	ches):								Hydric Soll	Present? Yes No		
Remarks:												
HYDROLO												
Wetland Hyd	drology In	dicators:										
Primary Indic	ators (mini	imum of or	ne is requi	red; check a	ali that ap	oly)			Seconda	ary Indicators (minimum of two required)		
🟒 Surface	Water (A1))		v	Vater-Stai	ned Leave	es (89)		Surf	ace Soil Cracks (B6)		
High Wa	ter Table (A2)		⊥ A	quatic Fa	una (B13)			Drainage Patterns (B10)			
Saturatio	on (A3)				rue Aquat					Season Water Table (C2)		
🗹 Water M	arks (B1)				lydrogen \$					rfish Burrows (C8)		
Sedimen	t Deposits	(B2)			xidized R	hizospher	es on Livi	ing Roots	(C3) Satu	uration Visible on Aerial Imagery (C9)		
👱 Drift Dep	osits (B3)				resence c					nted or Stressed Plants (D1)		
Algal Ma	t or Crust ((B4)		F	ecent Iror	n Reductio	on in Tillec	i Soils (Ci		morphic Position (D2)		
Iron Dep	osits (B5)				hin Muck			•		-Neutral Test (D5)		
Inundatio	on Visible o	on Aerial Ir	magery (Bi		auge or V		-					
	Vegetated				ther (Exp							
Field Observ	vations:			·			•					
Surface Wate	er Present?	? Y€	es	No I	Depth (inc	hes):						
Water Table				No, I				- I				
Saturation Pr				No					بمما الإسابية المعما			
(includes cap		e) it			Sebru (uic	nes)			ianu nyurology	y Present? Yes <u> </u>		
Describe Rec			gauge, mo	onitoring we	ll, aerial p	hotos, pre	evious insp	pections),	if available:			
<u> </u>												
Remarks:												

wet 9

WETLAND DET	ERMINAT	TION DAT	A FORM	1 – Midwest Region
Project/Site: POC/Dauberr	<u>y</u>	City/County		
Applicant/Owner: <u>POC</u>	•			State: Sampling Point: Beaver Wet-
				ange: Sers 7 TZON RISE
Landform (hillslope, terrace, etc.):				
Slope (%): ()- Lat:	<u></u>	Long:		Datum: <u></u>
Soil Map Unit Name: Wetter		<u></u>	<u>ldric</u>	NWI classification:
Are climatic / hydrologic conditions on the site typical for th	ls time of ye	ear? Yes	No _	(If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology Are Vegetation, Soil, or Hydrology				"Normal Circumstances" present? Yes V No
			•	eeded, explain any answers in Remarks.) locations, transects, important features, etc.
			g point i	iocations, transects, important leatures, etc.
Hydric Soil Present? Yes Ves	lo lo lo		ie Sampleo in a Wetla	d Area nd? Yes <u>No</u>
Remarks: Becaver maintaincol	; ra	infall	bet	vind for year
VEGETATION - Use scientific names of plants		**		
Tree Stratum (Plot size: 30m)		Dominant Species?		Dominance Test worksheet:
1. Salix Nigra				Number of Dominant Species 3 (A)
2				
3				Total Number of Dominant Species Across All Strata: <u>5</u> (B)
4				
5		·		Percent of Dominant Species That Are OBL, FACW, or FAC: \00 (A/B)
Sapling/Shrub Stratum (Plot size:)		= Total Cov	/er	
1. Salix nigra)		FACW	Prevalence Index worksheet:
2. Cephalantinus exerciteurialis	- <u>- (</u>	·	086	Total % Cover of: Multiply by: OBL species 75 x 1 = 75
3				FACW species $\underline{91}$ $x_2 = \underline{182}$
4				FAC species $1 \times 3 = 3$
5	·	-		FACU species x 4 =
K		= Total Cov	er	UPL species x 5 =
Herb Stratum (Plot size: <u>15 m</u>)	<i>a</i> .	<u>N</u> I	OBL	Column Totals: 195 (A) 220 (B)
1. Carex Iupalina 2. Polygonum lapothildium	<u>30</u>	<u> </u>	<u>Co</u>	Prevalence index = $B/A = 1.13$
2. <u>Polygionum lapodhitolium</u> 3. <u>Solidaap aigantea</u>	- <u>70</u>		Fren	Prevalence Index = B/A = <u>\. 1)</u> Hydrophytic Vegetation Indicators:
4. Jonany Jigania		·	FAC.	Dominance Test is >50%
5				Prevalence Index is ≤3.0 ¹
6				Morphological Adaptations ¹ (Provide supporting
7				data in Remarks or on a separate sheet)
8				Problematic Hydrophytic Vegetation ¹ (Explain)
9	. <u></u>			
10,		<u> </u>		¹ Indicators of hydric soll and wetland hydrology must be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:)		= Total Cov	er	
				Hydrophytic
1				Vegetation /
		= Total Cov	er	Present? Yes No
Remarks: (Include photo numbers here or on a separate s				
	neerj			

.

,

Sampling	Point:	beaver 1

Profile Desc	cription: (Describ	e to the depti	n needed to docur	nent the	indicator	or confirm	the absence	of indicators.)
Depth	Matrix			x Feature				
(inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	Remarks
0-3	7.5YR.4/1	, 90	alex/14104	ex1 4104 10				organies in clare
3-16	- de 1) 64 11	NG MIN	$\overline{\mathcal{O}}$	· _15,~	·	·	· · · · · · · · · · · · · · · · · · ·	CIAV
	-destruit	- TEXICO		·				
			·····	·				<u></u>
					. <u> </u>			•
17							2	
Hydric Soil		epietion, RM=	Reduced Matrix, CS	s=Covere	d or Coate	d Sand Gr		cation: PL=Pore Lining, M=Matrix. for Problematic Hydric Soils ³ :
Histosol			Sondy	Noved M	ntriv (QA)			-
	oipedon (A2)			Redox (St	atrix (S4)			Prairie Redox (A16) langanese Masses (F12)
	stic (A3)			Matrix (-			(Explain in Remarks)
	n Sulfide (A4)			•	neral (F1)			
Stratified	t Layers (A5)				atrix (F2)			
2 cm Mu	ick (A10)		Deplete	d Matrix (F3)			
	d Below Dark Surfa	ce (A11)		Dark Surfa				
	ark Surface (A12)				urface (F7)			of hydrophytic vegetation and
	lucky Mineral (S1)		Redox I	Depressio	ns (F8)	•		d hydrology must be present,
	icky Peat or Peat (Layer (if observed	-					unless	disturbed or problematic.
		-						
Type:	-1							a se la la se
Depth (ind Remarks:	cnes):						Hydric Soil	Present? Yes No
HYDROLO	GY .							
Wetland Hyd	drology Indicators	s:						
Primary Indic	ators (minimum of	one is require	d; check all that ap	ply)			Seconda	ary Indicators (minimum of two required)
Surface	Water (A1)		Water-Stai	ned Leav	es (B9)	١	Surf	face Soil Cracks (B6)
/High Wa	ter Table (A2)		🗹 Aquatic Fa	una (B13) Bean	er`,	🗹 Drai	inage Patterns (B10)
√/Saturatio	on (A3)		True Aqua		-			Season Water Table (C2)
🖌 Water M	arks (B1)		Hydrogen	Sulfide O	dor (C1)		Cray	yfish Burrows (C8)
Sedimer	nt Deposits (B2)		Oxidized R	hizosphe	res on Livi	ng Roots (C3) 🗹 Satu	uration Visible on Aerial Imagery (C9)
🖌 🖌 Drift Dep	oosits (B3)	,	Presence of	of Reduce	ed Iron (C4)	Stur	nted or Stressed Plants (D1)
Algal Ma	ut or Crust (B4)		Recent Iron	n Reducti	on in Tilled	l Soils (C6) Geo	morphic Position (D2)
	osits (B5)		Thin Muck	Surface	(C7)		FAC	C-Neutral Test (D5)
<u>V</u> Inundatio	on Visible on Aeria	l Imagery (B7)	Gauge or \	Vell Data	(D9)			
Sparsely	Vegetated Conca	ve Surface (B	B) Other (Exp	lain in Re	emarks)			
Field Observ	vations:	1						
Surface Wate	er Present?	Yes 📈 N	· = - [(_		
Water Table	Present?	YesN	o Depth (inc		<i>~</i>	_		
Saturation Pr (includes cap	oillary fringe)		o Depth (inc		1-10		and Hydrolog	y Present? Yes 🔽 No
Describe Red	corded Data (strea	n gauge, mon	itoring well, aerial p	photos, pr	evious insp	pections), i	if available:	
Remarks:								

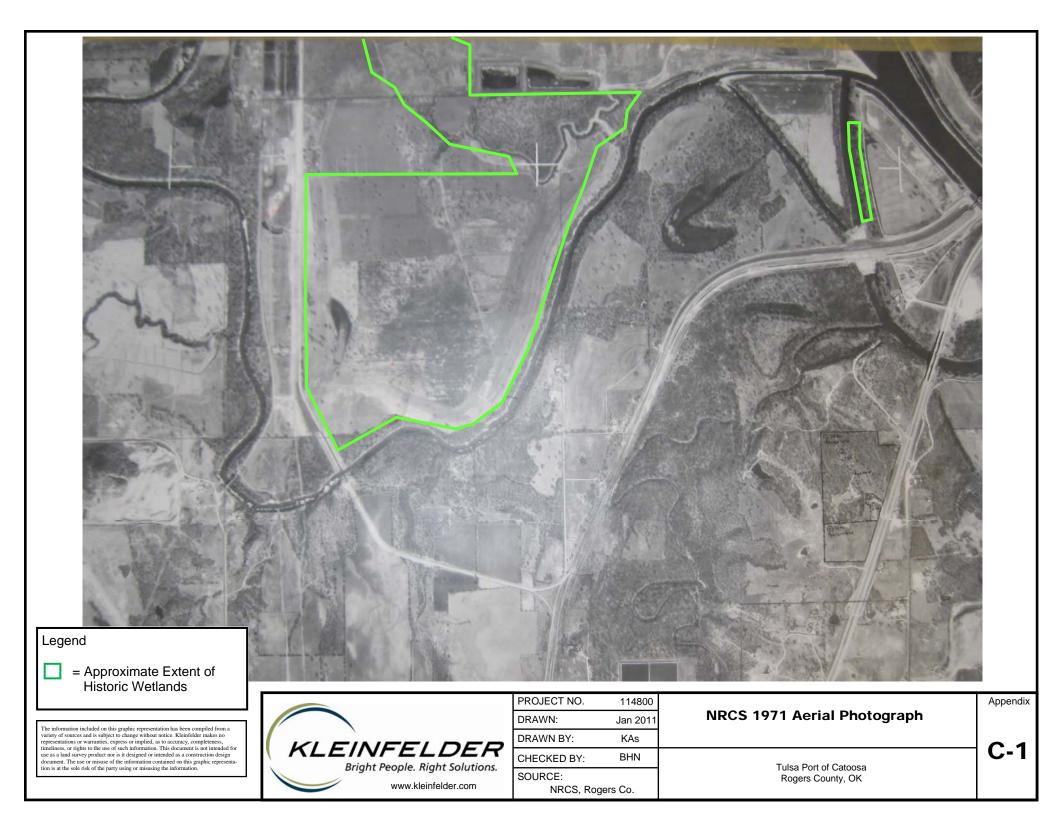
 $\Delta_{i}^{(i)}$

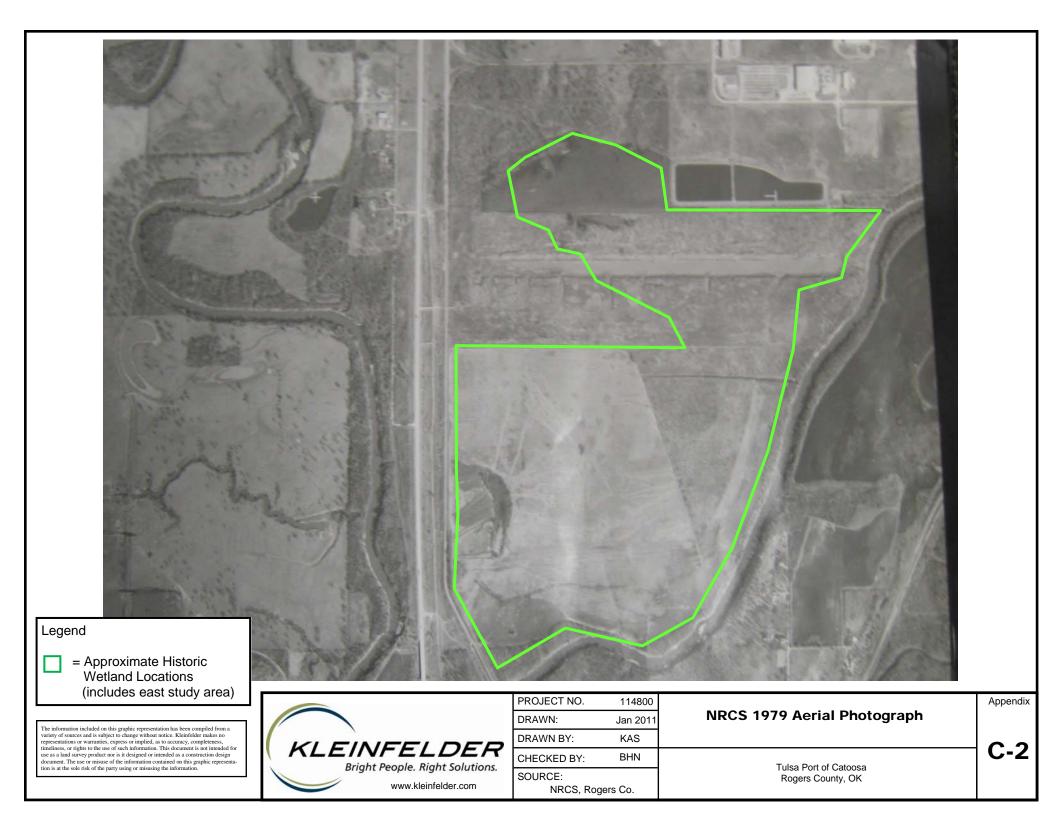
UPL 5-10

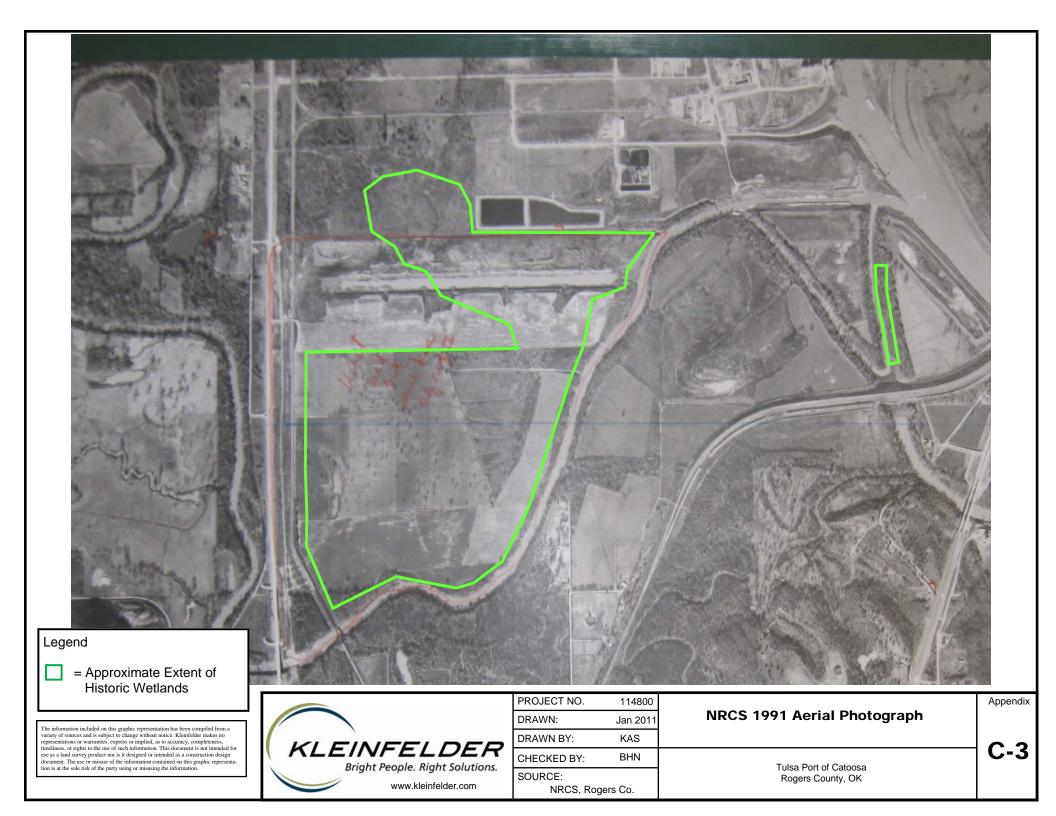
1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2					– Midwes	-				
Project/Site: POC Daulitur	<u></u>	City/C	County	: <u>_Ra</u>	yers (0	Sarr	pling Date	: <u>)//</u>	5
Applicant/Owner: <u>FOC</u>					State	:	Sam	pling Poin	t: <u>DV Y</u>	<u>valan</u>
nvestigator(s): KShannan J Caste	<u>\$/</u>	Secti	on, To	wnship, Ra	ange: <u>5</u>	28	<u> </u>	<u>20NI</u>	RIS	<u> </u>
_andform (hillslope, terrace, etc.):	1			Local relief	(concave, co	nvex, noi	ne):			
Slope (%): <u> -3</u> Lat:		Long			-		Datu	im:N	AD8	3
Soil Map Unit Name:										
Are climatic / hydrologic conditions on the site typical for thi					*					
Are Vegetation, Soil, or Hydrology					"Normal Circ	-				lo
Are Vegetation, Soil, or Hydrology					eeded, expla					-
SUMMARY OF FINDINGS – Attach site map						-				e etc
SUMMART OF FINDINGS – Attach site map	snowing	San	ihuu	g point i	ocations,	transe	us, im	Jonani	reature	s, etc.
Hydrophytic Vegetation Present? Yes N			Is th	e Sampleo	i Area					ŀ
Hydric Soil Present? Yes N				•	nd?	Yes_		No_V	_	
Wetland Hydrology Present? Yes N	lo									
Remarks: Defined on V	ainto	U	Æ	ir yee	r.C					
VEGETATION Use scientific names of plants	•									
<u>Tree Stratum</u> (Plot size:)	Absolute % Cover			Indicator Status	Dominand					
					Number of That Are C					(A)
2						-				
3					Total Num Species A					(B)
4										
5					Percent of That Are C				-	(A/B)
	<u></u>	≍ Toi	al Cov	/er	Prevalence	o Indovi	uorkobo			
Sapling/Shrub Stratum (Plot size:)								Mult	inly by:	
2					OBL speci					
3.					FACW spe					
4					FAC speci					
5.					FACU spe					
		= To	al Cov	/er	UPL speci	es		x5≍		_
Herb Stratum (Plot size:)	ينتقن و ا			<u>E</u> M	Column To	otals:		(A)		_ (B)
1. Solidago gigantea	<u> 40 </u>			FAC	Brow	alonoo In		4 ≕		
2. Schizachyrum seoparium	- 8 10			<u>facu</u>	Hydrophy					
3. <u>Sétaria</u> 4. Astec					1	ance Tes				
5. Carey jupalina	62	<u> </u>	<u> </u>	OBL		ence Ind				
6					Morph	ological /	Adaptatio	ns ¹ (Provid	de suppo	rting
7					da	a in Rem	arks or o	n a separa	ite sheet)	
8					Proble	ematic Hy	drophytic	Vegetatio	n' (Expla	iin)
9					1					
10					¹ Indicators be presen					must
		= To	al Cov	/er				• • • • •		
Woody Vine Stratum (Plot size:)					Hydrophy	fic				
1 2					Vegetatio	n				
2,			al Con		Present?		Yes	No		
		- 10	ພັບປັ	rul	1					1

SUIL		Sampling Point:				
Profile Description: (Describe to the de	pth needed to document the indicator or cor	nfirm the absence of indicators.)				
Depth Matrix	Redox Features	,				
(inches) Color (moist) %	Color (moist)%Type1Loc	2 Texture Remarks				
0-16 7.54R.4/2 98	1.5YR 4/6 2 RM M	Class				
	IIJA 10 as AFT FI	_ Clay_				
· · · · · · · · · · · · · · · · · · ·						
· · · · · · · · · · · · · · · · · · ·						
·						
	=Reduced Matrix, CS=Covered or Coated San					
Hydric Soll Indicators:		Indicators for Problematic Hydric Soils ³ :				
Histosol (A1)	Sandy Gleyed Matrix (S4)	Coast Prairie Redox (A16)				
Histic Epipedon (A2)	Sandy Redox (S5)	Iron-Manganese Masses (F12)				
Black Histic (A3)	Stripped Matrix (S6)	Other (Explain in Remarks)				
Hydrogen Sulfide (A4)	Loamy Mucky Mineral (F1)					
Stratified Layers (A5)	Loamy Gleyed Matrix (F2)					
2 cm Muck (A10)	Depleted Matrix (F3)					
Depleted Below Dark Surface (A11)	Redox Dark Surface (F6)					
Thick Dark Surface (A12)	Depleted Dark Surface (F7)	³ Indicators of hydrophytic vegetation and				
Sandy Mucky Mineral (S1)	Redox Depressions (F8)	wetland hydrology must be present,				
5 cm Mucky Peat or Peat (S3)		unless disturbed or problematic.				
Restrictive Layer (if observed):						
Туре:						
Depth (inches):		Hydric Soil Present? Yes Mo				
Remarks:						
IYDROLOGY Wetland Hydrology Indicators:						
Primary Indicators (minimum of one is requ		Secondary Indicators (minimum of two required				
Surface Water (A1)	Water-Stained Leaves (B9)	Surface Soil Cracks (B6)				
High Water Table (A2)	Aquatic Fauna (B13)	Drainage Patterns (B10)				
Saturation (A3)	True Aquatic Plants (B14)	Dry-Season Water Table (C2)				
Water Marks (B1)	Hydrogen Sulfide Odor (C1)	Crayfish Burrows (C8)				
Sediment Deposits (B2)	Oxidized Rhizospheres on Living Ro					
Drift Deposits (B3)	Presence of Reduced Iron (C4)	Stunted or Stressed Plants (D1)				
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled Soils					
Iron Deposits (B5)						
	Thin Muck Surface (C7)	FAC-Neutral Test (D5)				
Inundation Visible on Aerial Imagery (E	 Gauge or Well Data (D9) 	•				
Field Observations:	(B8) Other (Explain in Remarks)					
	······································					
	(B8) Other (Explain in Remarks) No Depth (inches):					
Surface Water Present? Yes	······································	For .				
Surface Water Present? Yes Water Table Present? Yes	No Depth (inches): No Depth (inches):	Vetland Hydrology Present? Yes No.				
Surface Water Present? Yes Water Table Present? Yes Saturation Present? Yes	No Depth (inches): No Depth (inches):	Vetland Hydrology Present? Yes No				
Surface Water Present? Yes Water Table Present? Yes Saturation Present? Yes (includes capillary fringe) Yes	No Depth (inches): No Depth (inches):	4 · · ·				
Surface Water Present? Yes Water Table Present? Yes Saturation Present? Yes (includes capillary fringe) Describe Recorded Data (stream gauge, m	No Depth (inches): No Depth (inches): No Depth (inches):					
Surface Water Present? Yes Water Table Present? Yes Saturation Present? Yes (includes capillary fringe) Describe Recorded Data (stream gauge, m Remarks:	No Depth (inches): No Depth (inches): No Depth (inches): V onitoring well, aerial photos, previous inspection					
Surface Water Present? Yes Water Table Present? Yes Saturation Present? Yes (includes capillary fringe) Describe Recorded Data (stream gauge, m Remarks:	No Depth (inches): No Depth (inches): No Depth (inches): V onitoring well, aerial photos, previous inspection	4				
Surface Water Present? Yes Water Table Present? Yes Saturation Present? Yes (includes capillary fringe) Describe Recorded Data (stream gauge, m Remarks:	No Depth (inches): No Depth (inches): No Depth (inches): V onitoring well, aerial photos, previous inspection					
Surface Water Present? Yes Water Table Present? Yes Saturation Present? Yes (includes capillary fringe) Describe Recorded Data (stream gauge, m Remarks:	No Depth (inches): No Depth (inches): No Depth (inches):	4 · · ·				

APPENDIX C HISTORIC AERIAL PHOTOGRAPHS







DELINEATION OF POTENTIALLY JURISDICTIONAL WATERBODIES REPORT, EVALUATION OF HISTORIC WETLANDS, and THREATENED, ENDANGERED and PROTECTED SPECIES POTENTIAL HABITAT

BARGE FLEETING AREA TULSA PORT OF CATOOSA ROGERS COUNTY, OKLAHOMA

Portions of Sections 8, 16 and 17 of Township 20 North, Range 15 East Rogers County, Oklahoma

> February 3, 2012 Revised March 19, 2012

Copyright 2012 Kleinfelder All Rights Reserved

UNAUTHORIZED USE OR COPYING OF THIS DOCUMENT IS STRICTLY PROHIBITED BY ANYONE OTHER THAN THE CLIENT FOR THE SPECIFIC PROJECT. A Report Prepared for:

Dewberry 600 Parsippany Road, Suite 301 Parsippany, NJ 07054-3715

DELINEATION OF POTENTIALLY JURISDICTIONAL WATERBODIES REPORT, EVALUATION OF HISTORIC WETLANDS and THREATENED, ENDANGERED and PROTECTED SPECIES POTENTIAL HABITAT

BARGE FLEETING AREA PORT OF CATOOSA ROGERS COUNTY, OKLAHOMA

Portions of Sections 8, 16, and 17 of Township 20 North, Range 15 East of the Indian Meridian, Rogers County, Oklahoma

Kleinfelder Project # 114800

Prepared by:

olly Ready

Polly Ready Environmental Scientist

Reviewed by:

Blain Bal

Blair Baker Senior Environmental Professional

KLEINFELDER

10835 East Independence, Suite 102 Tulsa, Oklahoma 74116 p| 918.627.6161 f| 918.627.6262

TABLE OF CONTENTS

<u>Chap</u>	<u>oter</u>	<u>Page</u>
1.0		1
2.0	REGULATORY FRAMEWORK	1
3.0	SETTING	
	3.1 ECOREGIONS	4
4.0	METHODS AND LIMITATIONS	4
5.0	SITE CHARACTERIZATION5.1SOILS AND DRAINAGE5.2VEGETATION ASSESSMENT5.3WILDLIFE ASSESSMENT	8 8
6.0	FINDINGS6.1THREATENED, ENDANGERED AND PROTECTED SPECIES6.2POTENTIALLY JURISDICTIONAL WATERBODIES6.3HISTORIC WETLANDS	10 13
7.0	REFERENCES	18
FIGU		

FIGURES

- 1 General Vicinity Map
- 2 Aerial Photography Map
- 3 USGS Topographic Map
- 4 National Wetland Inventory (NWI) Map
- 5 Level IV Ecoregion Map
- 6 NRCS Soils Map
- 7 FEMA FIRM
- 8 Potentially Jurisdictional Waters Map
- 9 Historic Wetlands Map

TABLES

- 1. Soil Map Units within Study Area
- 2. Plant Species Observed within Study Area
- 3. Animal Species Observed within Study Area
- 4. Rogers County, OK Listed and Protected Species
- 5. Potentially Jurisdictional Waters within Study Area

APPENDICES

- A Photographic Record
- B Historic Aerial Photographs
- C Wetland Delineation Forms

1.0 INTRODUCTION

Kleinfelder was contracted by Dewberry to conduct an assessment of United States Army Corps of Engineers (USACE) waters of the United States (Waters), including wetlands; historic wetlands; the presence of potential habitat for federally threatened or endangered (listed) and protected species within this property of the Tulsa Port of Catoosa, in Rogers County, Oklahoma (Figure 1). The environmental study area (study area) is approximately 130 acres. The center of the study area is located at 36.131109° N, -95.435457° W (Figure 2). This report documents the results of the delineation for the benefit of Dewberry and the Tulsa Port of Catoosa and may be relied upon by their successors and/or assignees associated with the transaction for which this report was commissioned.

The study area is located within portions of: the S 1/2 of Section 8, the NW 1/4 of Section 16, and the NE 1/4 of Section 17 of Township 20 North, Range 15 East, of the Indian Meridian, Rogers County, Oklahoma. The study area is mapped on the 1980 photorevised Catoosa, OK quadrangle United States Geological Survey (USGS) 7.5-Minute Series Topographic Map (Figure 3).

Kleinfelder biologists (Ms. Polly Ready and Mr. Jason Caskey) conducted a delineation to characterize and map potentially jurisdictional Waters within the study area. Potentially jurisdictional Waters, including wetlands, were found within the study area. The survey was conducted on November 29, 2011 and consisted of a focused pedestrian field survey within the study area. The study area was also evaluated for historic wetlands and for the presence of potential habitat for federally threatened or endangered (listed) and protected species for Rogers County, OK. Prior to conducting the field survey, Kleinfelder reviewed site maps, historic aerial photographs, natural resource database accounts, National Wetlands Inventory (NWI) maps (Figure 4), the U.S. Fish and Wildlife Service (USFWS) Project Review of federally listed species and designated critical habitat areas in Rogers County, Oklahoma, and other relevant scientific literature to determine the potential existence of known wetland features and listed and protected species in the study area.

This report is based on knowledge of the special-status resources in the region, a review of relevant background literature, and a focused field survey of the study area. A discussion of plant and animal species observed on site is included in this report. Information in this report is intended to provide the biological information that is necessary to avoid or minimize impacts to Waters that are potentially jurisdictional. This information may also be used in support of permit applications associated with impacts to these Waters.

2.0 REGULATORY FRAMEWORK

2.1 WATERS OF THE U.S.

The following section provides an overview of the regulatory framework involved with impacts to Waters (including wetlands) associated with the study area. Wetlands and riparian communities are considered to have special ecological status and are also considered a declining resource by several regulatory agencies, including the USACE. Wetlands serve significant biological functions by providing nesting, breeding, foraging, and spawning habitat for a wide variety of resident and migratory animal species. Wetlands also provide for the movement of water and sediments, nutrient cycling, groundwater recharge, water purification, storage of storm water runoff, recreation and transportation.

According to Section 404 of the Clean Water Act (CWA) of 1977, work (dredging) within navigable waters and the placement of fill material into Waters, including intermittent streams and wetlands, requires authorization by the USACE (EPA, 1972). The type of authorization (e.g., individual permit, nationwide permit, regional permit, or letter of permission from the District Engineer) depends on the acreage, volume, linear distance along a stream course, and purpose of the activity.

Under Section 404 of the CWA, and Section 10 of the Rivers and Harbors Act of 1899, the Environmental Protection Agency (EPA) and the USACE share regulatory authority over Waters. Waters includes all waterbodies that are, have, or may be used for interstate and/or international commerce, including all water that is subject to the ebb and flow of tide; all waters that are rivers, streams, sloughs, lakes, mudflats, sandflats, wetlands, wet meadows, prairie potholes, playa lakes, or natural ponds and the use, degradation, or destruction, of the aforementioned, which could affect interstate and international commerce; all impoundments of above mentioned; all tributaries of above mentioned; territorial seas; and all wetlands adjacent to above mentioned Waters. The width of Waters is defined as that portion which falls within the limits of the ordinary high water mark (OHWM). Field indicators of OHWM are clear and natural lines on opposite sides of the banks, scouring, sedimentary deposits, drift lines, exposed roots, shelving, destruction of terrestrial vegetation, and the presence of litter debris. Typically, the OHWM corresponds to the two-year flood event.

The USACE retains jurisdiction over wetlands that are Waters, and definitions and regulations for the identification and delineation of wetlands were published in the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987). This 1987 manual is the current federal delineation manual used in the CWA Section 404 regulatory program for the identification and delineation of wetlands. The 1987 manual has been clarified and updated through a series of regional supplements, guidance documents and memoranda from the USACE. The Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region is used for southeastern Oklahoma (USAERDC, 2008). The USACE defines wetlands as:

"Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

Thus, the interaction of hydrology, hydrophytic vegetation and hydric soil conditions results in the development of characteristics unique to wetlands. For a wetland to exist, it must have: 1) prevalent hydrophytic vegetation (plants that are adapted to grow, compete, reproduce and persist under anaerobic soil conditions); 2) hydric soils (those that possess characteristics associated with reducing soil conditions); and 3) a source of hydrology (frequently inundated or saturated during the biological growing season). The USACE clearly states, "Except in certain situations defined in this manual, evidence of a minimum of one positive wetland indicator from each parameter (hydrology, soil, and vegetation) must be found in order to make a positive wetland determination."

2.2 THREATENED, ENDANGERED, AND PROTECTED SPECIES

Where activity would require federal authorization or be contingent upon some other federal action, consultation under the Endangered Species Act (ESA) of 1973 is necessary. The ESA prohibits any person from taking, which includes harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, relocating, collecting, or attempting to engage in

any such conduct, of any federally listed threatened or endangered species. Significant habitat modification or degradation that results in death or injury to federally protected species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering is also prohibited. Federal agencies are required to comply with the provisions and use their authorities to conserve species. Section 7 of the ESA states that every federal agency taking an action that may affect listed species must consult with the U.S. Department of the Interior, USFWS, or the National Marine Fisheries Service (NMFS). Consultation allows the USFWS to provide their expertise to ensure that the agency is making effective choices to conserve listed species, and that the proposed action would not jeopardize the continued existence of listed species.

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb (USFWS, 1940)."

The Migratory Bird Treaty Act of 1918 decreed that all migratory birds and their parts (including eggs, nests, and feathers) were fully protected. The Migratory Bird Treaty Act (MBTA) is the domestic law that affirms, or implements, the United States' commitment to four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. Each of the conventions protect selected species of birds that are common to both countries (i.e., they occur in both countries at some point during their annual life cycle). A List of Migratory Birds protected by the MBTA is available.

3.0 SETTING

The general setting of the study area is within the floodplain of Bird Creek and the Verdigris River. The study area is rural and wooded consisting primarily of bottomland forest, improved grasslands, agricultural fields and developed areas including road and associated right-of-ways (ROW). There are large areas that have been excavated to create ponds, and other areas that have received fill on the north half of the island.

The study area has an elevation range of approximately 530 feet above MSL at the northern end and 556 feet above MSL at the southern end, as shown on the 1980 photorevised Catoosa, OK quadrangle, USGS 7.5-Minute Series Topographic Map. The climate in this area is primarily influenced by movement of moist air from the Gulf of Mexico, hot and dry air from the desert southwest and cold air from the Arctic. The region undergoes seasonal variations in temperature and precipitation and typically experiences long, humid summers and short mild winters. The average annual precipitation for Rogers County is 43.45 inches, the average annual temperature is 60 degrees Fahrenheit, and the annual growing season is 208 days (OCS, 2010).

Habitats within the study area included mixed-age bottomland forest, mixed-age upland forest, dissected upland dominated by grasses, developed areas, and waterbodies. Within the bottomland forest dominant plant species included Pecan (*Carya illinoensis*), Boxelder (*Acer negundo*), American elm (*Ulmus americana*), Sycamore (*Platanus occidentalis*), Hackberry (*Celtis occidentalis*), Black willow (*Salix nigra*), Deciduous holly (*Ilex decidua*), and Northern red oak (*Quercus rubra*). The forested wetland is included in this habitat type. The upland forest site

was dominated by Post oak (*Quercus stellata*), Blackjack oak (*Quercus marilandica*), Gum Bully (*Sideroxylon lanuginosum*), Buckbrush (*Symphoricarpos orbiculatus*), Frost flower (*Verbesina virginica*), and Saw Greenbrier (*Smilax bona-nox*). The waterbodies did not have plants specifically associated with them. Introduced and invasive plant species were common in disturbed areas and were observed predominantly within mowed or maintained ROWs. These species included Sericea Lespedeza (*Lespedeza cuneata*), Bermudagrass (*Cynodon dactylon*), and Johnsongrass (*Sorghum halepense*).

3.1 ECOREGIONS

Level 4 Ecoregions of Oklahoma Information

The study area is located within the Osage Cuestas, a subregion of the Central Irregular Plains ecoregion (#40) of Oklahoma (Figure 5).

40b. Osage Cuestas

The Osage Cuestas ecoregion is an irregular to undulating plain that is underlain by interbedded, westward-dipping sandstone, shale, and limestone. East-facing cuestas and low hills occur. Topography is distinct from the nearby Flint Hills, Ozark Highlands, and Cherokee Plains ecoregions. Natural vegetation is mostly tall grass prairie, but a mix of tall grass prairie and oak–hickory forest is native to eastern areas. Overall, the mosaic of natural vegetation is unlike the neighboring Cross Timbers and Ozark Highlands ecoregions. Today, rangeland, cropland, riparian forests, and on rocky hills, oak woodland or oak forest occur; cropland is not as common as in the neighboring Cherokee Plains Ecoregion. (Woods et al, 2005).

Potential natural vegetation for this ecoregion consists mostly of tallgrass prairie (dominants: big bluestem, little bluestem, switchgrass, and Indiangrass), grading eastward into a mosaic of tall grass prairie and oak-hickory forest; on rocky hilltops, cross timbers (dominants: blackjack oak, post oak, and little bluestem). Tallgrass prairie is native on deep loams derived from shale or limestone. Bottomland forests are native on floodplains and low terraces. Currently, on rocky hills, dry upland forest and woodland is found. Dry prairie composed of short and tall grasses occurs on shallow, gravelly soils of limestone scarps. In riparian areas are forests containing boxelder, silver maple, bur oak, Shumard oak, American elm, hackberry, pecan, walnut, sycamore, and eastern cottonwood.

Land cover and land use for this ecoregion is a mosaic of rangeland, grassland, cropland, and especially in more rugged areas, woodland. Wooded riparian corridors occur on wettest bottomlands. Wheat, soybeans, grain sorghum, and alfalfa hay are major crops. Livestock (especially cattle) farming is important. Strip mining for coal and oil production have degraded water quality in some streams (Woods et al., 2005).

4.0 METHODS AND LIMITATIONS

The USACE has prescribed methodologies for delineating "waters of the United States" and wetlands pursuant to the CWA of 1977 (EPA, 1972). Determination of Waters is based on definitions and descriptions found in the Code of Federal Regulation (CFR) at 33 CFR 328. Methods for delineating wetlands are detailed in the USACE Wetland Delineation Manual (Environmental Laboratory, 1987) and require that, under normal circumstances, an area possess three technical criteria to be designated as a jurisdictional wetland. Those criteria are:

1) the prevalence of hydrophytic vegetation, 2) the presence of hydric soils, and 3) the presence of wetland hydrology.

The evaluation of any on-site stream features for the jurisdictional determination was conducted in accordance with the policy, practice, and procedures set forth in 33 CFR 328, which determines the extent of jurisdiction of the USACE over Waters. The definitions for jurisdictional determination consist of the following:

- A. The term *"waters of the United States"* means:
 - 1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
 - 2. All interstate waters including interstate wetlands;
 - 3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
 - Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
 - From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
 - Which are used or could be used for industrial purpose by industries in interstate commerce;
 - 4. All impoundments of waters otherwise defined as waters of the United States under the definition;
 - 5. Tributaries of Waters identified in paragraphs (a)(1)-(4) of this section;
 - 6. The territorial seas;
 - 7. Wetlands adjacent to Waters (other than Waters that are themselves wetlands) identified in paragraphs (a)(1)-(6) of this section.
 - 8. Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 123.11(m) which also meet the criteria of this definition) are not Waters of the United States.
 - 9. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with the EPA.

Limits of jurisdictional authority are as follows:

- A. *Territorial Seas* The limit of jurisdiction in the territorial seas is measured from the baseline in a seaward direction a distance of three nautical miles. (See 33 CFR 329.12)
- B. *Tidal Waters of the United States* The landward limits of jurisdiction in tidal waters:

- Extends to the high tide line, or
- When adjacent non-tidal waters of the United States are present, the jurisdiction extends to the limits identified in paragraph (c) of this section.
- C. Non-Tidal Waters of the United States The limits of jurisdiction in non-tidal waters:
 - In the absence of adjacent wetlands, the jurisdiction extends to the ordinary high water mark, or
 - When adjacent wetlands are present, the jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands.
 - When the water of the United States consists only of wetlands, the jurisdiction extends to the limit of the wetland.

The wetland assessment and delineation was conducted in accordance with the Corps of Engineers Wetlands Delineation Manual and the Midwest Region supplement (USAERDC, 2008). The delineation form for the Midwest region was used and the wetland assessment consisted of the following:

- A desktop review was undertaken to identify areas that were previously mapped as wetlands, streams, or other waterbodies. A pedestrian survey was conducted within the study area to locate potential jurisdictional waterbodies. When these areas were encountered, the routine determination method described in the 1987 USACE Wetland Delineation Manual and Midwest Region supplement was employed, and sample plots were used to determine wetland or non-wetland status. Visual observations were used to identify vegetation, soil, and hydrological characteristics within the vicinity of the sample plots.
- Plant community types in proximity to potential wetland boundaries were identified. Dominant plant species were identified within the visually perceived wetland boundary or until the nearest significant vegetative community change. The biologist selected a representative observation area for each plant community, visually selected the dominant species from each stratum of the community, evaluated the percent cover of plant species in each stratum, and recorded the wetland indicator status of the dominant species. A determination was then made as to whether the vegetation was hydrophytic based on the plant's indicator status and a minimum of two evaluation methods. If no potential jurisdictional waterbodies were observed, upland plant communities were mapped and characterized.
- Hydrophytic vegetation dominates areas where the frequency and duration of inundation or soil saturation exerts a controlling influence on the plant species present. Plant species were assigned wetland indicator status according to the probability of species occurring in wetlands (USFWS, 1988). More than fifty percent of the dominant species must have been hydrophytic to have met the wetland vegetation criterion. Hydrophytic plant indicator status designations conform to the following:
 - OBL Plants that occur almost always (estimated probability >99 percent) in wetlands under natural conditions, but may also occur rarely (estimated probability <1) in non-wetlands.

- FACW Plants that occur usually (estimated probability >67 percent to 99 percent) in wetlands under natural conditions, but also occur (estimated probability 1 percent to 33 percent) in non-wetlands.
- FAC Plants with a similar likelihood (estimated probability 33 to 67 percent) of occurring in both wetlands and non-wetlands.
- FACU Plants that occur sometimes (estimated probability 1 percent to <33 percent) in wetlands, but occur more often (estimated probability >67 percent to 99 percent) in non-wetlands.
- UPL Plants that occur rarely (estimated probability <1 percent) in wetlands, but almost always occur (estimated probability >99 percent) in non-wetlands under natural conditions.
- Soil pits were dug at sample plots for the potential wetlands being investigated. Munsell Soil Color Charts (MacBeth, 1994) were used to evaluate the color, hue, and chroma of representative soils and associated redox features. The redox features were also characterized by their size, distinction, and frequency of occurrence. Soil indicators from the samples were then recorded and it was determined if the soils are hydric. Reducing conditions on site were indicated by the presence of oxidized root channels, positive reaction from Alpha-Alpha Dipyradil, sulfidic odor, or gleyed soils. Also noted were other hydrological indicators, such as soil saturation within the upper 12 inches of the soil, standing water existing within the soil pits, and the depth to inundated or saturated soil. If no hydric soils or potential jurisdictional waterbodies were observed within the study area, no soil pits were dug.

If potential jurisdictional waterbodies are observed, appropriate jurisdictional wetland boundaries would be derived from wetland sampling plot analysis and subsequently recorded using a Trimble GeoXTTM global positioning system (GPS). When satellites cannot be detected by GPS or when there is poor satellite geometry, the boundaries of Waters are marked on aerial photography and field measurements are taken for reference. For areas between sample points, the wetland/upland boundary would be determined by interpolation of the position of vegetation, soil, and hydrologic indicators. This geospatially corrected information would then be digitally overlaid onto a representative aerial photograph and a topographic map using ArcGIS software to display the cumulative, on-site jurisdictional area. Wetland feature polygons, wetland soil pits, and upland soil pits would be identified on the maps and identified with a corresponding label. Digital photographs were taken to document on-site conditions and are provided in Appendix A.

A variety of data sources were reviewed with regard to the location of historic wetlands within the study areas. These data sources included:

- NRCS historic aerial photographs
- NRCS Web Soil Survey data including
 - hydric ratings
 - soil physical features
 - flooding frequency
- NRCS 2009 Hydric Soils List for Oklahoma
- Google Earth Pro
- USFWS NWI maps
- USGS Topographic maps

The historic aerial photographs acquired from the NRCS were taken in 1971, 1979, and 1993 and are included in Appendix B. Aerial photos taken prior to 1971 were not available from the NRCS office.

5.0 SITE CHARACTERIZATION

The study area can be generally characterized as rural, wooded, agricultural, with small maintained/mowed areas surrounding roads or utility ROWs, with streams and wetlands interspersed throughout. The large site is bordered to the south and east by Bird Creek, by Hwy 167 to the west, and commercial development to the north. The northern half of the large site is dominated by an area of fill deposit, small wetlands, ephemeral streams and bottomland forest, while the southern half site is dominated by areas of bottomland forest, upland areas, a wetland and an agricultural field.

5.1 SOILS AND DRAINAGE

Soils within the study area consist mainly of silt loams and silty clay loams. The parent material consists of silty alluvium and silty dredge spoils. These soils occur on floodplains on valleys and are occasionally or frequently flooded. The natural drainage class is well drained. The specific soil types for each project area are listed in Table 1 below. Of these soil types, Verdigris silt loam and Verdigris clay loam are considered to be partially hydric soils (USDA, 2009) (Figure 6). Portions of the study area occur within the 100-year floodplain of Bird Creek. FEMA Flood Insurance Rate Maps are included (Figure 7).

Table 1: Soil Map Units within Study Area						
Map Unit Symbol	Map Unit Name	Slope	Drainage / Hydric			
BarG	Barge silty clay loam	0 to 30 percent	Well drained / not hydric			
Vd	Verdigris silt loam	0 to 1 percent	Well drained / partially hydric			
Ve	Verdigris clay loam	0 to 1 percent	Well drained / partially hydric			
Vf	Verdigris silty clay loam	0 to 2 percent	Well drained / not hydric			

5.2 VEGETATION ASSESSMENT (PLANT COMMUNITIES)

The dominant plant communities within the study area include bottomland forest, a forested wetland, upland forest, emergent wetlands, improved grasslands, and mowed or maintained areas within ROWs. The table below summarizes the plant species observed within the study area.

Table 2: Plant Species Observed within Study Area				
Common Name	Scientific Name	Vegetation Type	NWI Status	
American Elm	Ulmus americana	t	FAC	
American Sycamore	Platanus occidentalis	t	FAC	
Bermuda Grass	Cynodon dactylon	h	FACU	
Blackberry	<i>Rubus</i> sp.	h	NI	
Black Oak	Quercus velutina	t	-	
Blackjack Oak	Quercus marilandica	t	-	
Black Willow	Salix nigra	t	FACW	
Boxelder	Acer negundo	t	FACW	
Bristlegrass	<i>Setaria</i> sp.	h	FAC	

Table 2: Plant Species Observed within Study Area					
Common Name	Scientific Name	Vegetation Type	NWI Status		
Coralberry	Symphoricarpos orbiculatus	S	FACU		
Buttonbush	Cephalanthus occidentalis	S	OBL		
Elderberry	Sambucus canadensis	t	FAC		
Grape	<i>Vitis</i> sp.	V	FAC		
Giant Goldenrod	Solidago gigantea	h	FAC		
Green Ash	Fraxinus pennsylvanica	t	FACW-		
Hackberry	Celtis occidentalis	t	FAC		
Hop Sedge	Carex lupulina	h	OBL		
Johnsongrass	Sorghum halepense	h	FACU		
Little Bluestem	Schizachyrium scoparium	h	FACU		
Multiflora Rose	Rosa multiflora	h	UPL		
Northern Red Oak	Quercus rubra	t	FACU		
Osage Orange	Maclura pomifera	t	UPL		
Pecan	Carya illinoensis	t	FAC		
Plum	Prunus americana	t	NI		
Poison Ivy	Toxicodendron radicans	V	FAC		
Post Oak	Quercus stellata	t	NA		
Saw Greenbrier	Smilax bona-nox	V	FAC		
Sericea Lespedeza	Lespedeza cuneata	S	NI		
Silver Maple	Acer saccharinum	t	FAC		
Switchgrass	Panicum virgatum	h	FACW		
Virginia Wildrye	Elymus virginicus	h	FAC		
t = tree, s = shrub, h=herbaceous, v=vine, NI=no indicator, "-" = not listed (Taylor et al., 1994; USDA, 2009)					

5.3 WILDLIFE ASSESSMENT

Wildlife species observed during field survey within the study area are summarized in Table 3 below.

Table 3: Animal Species Observed within Study Area				
Common Name	Scientific Name			
Birds (Sibley, 2000)				
American Crow	Corvus brachyrhynchos			
American Goldfinch	Spinus tristis			
Bewick's Wren	Thryomanes bewickii			
Blue Jay	Cyanocitta cristata			
Canada Goose	Branta canadensis			
Cedar Waxwing	Bombycilla cedrorum			
Mallard	Anas platyrhynchos			
Red-tailed Hawk	Buteo jamaicensis			
Tufted Titmouse	Baeolophus bicolor			
White Breasted Nuthatch	Sitta carolinensis			

Table 3: Animal Species Observed within Study Area					
Common Name	Scientific Name				
Mammals (Caire et al., 1989)	Mammals (Caire et al., 1989)				
American Beaver	Castor canadensis				
Eastern Cottontail	Sylvilagus floridanus				
Eastern Gray Squirrel	Sciurus carolinensis				
Nine-banded Armadillo	Dasyppus novemcinctus				
White-tailed Deer	Odocoileus virginianus				

6.0 FINDINGS

6.1 THREATENED, ENDANGERED AND PROTECTED SPECIES

In order to evaluate the study area for the potential presence of protected species, the USFWS list of federally listed species and designated critical habitat areas in Rogers County, Oklahoma was reviewed (USFWS, 2009). These sources were reviewed to determine if listed species and their associated habitat had the potential to occur within the study area or if adverse effects associated with the proposed construction may occur. Based upon the habitat descriptions of those species that were indicated to occur in Rogers County, a qualitative comparison to the habitat present within the study area was made during field reconnaissance efforts. The qualitative comparison was based upon regional and local ecological characteristics including soils, terrain, hydrology, and vegetation. The USFWS was not directly contacted.

Notes were also taken on livestock grazing, development, pollution and other disturbances that could decrease the potential for listed species to be present. Table 4 includes listed and candidate species that are either present, have the potential to be present, or have been observed in the past in Rogers County.

Table 4: Rogers County, Oklahoma Listed and Protected Species					
Common Name	Scientific Name	Federal Listing	Critical Habitat		
American Burying Beetle	Nicrophorus americanus	E	No		
Interior Least Tern	Sterna antillarum	E	No		
Piping Plover	Charadrius melodus	Т	No		
Whooping Crane	Grus americana	E	No		
Neosho Mucket Mussel	Lampsilis rafinesaqueana	finesaqueana C			
Rabbitsfoot Mussel	No				
Arkansas Darter	Etheostoma cragini	С	No		
Bald Eagle Haliaeetus leucocephalus DL* No					
T = threatened, E = endangered, C = candidate, DL = delisted *Bald Eagle is protected under the Bald and Golden Eagle Protection Act					

No critical habitat has been designated for the eight species listed above in Rogers County, Oklahoma (USFWS Critical Habitat Mapper).

American Burying Beetle: The American Burying Beetle (ABB) is federally listed as endangered. This species is found in 22 counties in eastern Oklahoma. An additional six

Oklahoma counties lie within the historic range of the ABB and two others have had unconfirmed sightings since 1992. This insect species is present on less than 10% of its original range. Mature forest is its preferred natural habitat, but it can be found in hedgerows, grasslands, and shrublands. This scavenger needs small vertebrates (from 50-200 grams in size) to feed upon. Habitat requirements for the ABB include areas with loose, well-drained soils with a well-formed litter layer from oak-hickory and oak-pine forests, as well as open native grassland and open native fields along forest edges. According to the USFWS, pastures where native grasses have been displaced by cultivation of Bermuda grass (*Cynodon dactylon*) are not expected to support the ABB. There is no Critical Habitat designated for the ABB in Rogers County (USFWS, 1991).

Findings of Survey Results for ABB: The mature forest areas adjacent to open grass fields that could provide suitable reproductive and foraging habitat for the ABB occur within the study area. There are approximately 130 acres of forested and upland grassland plant communities that provide potentially suitable ABB habitat within the study area.

Interior Least Tern: The Interior Least Tern is federally listed as endangered (USFWS, 1985a). The Interior Least Tern is a frequent summer resident that occurs along sand bars within the braided channels of the Canadian, Red, Cimarron, and Arkansas rivers (USFW, 1990). In Oklahoma, the largest populations occur at the Salt Plains National Wildlife Refuge in Alfalfa County. Nesting colonies occur on sparsely vegetated sandbars on large rivers or salt flats with some natural debris. Most nesting occurs in May-June.

Findings of Survey Results for Interior Least Tern: The study area does not contain sparsely vegetated sandbars on large rivers or salt flats with the natural debris required by the Interior Least Tern for both nesting and feeding. Suitable habitat for the Interior Least Tern was not observed to be present on or in the immediate vicinity of the study area.

Piping Plover: The Piping Plover is federally listed as endangered within the Great Lakes Region, and threatened in the remainder of its range, including Oklahoma. Preferred habitats include sandy beaches along the ocean or lakes, and bare areas of islands or sandbars along large rivers. They also nest on the pebbly mud of interior alkali lakes and ponds. This shorebird migrates through Oklahoma each spring and fall. Sight records of migratory Piping Plovers exist for many central and eastern Oklahoma counties. Rogers County is not located in the probable migratory pathway between breeding and winter habitats (USFWS, 1985b).

Findings of Survey Results for Piping Plover: The study area does not contain sparsely vegetated sandbars on large rivers with the natural debris required by the Piping Plover for both nesting and feeding. No suitable habitat for the Piping Plover was observed to be present on or in the immediate vicinity of the study area. Nesting Piping Plovers are only known pre-1997, from the Oklahoma panhandle and do not nest in Rogers County (GMSARC, 2009).

Whooping Crane: The Whooping Crane is federally listed as endangered (USFWS, 1967). Critical Habitat has been designated for this species in Oklahoma at the Salt Plains National Wildlife Refuge (NWR) in northwestern Oklahoma. This wading bird is ecologically dependent on freshwater wetlands and, in the winter, on coastal brackish wetlands. The Whooping Crane migrates through western Oklahoma in the spring and fall (Austin, 2001). During migration, Whooping Cranes are sometimes found in Oklahoma outside of the Salt Plains NWR along

rivers, grain fields, or in shallow wetlands. There is no critical habitat for the Whooping Crane in Rogers County, OK.

Findings of Survey Results for Whooping Crane: All areas within and adjacent to the study area were examined during field survey effort for the presence of suitable Whooping Crane foraging and roosting habitat. No preferred foraging or roosting habitat for this species was observed within or in areas adjacent to the study area.

Neosho Mucket Mussel: The Neosho Mucket is federally listed as a candidate species. It lives in freshwater and has an elongated, slightly rounded shell and I is approximately 4 inches across. In Oklahoma, living Neosho muckets were found along 55 miles of the Illinois River from the Oklahoma/Arkansas state line, downstream to the headwaters of Tenkiller Lake, Cherokee County, Oklahoma (Mather, 1990). Reproduction and recruitment rates of this species are low and the Neosho muckets is relatively rare in the Fall, Verdigris, Neosho, and North Fork Spring Rivers, and Shoal Creek, in northeastern Oklahoma. There is no critical habitat designated for the Neosho mucket in Rogers County.

Findings of Survey Results for Neosho Mucket Mussel: Surveys conducted at 32 sites on the Verdigris River found no live Neosho mucket mussels. The results of these surveys suggest the Neosho mucket has been extirpated from the Verdigris River in Oklahoma (Mathers, 1990). Researchers at Oklahoma State University have revisited these sites in the Verdigris River in the 1990's and confirmed that the species has been extirpated from this river in Oklahoma.

Rabbitsfoot Mussel: The Rabbitsfoot is federally listed as a candidate species. In Oklahoma, living Rabbitsfoot mussels are found within the Illinois and Verdigris River in the northeastern portion of the state, as well as in the Little, Glover, and Mountain Fork Rivers in the southeastern portion of the state. Rabbitsfoot mussels exhibit seasonal movement, migrating toward shallower water during brooding periods (Fobian, 2007). Threats to the species are primarily reduction of habitat due to impoundment, sedimentation, agricultural pollutants, and lead and zinc mining. There is no critical habitat designated for the Rabbitsfoot in Rogers County.

Findings of Survey Results for Rabbitsfoot Mussel: Surveys for the presence of the Rabbitsfoot mussel were conducted by Vaughn (1998) and Oklahoma Department of Wildlife Conservation (2006-2009). This species was previously thought to be extirpated from the Verdigris River. However, recent surveys found the lower Verdigris River (below Lake Oologah) supported the densest assemblages of the Rabbitsfoot mussel in Oklahoma, Missouri, and Kansas (ODWC, 2009).

Arkansas Darter: The Arkansas Darter is federally listed as a candidate species. It occurs in the Arkansas River drainage from Arkansas to Colorado; numerous viable populations exist, but recent declines have occurred and many populations are threatened by continuing loss of habitat, especially through dewatering. Historically, this fish was never very common. Preferred habitat includes spring-fed creeks with cool, clear water with herbaceous aquatic vegetation, or pools with sand, fine gravel, or organic detritus substrate. Surveys in 1994-1997 in south-central Kansas and adjacent Oklahoma recorded this species from 67 of the 108 localities that were sampled within the general historical range of the species (Eberle and Stark, 2000).

Findings of Survey Results for Arkansas Darter: The study area does not contain spring-fed creeks with cool clear water, aquatic herbaceous vegetation, and gravel bottoms, as required by the Arkansas Darter. Suitable habitat for the Arkansas Darter was not observed to be present on or in the immediate vicinity of the study area.

Bald Eagle: The Bald Eagle is a large predatory bird that occupies large trees along major rivers and streams during their winter distribution (December through March) in Oklahoma. In August 2007, the Bald Eagle was delisted by the USFWS from the Federal List of Endangered and Threatened Wildlife (USFWS, 2007). Since delisting, the Bald Eagle continues to be protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act (USFWS, 1940). Bald Eagles nest in tall trees usually within one or two miles of large rivers, streams and lakes where fish are abundant. Although nesting eagles are concentrated in eastern Oklahoma, their nesting range appears to be expanding.

Findings of Survey Results for Bald Eagle: There are two perennial streams (Bird Creek and the Verdigris) with tall trees within the study area. Based on information from the G.M. Sutton Avian Research Center, the closest occupied Bald Eagle nest is located approximately four miles northeast of the study area along the Verdigris River (GMSARC, 2011). No Bald Eagle nests were observed within or adjacent to the study area. Suitable nesting, roosting, and foraging habitat for the Bald Eagle was observed in the study area. While suitable nesting, roosting, and foraging habitat is present within the study areas, disturbance would only be associated with temporary construction activities.

6.2 POTENTIALLY JURSIDICTIONAL WATERBODIES

Based on Kleinfelder's assessment, specific locations within the study area met the technical criteria for jurisdictional wetlands. Following the U.S. Supreme Court's decision in Rapanos v. United States and Carabell v. United States (2006), new technical standards have been implemented for determining the limit of Waters. The new technical standards have: 1) rejected the argument that the term "waters of the United States" is limited to only those waters that are navigable in the traditional sense and their abutting wetlands, and 2) asserted that regulatory authority should extend only to "relatively permanent, standing or continuously flowing bodies of water" connected to traditional navigable waters, and to "wetlands with a continuous surface connection to" such relatively permanent waters (USACE, 2007).

The study area contains nine (9) potentially jurisdictional waterbodies. One (1) mapped, blueline, named perennial stream (Bird Creek), two (2) emergent wetlands, one (1) forested wetland, and five (5) ephemeral streams were observed during field investigations within the study area (Figure 8). Wetland delineation data forms for the wetland features and their adjacent upland features are located in Appendix C. A summary of all Waters within the study area is shown in Table 5.

	Table 5: Potentially Jurisdictional Waterbodies within the Study Area						
Water- body	USGS Topo or NWI Classificati	Length /Area	Field Observa- tions	Potentially Jurisdic- tional	Cowardin Classifi- cation	OHWM / Avg. Width Observed	Comments
Stream 1	Unmapped	230 ft. 0.02 acres	Ephemeral stream	Yes	NA	3 feet	Un-consolidated, mud bottom, vegetated banks, dry at time of survey
Stream 2	Unmapped	168 ft. 0.04 acres	Ephemeral stream	Yes	NA	10 feet	Un-consolidated, vegetated banks, dry at time of survey
Stream 3	Unmapped	266 ft. 0.03 acres	Ephemeral stream	Yes	NA	5 feet	Un-consolidated, mud bottom, steep, vegetated banks, dry at time of survey
Stream 4	Unmapped	87 ft. 0.02 acres	Ephemeral stream	Yes	NA	10 feet	Un-consolidated, steep, vegetated banks, dry at time of survey
Stream 5	Unmapped	494 ft. 0.06 acres	Ephemeral stream	Yes	NA	5 feet	Slow flow, un- consolidated mud bottom, vegetated banks, average 0-3 inches deep
Stream 6	Perennial, named, blue-line stream (Bird Creek)	6697 ft. 9.99 acres	Perennial stream	Yes	R3UB3	65 feet	Un-consolidated mud bottom, vegetated banks, average 7 feet deep
Wetland 1	PFO1Ah	0.02 acres	Emergent Wetland	Yes	PEM1A	NA	Emergent wetland in depression area
Wetland 2	PEM1A	0.12 acres	Emergent Wetland	Yes	PEM1A	NA	Emergent wetland in depression area
Wetland 3	PFO1A	2.51 acres	Forested Wetland	Yes	PFO1A	NA	Forested, borders Bird Creek at western edge
Approx. Totals		7,942 Linear Feet / 12.81 Acres of Waters					

One wetland is identified on current NWI maps. Approximately **12.81 acres** of potentially jurisdictional Waters (**10.16 acres** of streams and **2.65 acres** of forested/emergent wetland were identified and are located within the study area (Figures 8).

Stream 1 – (230 linear feet) This waterbody is not mapped on the USGS topographic maps and is located within the northeastern part of the study area. It is an ephemeral stream that flows from the east to west. This waterbody has an unconsolidated mud bottom with bare or vegetated banks. At the time of the survey, the stream was mostly dry with a few pooled areas of water that were up to six (6) inches deep. Dominant vegetation associated with this waterbody included Hackberry, American elm, Post oak and Cottonwood (Figure 8).

This intermittent stream is likely to be subject to jurisdiction of the USACE because it has direct hydrologic connection with the straightened portion of Bird Creek.

Stream 2 – (168 linear feet) This waterbody is not mapped on the USGS topographic maps and is located within the northeastern part of the study area. It is an ephemeral stream that flows from west to east. This waterbody has an unconsolidated mud bottom with steep vegetated banks and is connected to the former channel of the Verdigris River. At the time of the survey, the stream was dry. Dominant vegetation associated with this waterbody included Hackberry, Green ash, American elm, Greenbrier, Bermuda grass and Poison ivy (Figure 8).

This intermittent stream is likely to be subject to jurisdiction of the USACE because it has direct hydrologic connection with the former channel of the Verdigris River.

Stream 3 – (266 linear feet) This waterbody is not mapped on the USGS topographic maps and is located within the northwestern part of the study area. It is an ephemeral stream that flows from east to west. The waterbody has an unconsolidated mud bottom with steep vegetated banks and flows into Bird Creek. At the time of the survey the stream was mostly dry with small runs that were up to three (3) inches deep. Dominant vegetation associated with this waterbody included Black willow, Post oak, Boxelder, American elm, and Greenbriar (Figure 8).

This intermittent stream is likely to be subject to jurisdiction of the USACE because it has direct hydrologic connection with Bird Creek.

Stream 4 – (87 linear feet) This waterbody is not mapped on the USGS topographic maps and is located within the west central part of the study area. It is an ephemeral stream that flows from northeast to southwest and is connected to Bird Creek. The waterbody is wide and shallow with an unconsolidated mud bottom with vegetated banks. At the time of the survey, the stream was mostly dry. Dominant vegetation associated with this waterbody included Plum, Hackberry, Post oak, American elm and Buckbrush (Figure 8).

This intermittent stream is likely to be subject to jurisdiction of the USACE because it has direct hydrologic connection with Bird Creek.

Stream 5 – (494 linear feet) This waterbody is not mapped on the USGS topographic maps and is located within the west central part of the study area. It is an ephemeral stream that flows from northeast to southwest into Bird Creek. This waterbody has an unconsolidated mud bottom with vegetated banks. At the time of the survey, the stream was slowly flowing with up to 3 inches of water. Dominant vegetation associated with this waterbody included Hackberry, American elm, Pecan, Post oak, Hackberry and Plum (Figure 8).

This intermittent stream is likely to be subject to jurisdiction of the USACE because it has direct hydrologic connection with Bird Creek.

Stream 6 – (6,697 linear feet) This waterbody borders the "island" on all sides. It is mapped on the USGS topographic maps as a blue-lined, perennial stream and includes portions of Bird Creek, the straightened portion of Bird Creek and the former channel of the Verdigris River. This waterbody has an unconsolidated mud bottom. At the time of the survey, the stream had moderate flow, was approximately 65 feet wide and approximately 7 feet deep. Dominant vegetation associated with this waterbody included Hackberry, Honey locust, American elm, Pecan, Post oak, Black Willow, and Cottonwood (Figure 8).

This perennial stream is likely to be subject to USACE jurisdiction because it has direct hydrologic connection with the Verdigris River.

Wetland 1 – (0.02 acres) Wetland 1 is located within the northwestern portion of the study area. Based on attributes seen during the field investigation, the wetland is classified as a PEM1A (palustrine, emergent, temporarily flooded) wetland (Cowardin, 1979). Wetland 1 is not mapped on the NWI map. The plant community was dominated by hydrophytic species that included Black willow, Hackberry, Cottonwood and Giant goldenrod. Hydrologic indicators consisted of drift deposits, surface water and saturated soil beginning at zero inches. However, this wetland does not have a connection to navigable water. From 0-16 inches, the soil matrix was 10YR 3/2 with redox features of 7.5YR 6/6 compared to Munsell color charts and is classified as hydric. Without the required significant nexus to a navigable waterway this wetland may be considered isolated. (Figure 8).

This wetland is not likely to be subject to USACE jurisdiction because it has no significant nexus to a navigable waterway.

Wetland 2 – (0.12 acres) Wetland 2 is located within the north-central portion of the study area. Based on attributes seen during the field investigation, the wetland is classified as a PEM1A (palustrine, emergent, temporarily flooded) wetland (Cowardin, 1979). Wetland 2 is not mapped on the NWI map. The plant community was dominated by hydrophytic species that included Hickory, Boxelder and hop sedge. Hydrologic indicators consisted of drift deposits and saturated soil beginning at zero inches. However, this wetland does not have a connection to navigable water. From 0-16 inches, the soil matrix was 10YR 2/1 when compared to Munsell color charts and is classified as hydric. Without the required significant nexus to a navigable waterway this wetland may be considered isolated (Figure 8).

This wetland is not likely to be subject to USACE jurisdiction because it has no significant nexus to a navigable waterway.

Wetland 3 – (2.51 acres) Wetland 3 is located in the eastern part of the study area along the former channel of the Verdigris River. Based on attributes seen during the field investigation, the wetland is classified as PFO1A (palustrine, forested, broad-leaved deciduous, temporarily flooded) wetland (Cowardin, 1979). Wetland 3 is mapped on the NWI map. The plant community is dominated by hydrophytic species that included Black willow, Boxelder, and American sycamore. Hydrologic indicators consisted of drift deposits and saturated soil beginning at zero inches. From 0-3 inches the soil matrix color was 10YR 3/4 with redox features of 10YR 2/1 and 10YR 4/4 when compared to Munsell color charts, and is classified as

hydric. From 3-9 inches the soil matrix color was 10YR 5/4 with redox features of 10YR 3/2 and from 9-16 inches the soil matrix color was 10YR 5/4 with redox features of 10YR 4/1, 10YR 3/1, and 2.5YR 3/4 when compared to Munsell color charts, and is classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 8).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with Waters (former channel of the Verdigris River).

6.3 HISTORIC WETLANDS

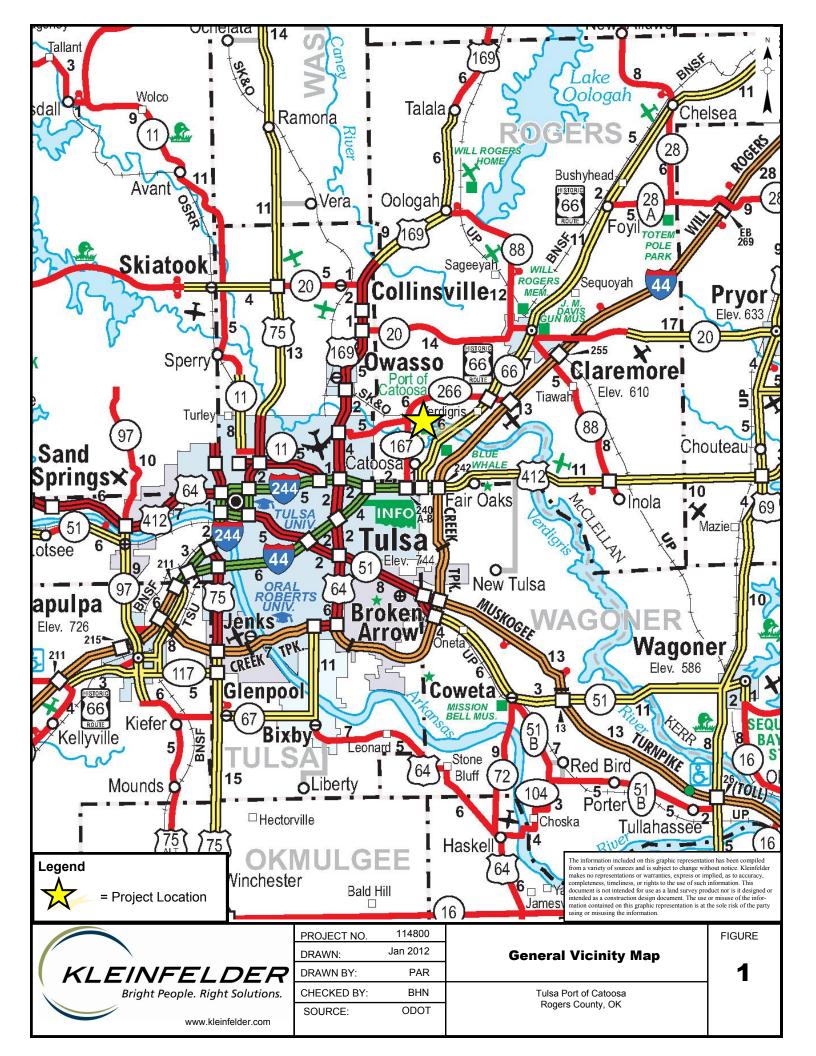
The approximate extent of historic wetlands was based on the review of NRCS historic aerial photographs, NRCS Web Soil Survey data, Oklahoma counties hydric soils list, Google Earth Pro, NWI maps, USGS Topographic maps, and the presence of hydric soils over portions of the study area. A key feature in determining the approximate extent of the historic wetlands was the 1971 NRCS aerial photograph (Appendix B). All the above factors were used to determine that large portions of the study area could have been historically classified as either forested or emergent wetlands (Figure 9). The channelization of Bird Creek minimizes the portions of the site that are currently subject to routine flooding, as does the drop of the bed level of Bird Creek.

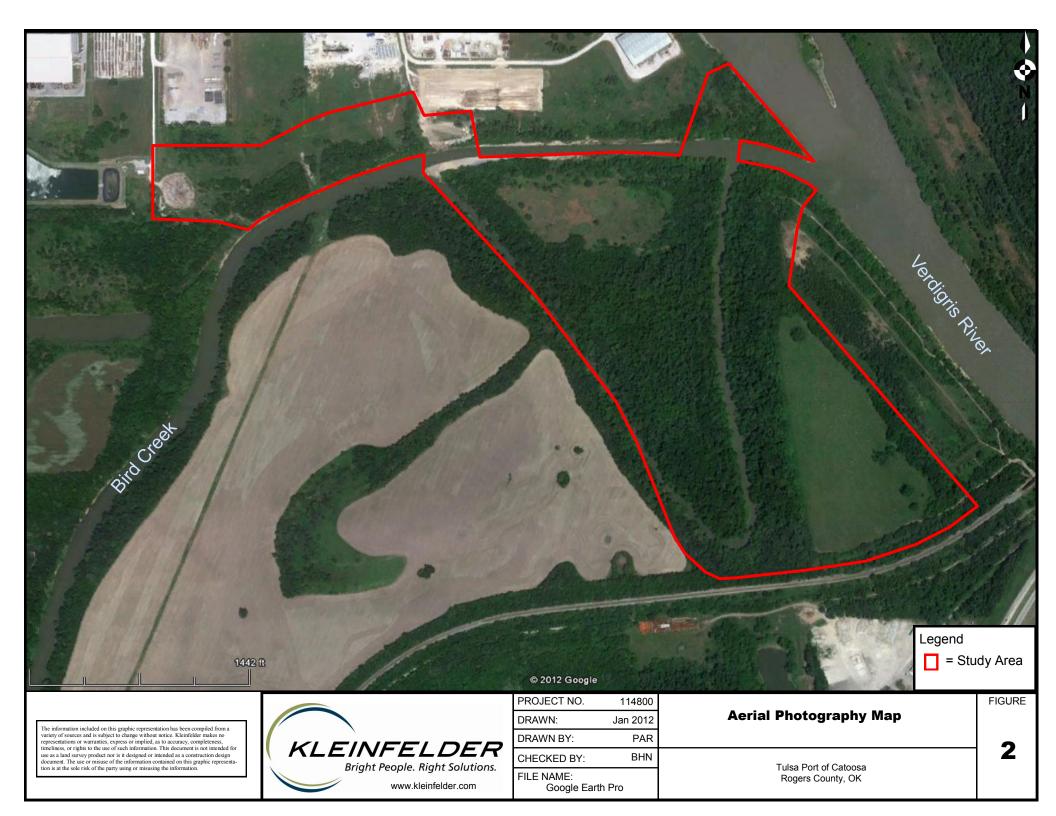
7.0 REFERENCES

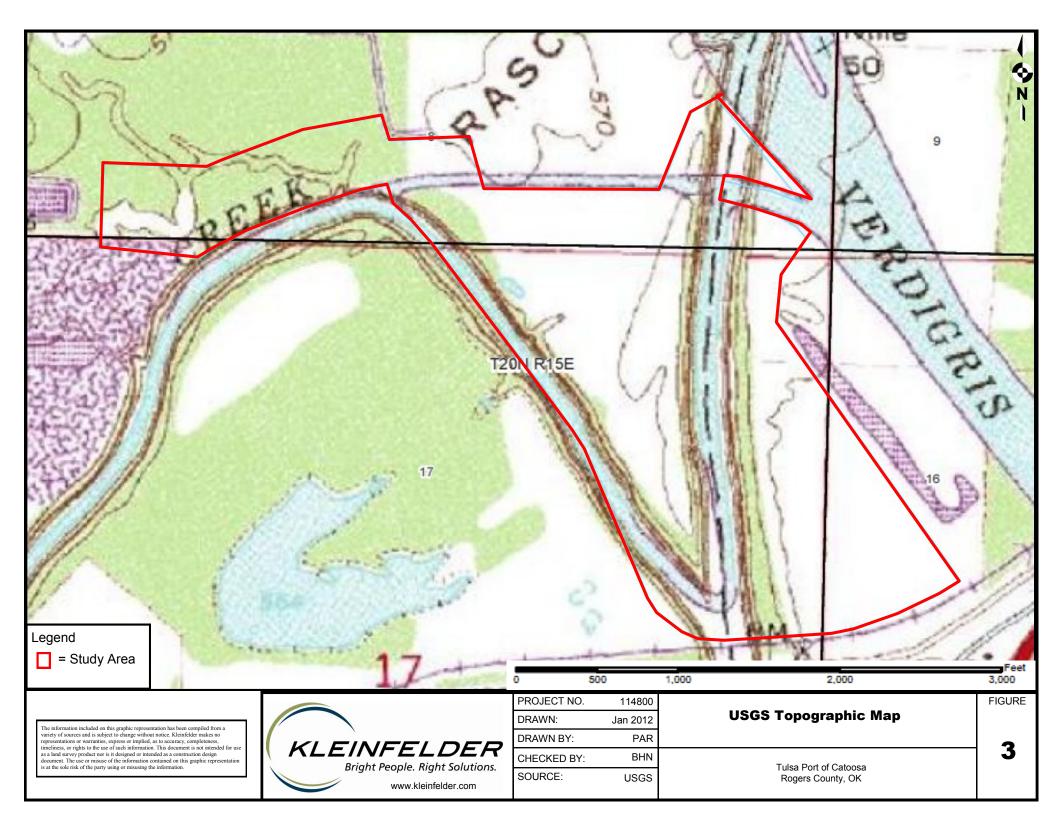
- Caire, W., B.P Glass, M.A. Mares, and J.D. Tyler. 1989. *Mammals of Oklahoma*. First Edition. University of Oklahoma Press. Norman, OK
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31, U.S. Fish and Wildlife Service, Washington, DC.103pp.
- Eberle, M. E., and W. S. Stark. 2000. Status of the Arkansas darter in south-central Kansas and adjacent Oklahoma. Prairie Naturalist 32:103-113.
- Environmental Laboratory. 1987. Corps of Engineers Wetland Delineation Manual. Technical Report Y-87-1, U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.
- G.M.Sutton Avian Research Center (GMSARC). 2011. Personal communication (email) with Alan Jenkins regarding the location and proxmity of occupied Bald Eagle within or near the Tulsa Port of Catoosa study areas.
- MacBeth Division, Kollmorgen Instruments Corporation (MacBeth). 1994. *Munsell Soil Color Charts*. Baltimore, Maryland.
- Mather, C. 1990. Status survey of the western fanshell and the Neosho mucket in Oklahoma. Final Report to the Oklahoma Department of Wildlife Conservation. Project No. E-7, Oklahoma. 22 pp
- Oklahoma Climatological Survey (OCS). 2010. Rogers County Climate Summary, accessed at: <u>http://climate.mesonet.org/county_climate/Products/QuickFacts/Rogers.pdf</u>.
- Oklahoma Department of Wildlife Conservation (ODWC). 2009. *Status of Macroinvertebrate and Fish Assemblages in the Small Rivers of the Tall Grass Prairie.* Federal Aid Grant No. T-40-P-1. Accessed at: <u>http://www.wildlifedepartment.com/wildlifemgmt/wildlifegrants/T-40-P-1%20Final%20APR%20FY10%203-24-10%20Report%20Only.pdf.</u>
- Sibley, David A. 2000. National Audubon Society *The Sibley Guide to Birds*. First Edition. Chanticleer Press, Inc. New York
- U.S. Army Corps of Engineers (USACE). 2007. Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States. At: <u>http://www.usace.army.mil/cw/cecwo/reg/cwa_guide/rapanos_guide_memo.pdf</u>.
- U.S. Army Engineer Research and Development Center (USAERDC). 2008. Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region. Available at: <u>http://el.erdc.usace.army.mil/elpubs/pdf/trel08-27.pdf</u>
- U.S. Department of Agriculture, NRCS (USDA). 2009. PLANTS Database (http://plants.usda.gov, 24 September 2009). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

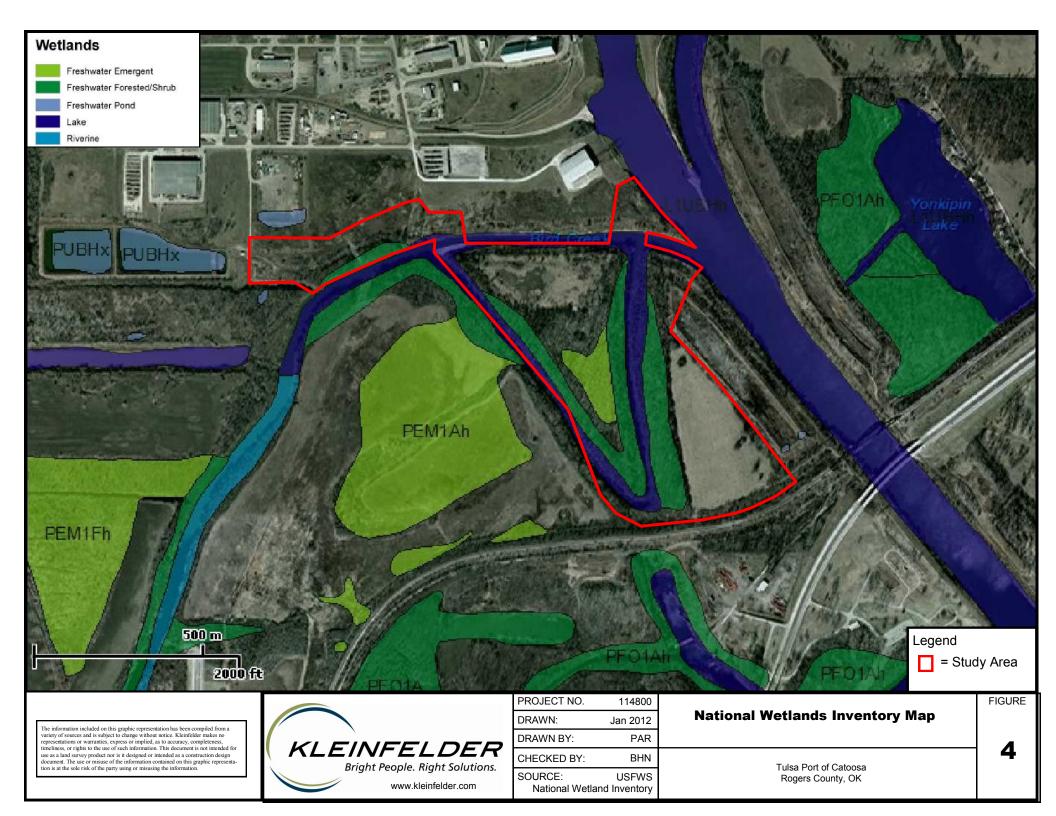
- U.S. Department of Agriculture (USDA). 2008. Soil Survey for Rogers County, Oklahoma. Natural Resources Conservation Service in Cooperation with Oklahoma Agricultural Experiment Station. Available at: <u>http://websoilsurvey.nrcs.usda.gov</u>.
- U.S. Environmental Protection Agency (EPA). 1972. Clean Water Act (amended 1977 and 1987). 33 U.S.C. §§ 1251-1387.
- U.S. Fish and Wildlife Service (USFWS). 2009. Oklahoma Ecological Services Field Office. County Occurrences of Oklahoma Federally-Listed Endangered, Threatened, Proposed and Candidate Species. Accessed at: http://www.fws.gov/southwest/es/oklahoma.
- U.S. Fish and Wildlife Service (USFWS). 2007. Endangered and Threatened Wildlife and Plants; Removing the Bald Eagle in the Lower 48 States. From the List of Endangered and Threatened Wildlife. Federal Register 72(130): 37345-37372.
- U.S. Fish and Wildlife Service (USFWS). 1990. Recovery Plan for the Interior Population of the Least Tern (Sterna antillarum). Grand Island, Nebraska. 95pp.
- U.S. Fish and Wildlife Service (USFWS). 1992. Western Prairie Fringed Orchid (*Platanthera praeclara*) Fact Sheet. At: <u>http://www.fws.gov/southwest/es/oklahoma/orchid1.htm</u>.
- U.S. Fish and Wildlife Service (USFWS). 1991. American Burying Beetle (*Nicrophorus americanus*) Recovery Plan. Newton Corner, Massachusetts. 80 pp.
- U.S. Fish and Wildlife Service (USFWS). 1988. 1988 National List of Plant Species that Occur in Wetlands. Available at: http://www.fws.gov.nwi/bha.download.1988region2.txt
- U.S. Fish and Wildlife Service (USFWS). 1985a. Interior Population of Least Tern Determined to be Endangered. Federal Register 50:21784-21792.
- U.S. Fish and Wildlife Service (USFWS). 1985b. Determination of Endangered and Threatened Status for the Piping Plover: Final Rule. Federal Register 50(238): 50726-50734.
- U.S. Fish and Wildlife Service (USFWS). 1940. Bald and Golden Eagle Protection Act. 16 U.S.C. §§ 668-668d, as amended 1959, 1962, 1972, and 1978.
- Vaughn, C.C. 1997. Determination of the status and habitat preference of the Neosho mucket in Oklahoma. Annual Performance Report submitted to Oklahoma Department of Wildlife Conservation, Oklahoma City, Oklahoma.
- Woods, A.J., Omernik, J.M., Butler, D.R., Ford, J.G., Henley, J.E., Hoagland, B.W., Arndt, D.S., and Moran, B.C., 2005, Ecoregions of Oklahoma (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,250,000).

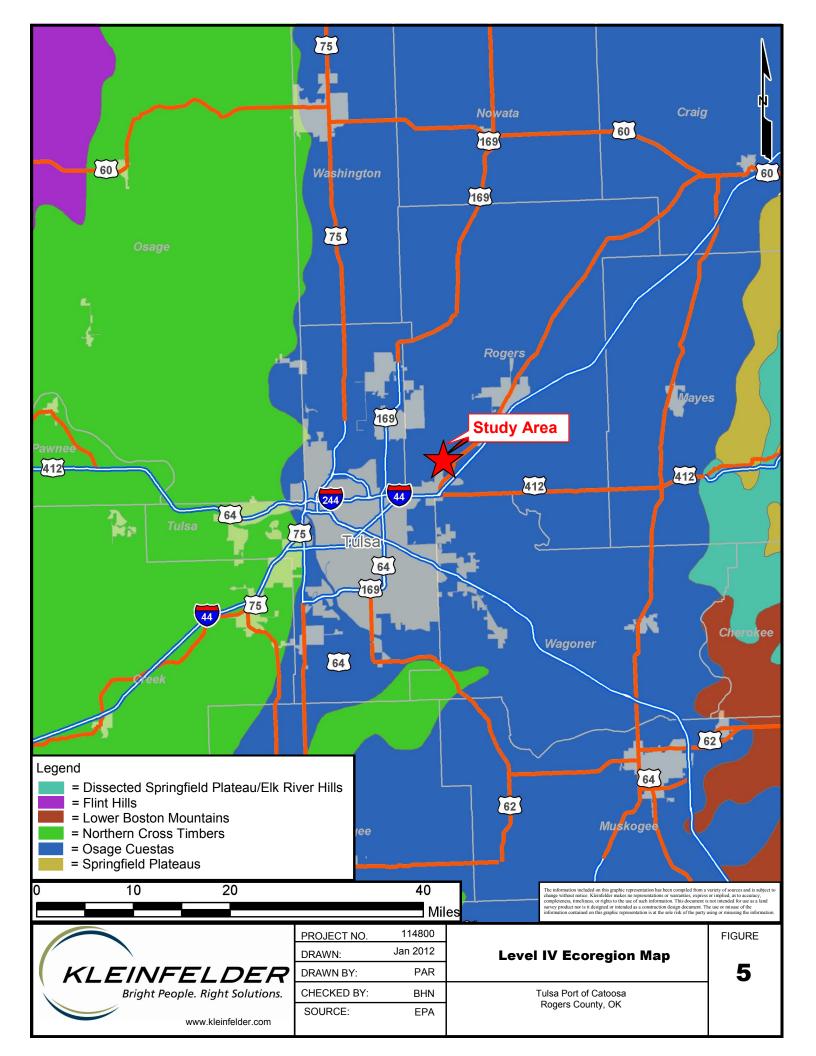
FIGURES

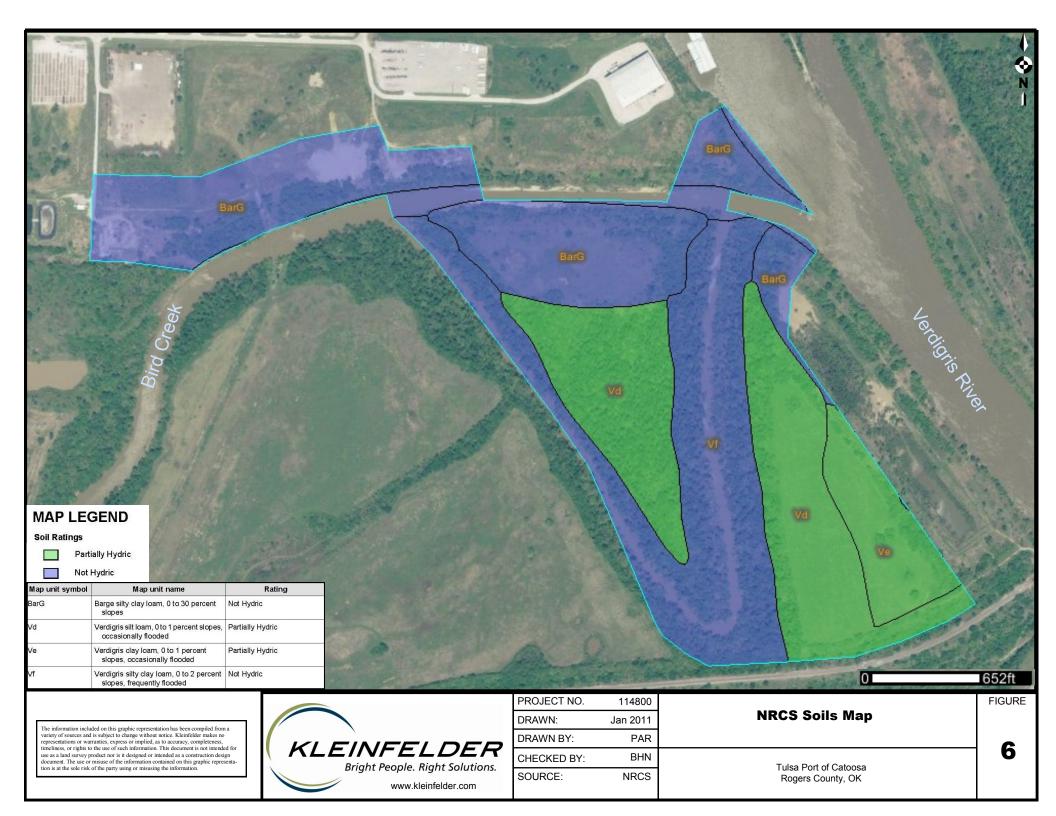


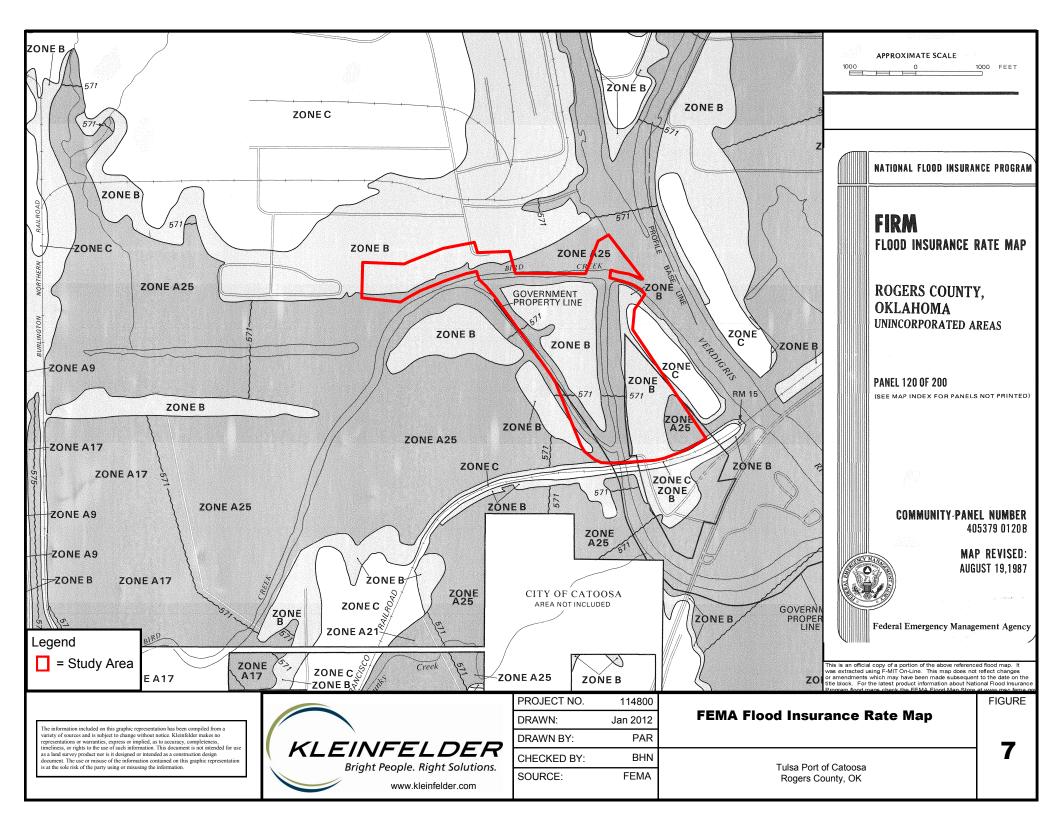


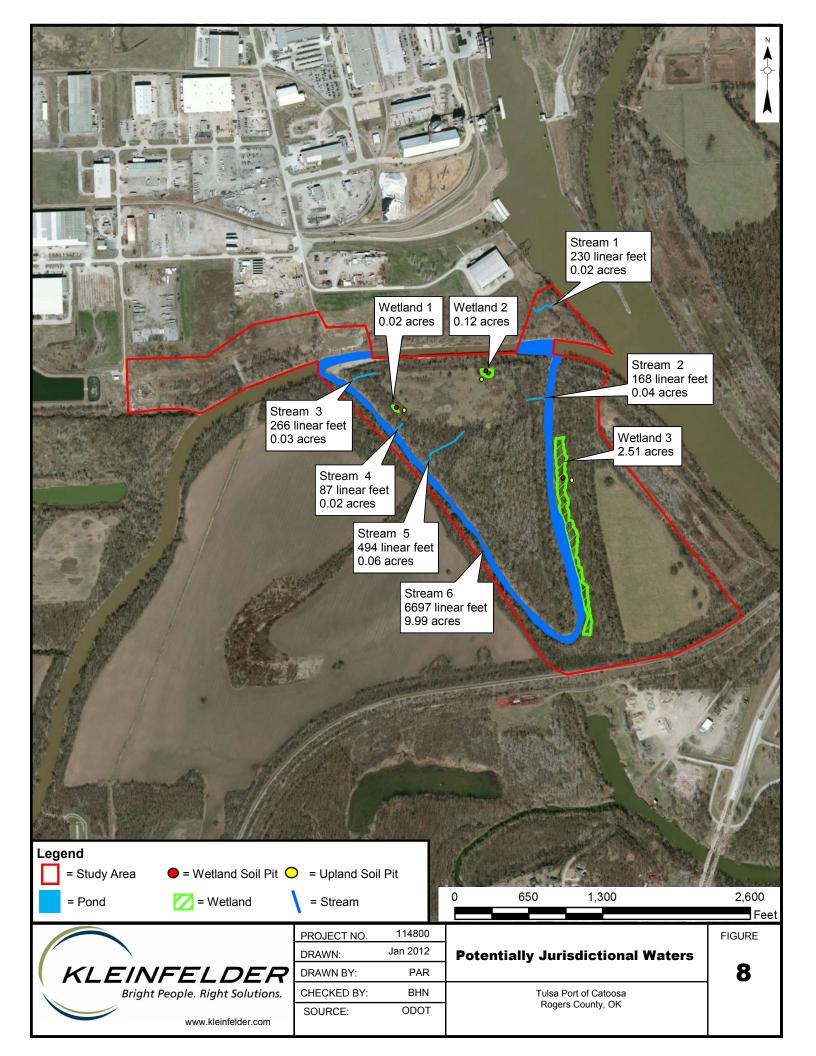


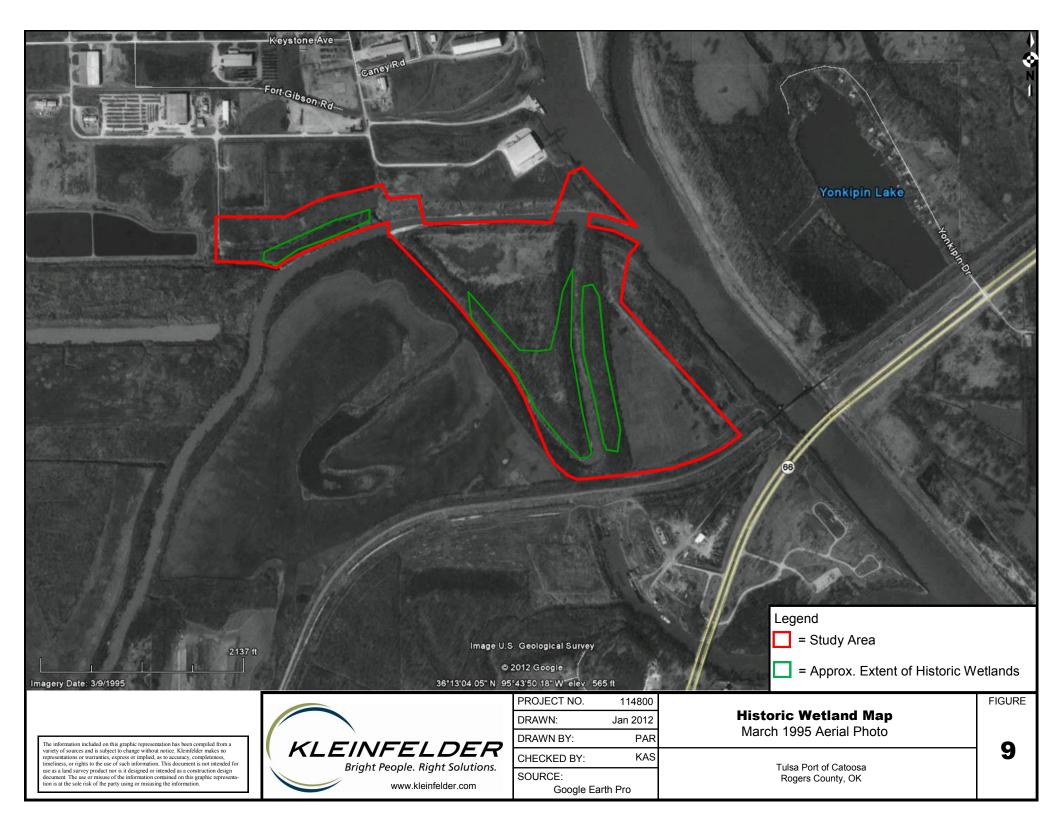












APPENDIX A PHOTOGRAPHIC RECORD



Photo 1 – View west; Perennial (Bird Creek), Stream 6.



11/29/2011

Photo 2 – View east; Perennial (Bird Creek), Stream 6.

Photo 3 – View west; Ephemeral, Stream 2.

Photo 4 – View east, Open area of fill on island.



Project Number: 114800 Photos Taken December 2010 Tulsa Port of Catoosa Rogers County, Oklahoma

Site Photographs

Appendix

Α



Photo 5 – View west; Open area of fill on the island.

Photo 6 – View northwest; Wetland 2.





Photo 7 – View west, Upland 2.

Photo 8 – View upstream; Ephemeral, Stream 3.



Project Number: 114800 Photos Taken December 2010 Port of Catoosa; Catoosa, OK Rogers County, Oklahoma

Site Photographs

Appendix

Α





Photo 9 – View north: Wetland 1.

Photo 10 – View south; Wetland 3.





Photo 11 – View north; Wetland 3.

Photo 12 – View east, Ephemeral, Stream 4.



Photos Taken December 2010

Tulsa Port of Catoosa Rogers County, Oklahoma

Site Photographs

Appendix

Α



Photo 13 – View west; Ephemeral, Stream 5.

Photo 14 – View west: Ephemeral, Stream 1.

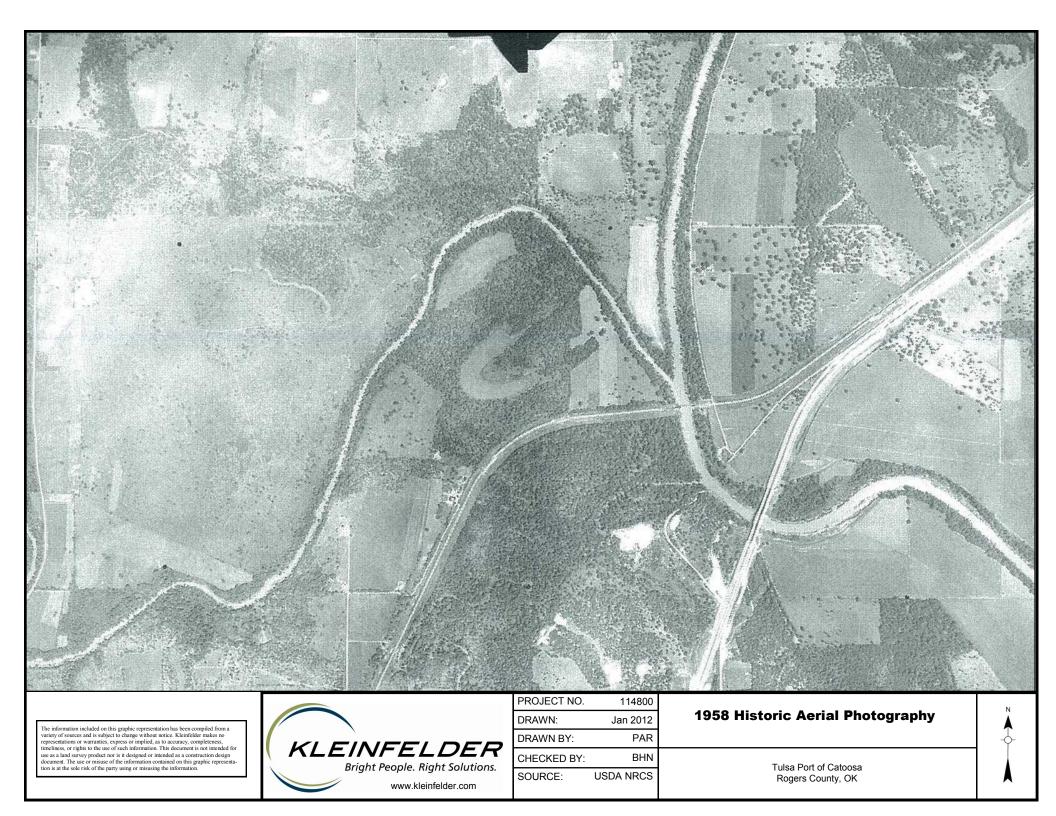


Project Number: 114800 Photos Taken December 2010 Tulsa Port of Catoosa Rogers County, Oklahoma

Site Photographs

Appendix A

APPENDIX B HISTORIC AERIAL PHOTOGRAPHS





The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or waranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representa-tion is at the sole risk of the party using or misusing the information.



	1	26-4
PROJECT NO.	114800	
DRAWN:	Jan 2012	
DRAWN BY:	PAR	
CHECKED BY:	BHN	
SOURCE:	USDA NRCS	

1972 Historic Aerial Photography

Tulsa Port of Catoosa Rogers County, OK



The information included on this graphic representation has been compiled from a variety of sources and is subject to change without notice. Kleinfelder makes no representations or waranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. This document is not intended for use as a land survey product nor is it designed or intended as a construction design document. The use or misuse of the information contained on this graphic representation is at the sole risk of the party using or misusing the information.

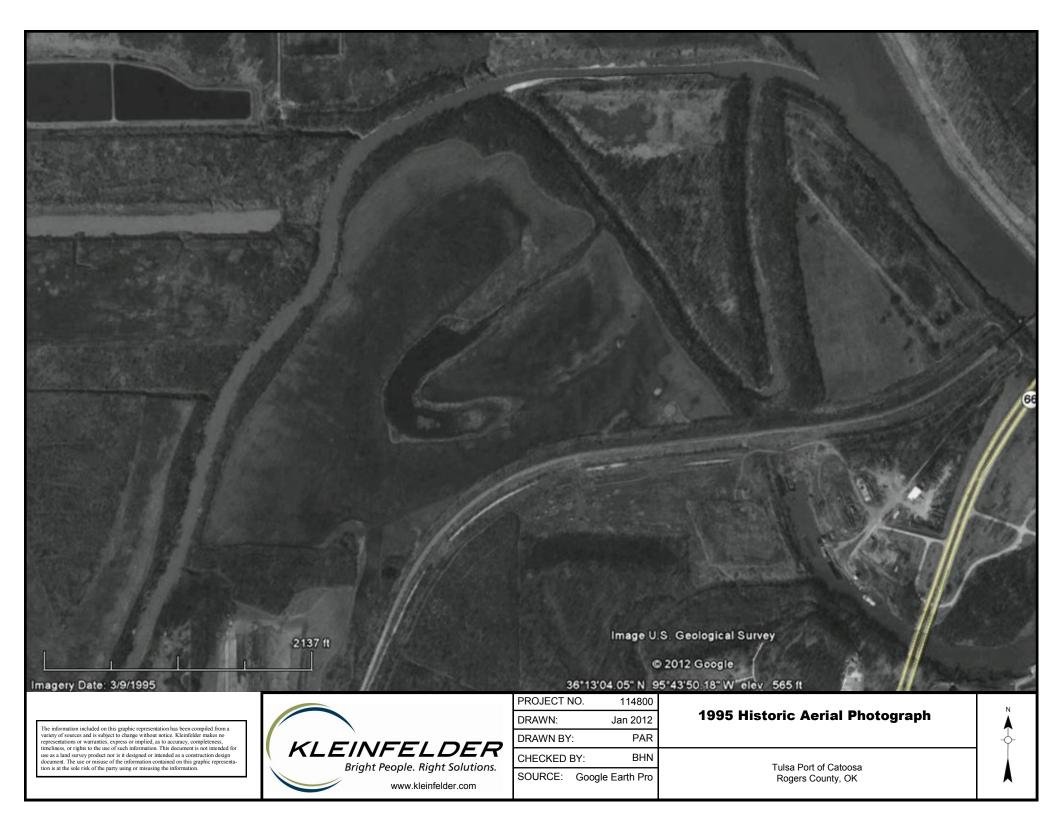


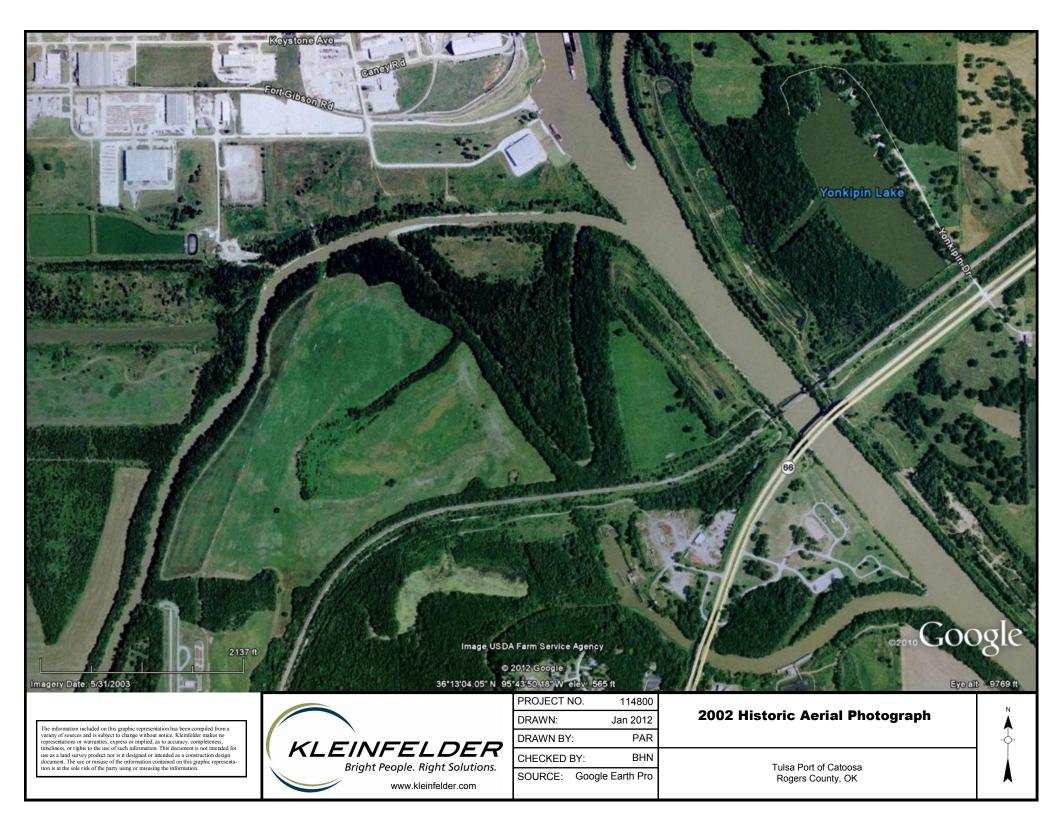
114800	
Jan 2012	
PAR	
BHN	
USDA NRCS	
	Jan 2012 PAR BHN

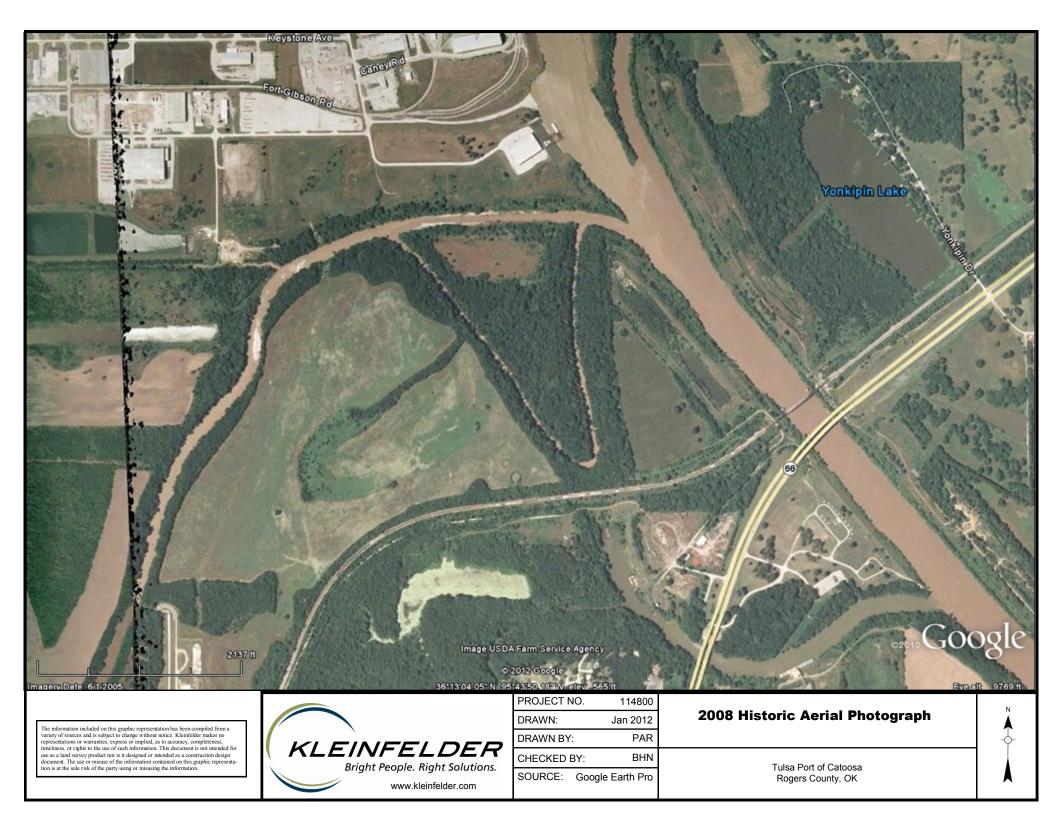
1991 Historic Aerial Photograph

N

Tulsa Port of Catoosa Rogers County, OK







APPENDIX C WETLAND DELINEATION FORMS

WEILAND DEIER	RMINAT	ION DATA FORM	I – Midwest Region
project/Site: Port of Cataosa		City/County:R	Sacrs Sampling Date: 11/29/0
oplicant/Owner: Port of Catoosa		· · · · · ·	State: O/2 Sampling Point: Wetta
vestigator(s): J-Caskey PRead	<u> </u>	Section, Township, Ra	ange:
andform (hillslope, terrace, etc.):			
lope (%): 3% Lat:			Datum:
· · · · · · · · · · · · · · · · · · ·			NWI classification: PEM
re climatic / hydrologic conditions on the site typical for this			
re Vegetation, Soil, or Hydrology sig		•	"Normal Circumstances" present? Yes Y. No
re Vegetation, Soil, or Hydrology na			
	•		
UMMARY OF FINDINGS – Attach site map s		sampling point i	locations, transects, important features, etc
	<u> </u>	is the Sampled	d Area
		within a Wetla	
Remarks:			
EGETATION – Use scientific names of plants.			· · · · · · · · · · · · · · · · · · ·
	Absolute	Dominant Indicator	Dominance Test worksheet:
		Species? Status	Number of Dominant Species
1. Ulpus amenticana	_10_	<u>F#C</u>	That Are OBL, FACW, or FAC: (A)
2 ulnus alata	<u>_[D</u> _	FACUL	Total Number of Dominant
3. Acerneguido	_22	- FACU	Species Across All Strata: (B)
4	,	••••••••••••••••••••••••••••••••••••••	Percent of Dominant Species
5	-00	= Total Cover	That Are OBL, FACW, or FAC: (A/B)
Sapling/Shrub Stratum (Plot size:)		= Total Cover	Prevalence Index worksheet:
1. <u>curya</u> illinolychis 2. <u>feer penna</u>	10	FAC+	Total % Cover of: Multiply by:
2. Acernegungo	()	- EACW	
3	. <u></u>	·	FACW species b b $x_2 = b$
4			FAC species $40 \times 3 = 120$
5			FACU species 10 $x4 = 40$
Herb Stratum (Plot size:)	20	= Total Cover	UPL species $ x 5 = - O$ Column Totals; $1 (0 (A) - 250 (B))$
Blue mun Denna Calaria can	10	FARW -	Column Totals: (A) (B)
2. juncus sp.	20	FACO	Prevalence Index = $B/A = 2.5$
3. Thasmanthyuin (ate folium	<u>_(</u> 0	<u>PAC</u>	Hydrophytic Vegetation Indicators:
Eclimas Vorginicus	<u>[D</u>	<u>FAC</u>	1 - Rapid Test for Hydrophytic Vegetation
5	. <u> </u>		2 - Dominance Test is >50%
3			3 - Prevalence Index is $\leq 3.0^{1}$
7			4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
8			Problematic Hydrophytic Vegetation ¹ (Explain)
9			
9			¹ Indicators of hydric soil and wetland hydrology must
9 10		= Total Cover	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
9		= Total Cover	be present, unless disturbed or problematic.
9		= Total Cover	

Ч

•___•

SOIL

Depth	Matrix		Redox Features	— <u> </u>
(inches)	Color (moist)	%	Color (moist) % Type ¹ Loc ⁴	
0-16	10 YR 3/2	100		selt loam
. 🛫				
<u> </u>				
		-		
1				21
		pletion, RM=R	educed Matrix, MS=Masked Sand Grains.	² Location: PL=Pore Lining, M=Matrix.
Hydric Soil I			Output of the second	Indicators for Problematic Hydric Solis ³ :
Histosol Histic En			Sandy Gleyed Matrix (S4) Sandy Redox (S5)	Coast Prairie Redox (A16)
	oipedon (A2) stic (A3)		Sandy Redox (S5) Stripped Matrix (S6)	Dark Surface (S7) Iron-Manganese Masses (E12)
Black His Hydroge	•••		Stripped Matrix (S6) Loamy Mucky Mineral (F1)	Iron-Manganese Masses (F12) Very Shallow Dark Surface (TF12)
	n Sulfide (A4) I Layers (A5)		Loamy Mucky Mineral (F1) Loamy Gleyed Matrix (F2)	Very Shallow Dark Surface (TF12) Other (Explain in Remarks)
	I Layers (A5) ick (A10)		Loamy Gleyed Matrix (F2)	
	ick (A10) d Below Dark Surfac	e (A11)	2 Depleted Matrix (F3) Redox Dark Surface (F6)	
-	ark Surface (A12)	- v + 1 1	Redox Dark Surface (F6) Depleted Dark Surface (F7)	³ Indicators of hydrophytic vegetation and
	lucky Mineral (S1)		Depieted Dark Surface (F7) Redox Depressions (F8)	wetland hydrology must be present,
	icky Peat or Peat (S1)	3)		unless disturbed or problematic.
	Layer (if observed)			
Type:				Χ.
Depth (inc			_	Hydric Soil Present? Yes 🔀 No
	~ ,,			
Remarks:				
Remarks:				
	GY			
1YDROLO Wetland Hyd	drology Indicators			
IYDROLO Wetland Hyd Primary Indic	drology Indicators cators (minimum of c		t: check all that apply)	
HYDROLO Wetland Hyd Primary Indic Surface	drology Indicators cators (minimum of o Water (A1)		Water-Stained Leaves (B9)	Surface Soil Cracks (B6)
HYDROLO Wetland Hyd Primary Indic Surface	drology Indicators cators (minimum of c			
HYDROLO Wetland Hyd Primary Indic Surface	drology Indicators: cators (minimum of e Water (A1) ater Table (A2)		Water-Stained Leaves (B9)	✗ Drainage Patterns (B10)
IYDROLO Wetland Hyd Primary Indic Surface High Wa Saturation Saturation	drology Indicators: cators (minimum of e Water (A1) ater Table (A2)		Water-Stained Leaves (B9) Aquatic Fauna (B13)	Surface Soil Cracks (B6) X Drainage Patterns (B10)
IYDROLO Wetland Hyd Primary Indic Y Surface High Wa X Saturation Water M	drology Indicators: cators (minimum of e Water (A1) ater Table (A2) on (A3)		Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14)	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8)
IYDROLO Wetland Hyd Primary Indic Y Surface High Wa X Saturation Water M	drology Indicators: cators (minimum of e Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2)		Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1)	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8)
HYDROLO Wetland Hyd Primary Indic Surface High Wa Saturation Water M Sedimer Drift Deg	drology Indicators: cators (minimum of e Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2)		Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Rod	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) ots (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1)
HYDROLO Wetland Hyd Primary Indic Surface High Wa Saturation Water M Sedimer Drift Deg Algal Mac	drology Indicators: cators (minimum of e Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3)		Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roo Presence of Reduced Iron (C4)	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) ots (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1)
IYDROLO Wetland Hyd Primary Indic Y Surface High Wa Saturation Water M Sedimer Drift Deg Algal Ma Iron Deg	drology Indicators: cators (minimum of e Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4)	one is required	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roc Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) (C6)
IYDROLO Wetland Hye Primary Indic Y Surface High Wa Saturation Water M Sedimer Drift Deg Algal Ma Iron Deg Inundation	drology Indicators: cators (minimum of e Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5)	one is required	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Rod Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils Thin Muck Surface (C7) Gauge or Well Data (D9) 	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) (C6)
HYDROLO Wetland Hyd Primary Indic Surface High Wa Saturatio Water M Sedimer Sedimer Drift Deg Algal Ma Iron Deg Inundati	drology Indicators: cators (minimum of e Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial y Vegetated Concav	one is required	 Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Rod Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils Thin Muck Surface (C7) Gauge or Well Data (D9) 	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) (C6)
HYDROLO Wetland Hyd Primary Indic Surface High Wa Saturatio Water M Sedimer Sedimer Algal Ma Iron Dep Inundati Sparsely	drology Indicators: cators (minimum of e Water (A1) ater Table (A2) on (A3) larks (B1) ht Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial y Vegetated Concav vations:	one is required	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Rod Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks)	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) (C6)
HYDROLO Wetland Hyd Primary Indic Surface High Wa Saturation Water M Sedimer Drift Deg Algal Ma Iron Deg Inundati Sparsely Field Obser Surface Water	drology Indicators: cators (minimum of e Water (A1) ater Table (A2) on (A3) larks (B1) ht Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial y Vegetated Concav vations: er Present?	<u>one is required</u> Imagery (B7) re Surface (B8 Yes <u>X.</u> No	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Rou Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): O unduction	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) (C6)
HYDROLO Wetland Hyd Primary Indic Surface High Wa Saturation Water M Sedimer Drift Deg Algal Ma Iron Deg Inundati Sparsely Field Obser Surface Water	drology Indicators: cators (minimum of e Water (A1) ater Table (A2) on (A3) larks (B1) ht Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial y Vegetated Concav vations: er Present?	Imagery (B7) re Surface (B8 Yes <u>X.</u> No Yes <u>Y</u> No	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Rod Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): <u>0 inclus</u>	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) (C6) FAC-Neutral Test (D5)
HYDROLO Wetland Hyd Primary Indic Surface High Wa Saturation Water M Sedimer Drift Deg Algal Ma Iron Deg Inundation Sparsely Field Obser Surface Water Water Table Saturation P	drology Indicators: cators (minimum of e Water (A1) ater Table (A2) on (A3) larks (B1) ht Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial y Vegetated Concav vations: er Present?	Imagery (B7) re Surface (B8 Yes <u>X.</u> No Yes <u>Y</u> No	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Rod Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): <u>0 inclus</u>	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) (C6)
IYDROLO Wetland Hyd Primary Indic Surface High Wa Saturation Water M Sedimer Drift Deg Iron Deg Iron Deg Inundati Sparsely Field Obser Surface Water Water Table Saturation P (includes ca)	drology Indicators: cators (minimum of e Water (A1) ater Table (A2) on (A3) larks (B1) ht Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial y Vegetated Concav vations: er Present? Present?	Imagery (B7) /e Surface (B8 Yes _X No Yes _Y No Yes _Y No	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Rod Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): <u>0 inclus</u>	Surface Soil Cracks (B6) Crayfish Burrows (B10) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) (C6) FAC-Neutral Test (D5) Vetland Hydrology Present? Yes No
HYDROLO Wetland Hyd Primary Indic Surface High Wa Saturatio Water M Sedimer Drift Deg Algal Ma Iron Deg Inundati Sparsely Field Obser Surface Wate Water Table Saturation P (includes ca	drology Indicators: cators (minimum of e Water (A1) ater Table (A2) on (A3) larks (B1) ht Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial y Vegetated Concav vations: er Present? Present?	Imagery (B7) /e Surface (B8 Yes _X No Yes _Y No Yes _Y No	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Rod Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): <u>0 Inclus</u> Depth (inches): <u>0 Inclus</u>	Surface Soil Cracks (B6) Crayfish Burrows (B10) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) (C6) FAC-Neutral Test (D5) Vetland Hydrology Present? Yes No
HYDROLO Wetland Hyd Primary Indic Surface High Wa Saturatio Water M Sedimer Drift Deg Algal Ma Iron Deg Inundati Sparsely Field Obser Surface Wate Water Table Saturation P (includes ca	drology Indicators: cators (minimum of e Water (A1) ater Table (A2) on (A3) larks (B1) ht Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial y Vegetated Concav vations: er Present? Present?	Imagery (B7) /e Surface (B8 Yes _X No Yes _Y No Yes _Y No	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Rod Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): <u>0 Inclus</u> Depth (inches): <u>0 Inclus</u>	Surface Soil Cracks (B6) Crayfish Burrows (B10) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) (C6) FAC-Neutral Test (D5) Vetland Hydrology Present? Yes No
HYDROLO Wetland Hye Primary Indic Surface High Wa Saturatio Water M Sedimer Drift Deg Atgal Ma Iron Deg Inundati Sparsely Field Obser Surface Wat Water Table Saturation P (includes cal Describe Re	drology Indicators: cators (minimum of e Water (A1) ater Table (A2) on (A3) larks (B1) ht Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial y Vegetated Concav vations: er Present? Present?	Imagery (B7) /e Surface (B8 Yes _X No Yes _Y No Yes _Y No	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Rod Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): <u>0 Inclus</u> Depth (inches): <u>0 Inclus</u>	Surface Soil Cracks (B6) Crayfish Burrows (B10) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) (C6) FAC-Neutral Test (D5) Vetland Hydrology Present? Yes No
HYDROLO Wetland Hye Primary Indic Surface High Wa Saturatio Water M Sedimer Drift Deg Atgal Ma Iron Deg Inundati Sparsely Field Obser Surface Wat Water Table Saturation P (includes cal Describe Re	drology Indicators: cators (minimum of e Water (A1) ater Table (A2) on (A3) larks (B1) ht Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial y Vegetated Concav vations: er Present? Present?	Imagery (B7) /e Surface (B8 Yes _X No Yes _Y No Yes _Y No	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Rod Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): <u>0 Inclus</u> Depth (inches): <u>0 Inclus</u>	Surface Soil Cracks (B6) Crayfish Burrows (B10) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) (C6) FAC-Neutral Test (D5) Vetland Hydrology Present? Yes No
IYDROLO Wetland Hye Primary Indic Surface High Wa Saturatio Water M Sedimer Drift Deg Algal Ma Iron Deg Inundati Sparsely Field Obser Surface Wat Water Table Saturation P (includes cal Describe Re	drology Indicators: cators (minimum of e Water (A1) ater Table (A2) on (A3) larks (B1) ht Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial y Vegetated Concav vations: er Present? Present?	Imagery (B7) /e Surface (B8 Yes _X No Yes _Y No Yes _Y No	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Rod Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): <u>0 Inclus</u> Depth (inches): <u>0 Inclus</u>	Surface Soil Cracks (B6) Crayfish Burrows (B10) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) (C6) FAC-Neutral Test (D5) Vetland Hydrology Present? Yes No
IYDROLO Wetland Hye Primary Indic Surface High Wa Saturatio Water M Sedimer Drift Deg Algal Ma Iron Deg Inundati Sparsely Field Obser Surface Wat Vater Table Saturation P (includes cal Describe Re	drology Indicators: cators (minimum of e Water (A1) ater Table (A2) on (A3) larks (B1) ht Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial y Vegetated Concav vations: er Present? Present?	Imagery (B7) /e Surface (B8 Yes _X No Yes _Y No Yes _Y No	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Rod Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): <u>0 Inclus</u> Depth (inches): <u>0 Inclus</u>	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2) FAC-Neutral Test (D5)

Project/Site: Portof	Catoosa		City/County	R	aws	_ Sampling Date:
Applicant/Owner: $P_{\delta}(+ > +$			onyroddiny	·	state: OK	_ Sampling Point:
Investigator(s): <u>T. Casken</u>	4		Section To	washia Rai		
Landform (hillslope, terrace, etc.):	1.000500	n hart	oc slope	ocal relief ((concave convey none	· (M.COVE.
Stope (%): <u>3.7</u> , Lat:		,	Long:		(conceve, convex, none	
Soil Map Unit Name:	· · · ·					ication: <u>PEM</u>
Are climatic / hydrologic conditions on	the site tunical for thi					
Are Vegetation, Soil, or						present? Yes No _
Are Vegetation, Soil, or					eded, explain any answ	,
SUMMARY OF FINDINGS - A	Attach site map	showing	samplin	g point le	ocations, transect	s, important features,
Hydrophytic Vegetation Present?	Yes <u></u> N					
Hydric Soil Present?	Yes 🗡 N		i i	e Sampled		
Wetland Hydrology Present?	Yes <u>¥</u> N	lo	with	in a Wetlan	id? Yes_ <u>X</u>	No
Remarks:		. '				
					······	
VEGETATION - Use scientific	names of plants.					
Tree Stratum (Plot size:)		Dominant Species?		Dominance Test wor	•
1. Salix hiara		10	N	FAU	Number of Dominant That Are OBL, FACW	
2. Ulmus appents		20	400	FAC		
3. Acer Sacchard		20	-	FAC	Total Number of Domi Species Across All Str	
4. Acer negunda	ส	20	~	FACU		
5. V					Percent of Dominant S That Are OBL, FACW	
Sapling/Shrub Stratum (Plot size:		_35	= Total Cov	er		
Sapling/Shrub Stratum (Plot size: _)			F1-50	Prevalence Index wo	
······································			<u> </u>	FACE	Total % Cover of:	
2					OBL species	
3			. ———			
4 5.					FAC species	$0 x_{4=} 40$
J	· .		= Total Cov			$\frac{\sqrt{1}}{2} \times 5 = 0$
Herb Stratum (Plot size:)		- 10(8) COV	ei	Column Totals:	
1. <u>Symphoroca</u>	rpas edei	culate	10	FAcu		
2. polygonum penns	glvanicum		<u>30 Y</u>	FAC	Prevalence Inde	x = B/A = <u> </u>
3	*	<u>.</u>			Hydrophytic Vegetat	
4	<u>.</u>					Hydrophytic Vegetation
5	<u> </u>	<u> </u>			2 - Dominance Te	
6		<u> </u>			<u> </u>	
7	·				4 - Morphological data in Remark	Adaptations ¹ (Provide support ks or on a separate sheet)
8	· · · ·	_,				ophytic Vegetation ¹ (Explain)
9		,	······	•		· · · · · · · · · · · · · · · · · · ·
10					¹ Indicators of hydric so	il and wetland hydrology mus
Woody Vine Stratum (Plot size:)	<u> </u>	= Total Cov	er	be present, unless dis	turbed or problematic.
1. Smilao 40	· · · · · · · · · · · · · · · · · · ·	10	<u></u>	-	Hydrophytic	
					Vegetation	••
2			· · · · · · · · · · · · · · · · · · ·			es_XNo

. F

Midwest Region - Version 2.0

2

SOIL

~'

. د

Profile Des Depth	Matrix			x Features		-				
(inches)	Color (moist)		Color (moist)	%	Type ¹	Loc ²	Texture		Remarks	
0-16	104R 3/2	80	251R3/4	20	٩	PL	Sandy	Ina in		
~								(
									-	
		<u></u> .			. <u></u>	<u> </u>	·	<u> </u>		
•i				· · · · · · · · · · · · · · · · · · ·						
							<u></u>	·		
+	<u></u>				<u></u>		.			
¹ Type: C=C	oncentration, D=Depl	etion, RM=	Reduced Matrix, MS	S=Masked	Sand Gra	ins.	² Location	n: PL=Pore	Lining, M=Mat	rix.
Hydric Soil	Indicators:						Indicators	for Proble	matic Hydric	Soil s ³:
Histoso	I (A1)		Sandy C	Sleyed Mat	rix (S4)		Coast	Prairie Red	ox (A16)	
Histic E	pipedon (A2)		🗹 Sandy F	Redox (S5)	1		Dark S	Surface (S7)	l .	
Black H	listic (A3)		Stripped	l Matrix (Sl	6)		Iron-N	langanese l	Masses (F12)	
Hydroge	en Sulfide (A4)		Loamy I	Mucky Mine	eral (F1)		Very S	Shallow Dar	k Surface (TF1	2)
	d Layers (A5)			Gleyed Ma			Other	(Explain in	Remarks)	
	uck (A10)	•		d Matrix (F						
	d Below Dark Surface	e (A11)		Dark Surfac			۹.			
	ark Surface (A12)			d Dark Sur					vtic vegetation	
	Mucky Mineral (S1)		Redox [Depression	is (F8)				must be prese	int,
	ucky Peat or Peat (S3	9 <u> </u>				•	unless	s disturbed o	or problematic.	
	Layer (if observed):									
Type:	none						Hydric Soi	Present?	Yes 🞾	No
								1 10301111	163 / -	····
Depth (in Remarks:							<u>1</u>			
Remarks:										
Remarks:	DGY									
Remarks: 1YDROLC Wetland Hy	DGY /drology Indicators:	ne is requir	red: check all that an	niv)			Second	arv Indicato	rs (minimum of	two required)
Remarks: IYDROLC Wetland Hy Primary Ind	DGY rdrology Indicators: icators (minimum of o	ne is requir			se /BQ)				rs (minimum of	two required)
Remarks: IYDROLC Wetland Hy Primary Indi Surface	DGY /drology Indicators: icators (minimum of o water (A1)	ne is requir	Water-Stai	ined Leave	• •		Sur	face Soil Cr	acks (B6)	two required)
Remarks: IYDROLC Wetland Hy Primary Indi Surface High W	DGY rdrology Indicators: icators (minimum of o e Water (A1) later Table (A2)	ne is requir	Water-Stat Aquatic Fa	ined Leave iuna (B13)			Sur Dra	face Soil Cr inage Patte	acks (B6) rns (B10)	
Remarks: IYDROLC Wetland Hy Primary Ind Surface High W Saturat	OGY vdrology Indicators: icators (minimum of o e Water (A1) later Table (A2) ion (A3)	ne is requir	Water-Stai Aquatic Fa True Aqua	ined Leave iuna (B13) tic Plants ((B14)		Sur Dra Dry	face Soil Cr inage Patte -Season Wa	acks (B6) rns (B10) ater Table (C2)	
Remarks: IYDROLC Wetland Hy Primary Ind Surface High W Saturat Water N	OGY Indicators: icators (minimum of o Water (A1) iater Table (A2) ion (A3) Marks (B1)	ne is requir	Water-Stai Aquatic Fa True Aqua Hydrogen	ined Leave iuna (B13) tic Plants (Sulfide Od	(B14) lor (C1)		Sur Dra Dry Cra	face Soil Cr inage Patte -Season Wi yfish Burrov	acks (B6) rns (B10) ater Table (C2) vs (C8)	
Remarks: IYDROLC Wetland Hy Primary Indi Surface High W Saturat Sedime	DGY vdrology Indicators: icators (minimum of o e Water (A1) ater Table (A2) ion (A3) Marks (B1) ent Deposits (B2)	ne is requir	Water-Stai Aquatic Fa True Aqua Hydrogen Oxidized F	ined Leave iuna (B13) tic Plants (Sulfide Od Rhizospher	(B14) lor (C1) les on Livi		Sur Dra Dry Cra (C3) Sat	face Soil Cr inage Patte -Season Wa yfish Burrov uration Visil	acks (B6) rns (B10) ater Table (C2) vs (C8) ble on Aerial In	agery (C9)
Remarks: IYDROLO Wetland Hy Primary Indi Surface High W Saturat Sedime Sedime Drift De	OGY vdrology Indicators: icators (minimum of o Water (A1) ater Table (A2) ion (A3) vdarks (B1) ent Deposits (B2) eposits (B3)	ne is requir	Water-Stai Aquatic Fa True Aqua True Aqua Hydrogen Oxidized F Presence	ined Leave iuna (B13) tic Plants (Sulfide Od Rhizospher of Reduced	(B14) lor (C1) es on Livi d Iron (C4)	Sur Dra Dry Cra (C3) Sat Stu	face Soil Cr inage Patte -Season Wi yfish Burrov uration Visil nted or Stre	acks (B6) rns (B10) ater Table (C2) vs (C8) ole on Aerial In ssed Plants (D	agery (C9)
Remarks: IYDROLC Wetland Hy Primary Indi Surface High W Saturat Sedime Sedime Algal M	DGY vdrology Indicators: icators (minimum of o water (A1) ater Table (A2) ion (A3) Marks (B1) ent Deposits (B2) eposits (B3) lat or Crust (B4)	ne is requir	Water-Stai Aquatic Fa True Aqua True Aqua Hydrogen Oxidized F Presence Recent Iro	ined Leave luna (B13) tic Plants (Sulfide Od Rhizospher of Reduced n Reductio	(B14) lor (C1) es on Livi d Iron (C4 on in Tilled)	Sur Dra Dry Cra (C3) Sat Stu Stu	face Soil Cr inage Patte -Season Wa yfish Burrov uration Visil nted or Stre omorphic Po	acks (B6) rns (B10) ater Table (C2) vs (C8) ble on Aerial In ssed Plants (D vsition (D2)	agery (C9)
Remarks: IYDROLC Wetland Hy Primary Indi Surface High W Saturat Water N Sedime Valer M Algal M Iron De	DGY rdrology Indicators: icators (minimum of o Water (A1) ater Table (A2) ion (A3) Marks (B1) ent Deposits (B2) eposits (B3) lat or Crust (B4) iposits (B5)	- -	Water-Stai Aquatic Fa True Aqua True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck	ined Leave luna (B13) tic Plants (Sulfide Od Rhizospher of Reduced n Reductio Surface (((B14) lor (C1) es on Livi d Iron (C4 on in Tilleo C7))	Sur Dra Dry Cra (C3) Sat Stu Stu	face Soil Cr inage Patte -Season Wi yfish Burrov uration Visil nted or Stre	acks (B6) rns (B10) ater Table (C2) vs (C8) ble on Aerial In ssed Plants (D vsition (D2)	agery (C9)
Remarks: IYDROLC Wetland Hy Primary Indi Surface High W Saturat Water N Sedime Valer N Algal M Iron De Inundai	DGY rdrology Indicators: icators (minimum of o water (A1) ater Table (A2) ion (A3) Marks (B1) ent Deposits (B2) eposits (B3) lat or Crust (B4) iposits (B5) lion Visible on Aerial I	magery (B	Water-Stai Aquatic Fa Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck 7) Gauge or	ined Leave iuna (B13) tic Plants (Sulfide Od Rhizospher of Reduced n Reductio Surface (Well Data ((B14) lor (C1) es on Livi d Iron (C4 on in Tilled C7) (D9))	Sur Dra Dry Cra (C3) Sat Stu Stu	face Soil Cr inage Patte -Season Wa yfish Burrov uration Visil nted or Stre omorphic Po	acks (B6) rns (B10) ater Table (C2) vs (C8) ble on Aerial In ssed Plants (D vsition (D2)	agery (C9)
Remarks: IYDROLC Wetland Hy Primary Indi Surface High W Saturat Water H Sedime Vater M Algal M Iron De Inundal Sparse	DGY rdrology Indicators: icators (minimum of o water (A1) ater Table (A2) ion (A3) Marks (B1) ent Deposits (B2) eposits (B3) lat or Crust (B4) eposits (B5) lion Visible on Aerial I ly Vegetated Concave	magery (B	Water-Stai Aquatic Fa Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck 7) Gauge or	ined Leave iuna (B13) tic Plants (Sulfide Od Rhizospher of Reduced n Reductio Surface (Well Data ((B14) lor (C1) es on Livi d Iron (C4 on in Tilled C7) (D9))	Sur Dra Dry Cra (C3) Sat Stu Stu	face Soil Cr inage Patte -Season Wa yfish Burrov uration Visil nted or Stre omorphic Po	acks (B6) rns (B10) ater Table (C2) vs (C8) ble on Aerial In ssed Plants (D vsition (D2)	agery (C9)
Remarks: IYDROLC Wetland Hy Primary Ind Surface High W Saturat Water N Sedime Drift De Algal M Iron De Inundai Sparse Field Obse	DGY rdrology Indicators: icators (minimum of o Water (A1) ater Table (A2) ion (A3) Marks (B1) ant Deposits (B2) eposits (B3) lat or Crust (B4) eposits (B5) lion Visible on Aerial I ly Vegetated Concave rvations:	magery (B) Surface (I	Water-Stai Aquatic Fa Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck 7) Gauge or 88) Other (Exp	ined Leave buna (B13) tic Plants (Sulfide Od Rhizospher of Reduced n Reductic Surface ((Well Data blain in Rei	(B14) lor (C1) es on Livi d Iron (C4 on in Tilled C7) (D9) marks)	i) 1 Soils (C6	Sur Dra Dry Cra (C3) Sat Stu Stu	face Soil Cr inage Patte -Season Wa yfish Burrov uration Visil nted or Stre omorphic Po	acks (B6) rns (B10) ater Table (C2) vs (C8) ble on Aerial In ssed Plants (D vsition (D2)	agery (C9)
Remarks: IYDROLC Wetland Hy Primary Ind — Surface — High W — Saturat — Vater M — Sedime — Orift De — Algal M — Iron De — Inundai — Sparse Field Obse Surface Wa	DGY vdrology Indicators: icators (minimum of o e Water (A1) ater Table (A2) ion (A3) Marks (B1) ent Deposits (B2) eposits (B3) lat or Crust (B4) posits (B5) lion Visible on Aerial I ly Vegetated Concave rvations: ter Present?	magery (B) Surface (I	Water-Stai Aquatic Fa Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck 7) Gauge or 1 38) Other (Exp No Depth (in	ined Leave tic Plants (Sulfide Od Rhizospher of Reduced n Reductio Surface ((Well Data (Dain in Ren	(B14) lor (C1) es on Livi d Iron (C4 on in Tilled C7) (D9) marks)) 1 Soils (C6	Sur Dra Dry Cra (C3) Sat Stu Stu	face Soil Cr inage Patte -Season Wa yfish Burrov uration Visil nted or Stre omorphic Po	acks (B6) rns (B10) ater Table (C2) vs (C8) ble on Aerial In ssed Plants (D vsition (D2)	agery (C9)
Remarks: IYDROLC Wetland Hy Primary Ind Surface High W Saturat Water N Sedime Drift De Algal M Iron De Inundai Sparse Field Obse	DGY vdrology Indicators: icators (minimum of o Water (A1) ater Table (A2) ion (A3) Marks (B1) ent Deposits (B2) eposits (B3) lat or Crust (B4) eposits (B5) lion Visible on Aerial I ly Vegetated Concave rvations: ter Present? Y	magery (B) Surface (I es I es I	Water-Stai Aquatic Fa Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck O Gauge or S8) Other (Exp No Depth (in- No Depth (in-	ined Leave itic Plants (Sulfide Od Rhizospher of Reduced n Reductic Surface (0 Well Data blain in Reductic ches):	(B14) lor (C1) res on Livi d Iron (C4 on in Tilled C7) (D9) marks)) 1 Soils (C6	Sur Dra Dry Cra (C3) Sat Stu) Geu	face Soil Cr inage Patte -Season Wa yfish Burrov uration Visil nted or Stre comorphic Po C-Neutral Te	acks (B6) rns (B10) ater Table (C2) vs (C8) ble on Aerial Im ssed Plants (D sition (D2) est (D5)	agery (C9)
Remarks: IYDROLO Wetland Hy Primary Indi Surface High W Saturat Vater N Sedime Vater N Algal M Iron De Algal M Field Obse Surface Wa Water Table Saturation N	DGY vdrology Indicators: icators (minimum of o Water (A1) ater Table (A2) ion (A3) Marks (B1) ent Deposits (B2) eposits (B3) lat or Crust (B4) eposits (B5) lion Visible on Aerial I ly Vegetated Concave rvations: ther Present? Present? Y	magery (B) Surface (I es I es I	Water-Stai Aquatic Fa Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck 7) Gauge or 1 38) Other (Exp No Depth (in	ined Leave itic Plants (Sulfide Od Rhizospher of Reduced n Reductic Surface (0 Well Data blain in Reductic ches):	(B14) lor (C1) res on Livi d Iron (C4 on in Tilled C7) (D9) marks)) 1 Soils (C6	Sur Dra Dry Cra (C3) Sat Stu Stu	face Soil Cr inage Patte -Season Wa yfish Burrov uration Visil nted or Stre comorphic Po C-Neutral Te	acks (B6) rns (B10) ater Table (C2) vs (C8) ble on Aerial Im ssed Plants (D sition (D2) est (D5)	agery (C9)
Remarks: IYDROLC Wetland Hy Primary Indi Surface High W Saturat Water N Sedime Drift De Algal M Iron De Inundal Sparse Field Obse Surface Wa Water Table Saturation I (includes ca	DGY rdrology Indicators: icators (minimum of o Water (A1) ater Table (A2) ion (A3) Marks (B1) ent Deposits (B2) eposits (B3) lat or Crust (B4) eposits (B5) lion Visible on Aerial I ly Vegetated Concave rvations: ther Present? Present? Y Present? Y	magery (B) Surface (I es I es I	Water-Stai Aquatic Fa Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck 7) Gauge or 1 88) Other (Exp No Depth (in No Depth (in	ined Leave ined Leave (B13) tic Plants (Sulfide Od Rhizospher of Reduced n Reductic Surface ((Well Data (blain in Rei ches): ches):	(B14) lor (C1) es on Livi d Iron (C4 on in Tilled C7) (D9) marks)) 1 Soils (C6	(C3) Ger (C3) Stu (C3) Stu (C3) Stu (C3) FAC	face Soil Cr inage Patte -Season Wa yfish Burrov uration Visil nted or Stre comorphic Po C-Neutral Te	acks (B6) rns (B10) ater Table (C2) vs (C8) ble on Aerial Im ssed Plants (D sition (D2) est (D5)	agery (C9)
Remarks: IYDROLC Wetland Hy Primary Indi Surface High W Saturat Water N Sedime Drift De Algal M Iron De Inundal Sparse Field Obse Surface Wa Water Table Saturation I (includes ca	DGY vdrology Indicators: icators (minimum of o Water (A1) ater Table (A2) ion (A3) Marks (B1) ent Deposits (B2) eposits (B3) lat or Crust (B4) eposits (B5) lion Visible on Aerial I ly Vegetated Concave rvations: ther Present? Present? Y	magery (B) Surface (I es I es I	Water-Stai Aquatic Fa Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck 7) Gauge or 1 88) Other (Exp No Depth (in No Depth (in	ined Leave ined Leave (B13) tic Plants (Sulfide Od Rhizospher of Reduced n Reductic Surface ((Well Data (blain in Rei ches): ches):	(B14) lor (C1) es on Livi d Iron (C4 on in Tilled C7) (D9) marks)) 1 Soils (C6	(C3) Ger (C3) Stu (C3) Stu (C3) Stu (C3) FAC	face Soil Cr inage Patte -Season Wa yfish Burrov uration Visil nted or Stre comorphic Po C-Neutral Te	acks (B6) rns (B10) ater Table (C2) vs (C8) ble on Aerial Im ssed Plants (D sition (D2) est (D5)	agery (C9)
Remarks: IYDROLC Wetland Hy Primary Indi Surface High W Saturat Water N Algal M Iron De Algal M Sparse Field Obse Surface Wa Water Table Saturation I (includes ca Describe Re	DGY rdrology Indicators: icators (minimum of o Water (A1) ater Table (A2) ion (A3) Marks (B1) ent Deposits (B2) eposits (B3) lat or Crust (B4) eposits (B5) lion Visible on Aerial I ly Vegetated Concave rvations: ther Present? Present? Y Present? Y	magery (B) Surface (I es I es I	Water-Stai Aquatic Fa Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck 7) Gauge or 1 88) Other (Exp No Depth (in No Depth (in	ined Leave ined Leave (B13) tic Plants (Sulfide Od Rhizospher of Reduced n Reductic Surface ((Well Data (blain in Rei ches): ches):	(B14) lor (C1) es on Livi d Iron (C4 on in Tilled C7) (D9) marks)) 1 Soils (C6	(C3) Ger (C3) Stu (C3) Stu (C3) Stu (C3) FAC	face Soil Cr inage Patte -Season Wa yfish Burrov uration Visil nted or Stre comorphic Po C-Neutral Te	acks (B6) rns (B10) ater Table (C2) vs (C8) ble on Aerial Im ssed Plants (D sition (D2) est (D5)	agery (C9)
Remarks: IYDROLC Wetland Hy Primary Indi Surface High W Saturat Water N Sedime Drift De Algal M Iron De Inundal Sparse Field Obse Surface Wa Water Table Saturation I (includes ca	DGY rdrology Indicators: icators (minimum of o Water (A1) ater Table (A2) ion (A3) Marks (B1) ent Deposits (B2) eposits (B3) lat or Crust (B4) eposits (B5) lion Visible on Aerial I ly Vegetated Concave rvations: ther Present? Present? Y Present? Y	magery (B) Surface (I es I es I	Water-Stai Aquatic Fa Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck 7) Gauge or 1 88) Other (Exp No Depth (in No Depth (in	ined Leave ined Leave (B13) tic Plants (Sulfide Od Rhizospher of Reduced n Reductic Surface ((Well Data (blain in Rei ches): ches):	(B14) lor (C1) es on Livi d Iron (C4 on in Tilled C7) (D9) marks)) 1 Soils (C6	(C3) Ger (C3) Stu (C3) Stu (C3) Stu (C3) FAC	face Soil Cr inage Patte -Season Wa yfish Burrov uration Visil nted or Stre comorphic Po C-Neutral Te	acks (B6) rns (B10) ater Table (C2) vs (C8) ble on Aerial Im ssed Plants (D sition (D2) est (D5)	agery (C9)
Remarks: IYDROLC Wetland Hy Primary Indi Surface High W Saturat Water N Algal M Iron De Algal M Sparse Field Obse Surface Wa Water Table Saturation I (includes ca Describe Re	DGY rdrology Indicators: icators (minimum of o Water (A1) ater Table (A2) ion (A3) Marks (B1) ent Deposits (B2) eposits (B3) lat or Crust (B4) eposits (B5) lion Visible on Aerial I ly Vegetated Concave rvations: ther Present? Present? Y Present? Y	magery (B) Surface (es es	Water-Stai Aquatic Fa Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck 7) Gauge or 1 88) Other (Exp No Depth (in No Depth (in	ined Leave ined Leave (B13) tic Plants (Sulfide Od Rhizospher of Reduced n Reductic Surface ((Well Data (blain in Rei ches): ches):	(B14) lor (C1) es on Livi d Iron (C4 on in Tilled C7) (D9) marks)) 1 Soils (C6	(C3) Ger (C3) Stu (C3) Stu (C3) Stu (C3) FAC	face Soil Cr inage Patte -Season Wa yfish Burrov uration Visil nted or Stre comorphic Po C-Neutral Te	acks (B6) rns (B10) ater Table (C2) vs (C8) ble on Aerial Im ssed Plants (D sition (D2) est (D5)	agery (C9)
Remarks: IYDROLC Wetland Hy Primary Indi Surface High W Saturat Water N Sedime Algal M Iron De Algal M Sparse Field Obse Surface Wa Water Table Saturation I (includes cs Describe Re	DGY rdrology Indicators: icators (minimum of o Water (A1) ater Table (A2) ion (A3) Marks (B1) ent Deposits (B2) eposits (B3) lat or Crust (B4) eposits (B5) lion Visible on Aerial I ly Vegetated Concave rvations: ther Present? Present? Y Present? Y	magery (B) Surface (es es	Water-Stai Aquatic Fa Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck 7) Gauge or 1 88) Other (Exp No Depth (in No Depth (in	ined Leave ined Leave (B13) tic Plants (Sulfide Od Rhizospher of Reduced n Reductic Surface ((Well Data (blain in Rei ches): ches):	(B14) lor (C1) es on Livi d Iron (C4 on in Tilled C7) (D9) marks)) 1 Soils (C6	(C3) Ger (C3) Stu (C3) Stu (C3) Stu (C3) FAC	face Soil Cr inage Patte -Season Wa yfish Burrov uration Visil nted or Stre comorphic Po C-Neutral Te	acks (B6) rns (B10) ater Table (C2) vs (C8) ble on Aerial Im ssed Plants (D sition (D2) est (D5)	agery (C9)

US Army Corps of Engineers

wet3

WETLAND DET	ERMINATION	I DATA FORM	I – Midwest Region
Project/Site: POC East	City/	County: Kr	AM Co Sampling Date: 12/8
Applicant/Owner: PCC,	0.00	<u></u>	State: Sampling Point:
	Sec	tion. Township, Ra	
Landform (hillslope, terrace, etc.):			
Slope (%): 0-3 Lat:			Datum: <u>NAD\$3</u>
	s silty cl	au loam	NWI classification: PFOTA
Are climatic / hydrologic conditions on the site typical for	1	1	
Are Vegetation, Soli, or Hydrology			"Normal Circumstances" present? Yes No
Are Vegetation, Soil, or Hydrology			eeded, explain any answers in Remarks.)
			· · · ·
SUMMARY OF FINDINGS - Attach site ma	p snowing sai	mpling point l	ocations, transects, Important features, etc.
Hydrophytic Vegetation Present? Yes	No	Is the Sampled	ι Δreg
Hydric Soil Present? Yes	No	within a Wetlan	
	No	<u> </u>	
Remarks:	d on a	NIM CA	(n C= ()
Denn	aona	a since the	111 104.11
VEGETATION - Use scientific names of plan	s.		
		minant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:) 1. Salix nikyg	<u>% Cover Sp</u> 30	ecies? <u>Status</u> Çpcvi	Number of Dominant Species
2. Platanus occidentalis	20	FAL	That Are OBL, FACW, or FAC: (A)
3. Arer Sarcharum	SUN	FAC	Total Number of Dominant Species Across All Strata: 3 (B)
4. Acer nervido	- 15 -	FACW	Species Across All Strata: (B)
5. Ulmus american	3	<u>Foc</u>	Percent of Dominant Species 100 (A/B)
	<u>83</u> = To	otal Cover	
Sapling/Shrub Stratum (Plot size:)	5	FACW	Prevalence Index worksheet:
1. <u>Acer Nezvado</u>	+	······	Total % Cover of: Multiply by: OBL species D x1 = _0
3			FACW species $55 \times 2 \times 110$
4			FAC species
5			FACU species x4 =0
	5 = To	otal Cover	UPL species 0 , $x_5 = \overline{0}$
Herb Stratum (Plot size:) 1. Chasman thy m latafalium	40	Fac	Column Totals:(4)314(B)
2. Chesmannyon latatality		FAC	Prevalence Index = B/A = 2/9
3. Elymous Virginitus		FAC	Hydrophytic Vegetation Indicators:
4			Dominance Test Is >50%
5			Prevalence index is ≾3.0 ¹
6			Morphological Adaptations ¹ (Provide supporting
7			data in Remarks or on a separate sheet)
8			Problematic Hydrophytic Vegetation ¹ (Explain)
9			¹ Indicators of hydric soli and wetland hydrology must
10			be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:)	<u> </u>	201000	
1	<u> </u>		Hydrophytic
2			Vegetation Present? Yes No
	·=To	olal Cover	
Remarks: (Include photo numbers here or on a separat	e sheet.)		

. .

		to the depti	h needed to docur	nent the i x Feature		confirm the	absence	of indicator	s.)	
(inches)			Color (moist)						Remarks	narks
0-3	10% 3/4	65	10YK 2/1				ing Saw			
****	· · ·	· <u> </u>	10 YR 4/4	34	•, , ,,,,	M.				
1	JOYR 54	80	104R 3/2	20		M		•		
9-16	IOYR SH	69 93	2.51 - 3/4	2		<u> </u>		Organic i	natorial	
		·	101× 4/1	·		<u>N</u>		<u> </u>		
		· ·	10YR 31	1		<u>M</u> _				
Hydric Soll I Histosol	(A1)	ielion, RM=I	Sandy G	Sleyed Ma	intx (S4)		ndicators Coast	for Problem Prairie Redox		
Histic Ep Black Hi	olpedon (A2) stic (A3)		🖌 Sandy F Siripped	Redox (S5 I Matrix (S				anganese Ma Explain in Ré		
Stratified 2 cm Mu Depleted	n Sulfide (A4) J Layers (A5) Ick (A10) J Below Dark Surface	e (A11)	Loamy (Deplete Redox I	Mucky Mir Gleyed Ma d Matrix (i Dark Surfa	atrix (F2) F3) Ice (F6)					
	ark Surface (A12) łucky Mineral (S1)			d Dark Su Depression	rface (F7) ns (F8)	3			ic vegetation lust be prese	
5 cm Mu	icky Peat or Peat (S3	3)					uniess	disturbed or	problematic.	
Restrictive I	Layer (if observed):									
Restrictive I Type: Depih (ind	Layer (if observed): 		: laxer at	bottom	of snimple		ydric Soil	Present?	Yes	No
Restrictive I Type: Depth (ind Remarks:	Layer (if observed): ches): Jay K		layer at	bottom	of snimple		ydric Soil	Present?	Yes	No
Restrictive I Type: Depth (ind Remarks:	Layer (if observed): ches): Jay K GY	organic	: layer at	bottom	of snample		/drīc Soli	Present?	Yes	No
Restrictive I Type: Depth (Ind Remarks: Remarks:	Layer (if observed): ches): Jay K	organia			of snimple				Yes	
Restrictive I Type: Depth (ind Remarks: IYDROLO Wetland Hyd Primary Indk	Layer (if observed): 	organia		viv)			Seconda		(minimum of	
Restrictive I Type: Depth (ind Remarks: Primary Indk Surface High Wa	GY GY GY Grology Indicators: water (A1) ater Table (A2)	organia	ed: check all that ap	ipiy)	es (B9)		Seconda Surf	inv Indicators	(minimum of ks (B6)	
Restrictive I Type: Depth (ind Remarks: YDROLO Wetland Hyd Primary Indig Surface High Wa Saturatio	GY GY drology Indicators: zators (minimum of o Water (A1) ater Table (A2) on (A3)	organia	ed: check ali that ap Water-Stai Aquatic Fø True Aqua	ined Leavi una (B13) tic Plants	es (B9)) (814)		Seconda Surf Drai Dry-	ny Indicators ace Soll Crac nage Pattern Season Wate	(minimum of ks (B6) s (B10) or Table (C2)	
Restrictive I Type: Depth (ind Remarks: YDROLO Wetland Hyd Primary Indix Surface High Wa Saturatic Water M	GY GY Grology Indicators: Sators (minimum of o Water (A1) ater Table (A2) on (A3) Tarks (B1)	organia	ed: check <u>ali that ap</u> Water-Stal Aquatic Fa True Aqua Hydrogen	ined Leavi una (B13) tic Plants Sulfide Ox	es (B9)) (B14) dor (C1)	<u></u>	Seconda Surf Drai Dry- Cray	ary Indicators ace Soll Crac nage Pattern Season Wate fish Burrows	(minimum of ks (B6) s (B10) or Table (C2) (C8)	wo required)
Restrictive I Type: Depth (ind Remarks: Remarks: Remarks: Remarks: Remarks: Remarks: Sufface High Wa Saturatic Water M Sedimer	GY GY Grology Indicators: sators (minimum of o Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2)	organia	ed: check ali that ap Water-Stai Aquatic Fa True Aqua Hydrogen Oxidized F	ined Leav una (B13) tic Plants Sulfide Ox Rhizosphe	es (B9)) (B14) dor (C1) res on Llving	<u></u>	Seconda Suff Drai Dry- Cray Satu	ry Indicators ace Soll Crac nage Pattern Season Wate fish Burrows iration Visible	(minimum of ks (B6) s (B10) er Table (C2) (C8) o on Aertal Ima	wo required)
Restrictive I Type: Depth (ind Remarks: Remarks: IYDROLO Wetland Hyd Primary Indk Watland Hyd Saturatic Saturatic Water M Sedimer Y Drift Deg	GY drology Indicators: cators (minimum of o Water (A1) ater Table (A2) on (A3) Tarks (B1) nt Deposits (B2) posits (B3)	organia	ed: check ali that ap Water-Stai Aquatic Fa True Aqua Hydrogen Oxidized F Presence of	oply) ined Leave una (B13) tic Plants Sulfide Oc Rhizosphe of Reduce	es (B9)) (B14) Jor (C1) res on Llving id iron (C4)	Rools (C3)	Seconda Surf Drai Dry- Cray Satu Stur	ny Indicators ace Soll Craco nage Pattern Season Wate fish Burrows iration Visible ited or Stress	(minimum of ks (B6) s (B10) or Table (C2) (C8) o n Aertal Ima ed Plants (D1	wo required)
Restrictive I Type: Depth (ind Remarks: IYDROLO Wetland Hyd Primary Indk Water M Saturatic Water M Sedimer Z Drift Deg Algal Ma	GY GY Grology Indicators: sators (minimum of o Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2)	organia	ed: check ali that ap Water-Stai Aquatic Fa True Aqua Hydrogen Oxidized F Presence of	poly) Ined Leave Iuna (B13) tic Plants Sulfide Oc Rhizosphe of Reduce n Reduce	es (B9)) (B14) dor (C1) res on Living id Iron (C4) on in Tilied So	Rools (C3)	Seconda Surf Drai Dry- Cray Satu Stur Geo	ry Indicators ace Soll Crac nage Pattern Season Wate fish Burrows iration Visible	(minimum of ks (B6) s (B10) or Table (C2) (C8) o on Aerial ima ed Plants (D1 tion (D2)	wo required)
Restrictive I Type: Depth (ind Remarks: YDROLO Wetland Hyd Primary Indik Surface High Wa Saturatik Saturatik Saturatik Saturatik Drift Deg Algal Ma Iron Deg Inundati	GY GY GY drology Indicators: cators (minimum of o Water (A1) ater Table (A2) on (A3) larks (B1) ni Deposits (B2) posits (B3) at or Crust (B4) cosits (B5) on Visible on Aerial I	oroani	ed: check all that ap Water-Stal Aquatic Fa True Aqua Hydrogen Oxtdized F Presence fo Recent Iro Thin Muck) Gauge or 1	ined Leave luna (B13) tic Plants Sulfide Oc Rhizosphe of Reduce n Reducti Surface (Well Data	es (B9)) (B14) dor (C1) res on Llving id iron (C4) on in Tilled So (C7) (D9)	Rools (C3)	Seconda Surf Drai Dry- Cray Satu Stur Geo	ny Indicators ace Soll Crac nage Pattern Season Wate fish Burrows iration Visible ited or Stress morphic Posl	(minimum of ks (B6) s (B10) or Table (C2) (C8) o on Aerial ima ed Plants (D1 tion (D2)	wo required)
Restrictive I Type: Depth (inc Remarks: Primary Indix Surface High Wa Saturatic Water M Sectmer J Drift Deg Inundati Sparseh	GY drology Indicators: cators (minimum of o Water (A1) ater Table (A2) on (A3) Tarks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) cosits (B5) on Visible on Aerial I y Vegetated Concave	oroani	ed: check all that ap Water-Stal Aquatic Fa True Aqua Hydrogen Oxidized F Presence for Recent Iro Thin Muck) Gauge or 1	ined Leave luna (B13) tic Plants Sulfide Oc Rhizosphe of Reduce n Reducti Surface (Well Data	es (B9)) (B14) dor (C1) res on Llving id iron (C4) on in Tilled So (C7) (D9)	Rools (C3)	Seconda Surf Drai Dry- Cray Satu Stur Geo	ny Indicators ace Soll Crac nage Pattern Season Wate fish Burrows iration Visible ited or Stress morphic Posl	(minimum of ks (B6) s (B10) or Table (C2) (C8) o on Aerial ima ed Plants (D1 tion (D2)	wo required)
Restrictive I Type: Depth (ind Remarks: Remarks: Remarks: Primary Indik Water M Saturatik Water M Saturatik Water M Sedimer Algal Ma Viron Dep Inundati	GY GY GY drology Indicators: ators (minimum of o Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial I y Vegetated Concave vations:	oy og hin ne is require imagery (B7 e Surface (B	ed: check all that ap Water-Stal Aquatic Fa True Aqua Hydrogen Oxtdized F Presence fo Recent Iro Thin Muck) Gauge or 1	ined Leavi luna (B13) tic Plants Sulfide Oc Rhizosphe of Reduce in Reducti Surface (Well Data Nain in Re	es (B9)) (B14) dor (C1) res on Living id Iron (C4) on in Tilled So (C7) (D9) marks)	Rools (C3)	Seconda Surf Drai Dry- Cray Satu Stur Geo	ny Indicators ace Soll Crac nage Pattern Season Wate fish Burrows iration Visible ited or Stress morphic Posl	(minimum of ks (B6) s (B10) or Table (C2) (C8) o on Aerial ima ed Plants (D1 tion (D2)	wo required)
Restrictive I Type: Depth (ind Remarks: YDROLO Wetland Hyd Primary Indk Watland Hyd Primary Indk Saturatio Saturatio Water M Sedimer Valer M Sedimer Algal Me Inon Dep Inundati Sparseh Field Obser	GY GY GY Grology Indicators: ators (minimum of o Water (A1) ater Table (A2) on (A3) Iarks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) cosits (B5) on Visible on Aerial I y Vegetated Concave vations: er Present? Y	oy og hin ne is require imagery (B7 e Surface (B	ed: check ali that ap Water-Stal Aqualic Fa True Aqua Hydrogen Oxidized F Presence of Recent Iro Thin Muck) Gauge or 1 8) Other (Exp	ined Leave tuna (B13) tic Plants Sulfide Oc Rhizosphe of Reduce n Reducti Surface (Well Data Main in Re ches):	es (B9)) (B14) dor (C1) res on Living id Iron (C4) on in Tilled So (C7) (D9) marks)	Rools (C3)	Seconda Surf Drai Dry- Cray Satu Stur Geo	ny Indicators ace Soll Crac nage Pattern Season Wate fish Burrows iration Visible ited or Stress morphic Posl	(minimum of ks (B6) s (B10) or Table (C2) (C8) o on Aerial ima ed Plants (D1 tion (D2)	wo required)
Restrictive I Type: Depth (ind Remarks: YDROLO Wetland Hyu Primary Indk Saturatic Surface High Wa Saturatic Water M Sedimer Z Drift Deg Algal Ma Saturatic Sedimer Surface Water Surface Water Surface Water Saturation P	GY GY GY Grology Indicators: ators (minimum of o Water (A1) ater Table (A2) on (A3) Iarks (B1) ni Deposits (B2) posits (B3) at or Crust (B4) cosits (B5) on Visible on Aerial I y Vegetated Concave vations: er Present? Y Present? Y	orojalinio ne is regular imagery (B7 e Surface (B	ed: check ali that ap Water-Stal Aquatic Fa True Aqua Hydrogen Oxidized F Presence of Recent Iro Thin Muck) Gauge of 1 8) Other (Exp to Depth (ini- to Depth (ini-	poly) ined Leave iuna (B13) tic Plants Sulfide Oc Rhizosphe of Reduce n Reducti Surface (Well Data Sain in Re ches): ches):	es (B9)) (B14) dor (C1) res on Llving id Iron (C4) on In Tilled So (C7) (D9) marks)	Rools (C3)	Seconda Surf Drai Dry- Cray Salu Stur Geo FAC	ny Indicators ace Soll Crac nage Pattern Season Wate fish Burrows iration Visible ited or Stress morphic Posl	(minimum of ks (B6) s (B10) or Table (C2) (C8) o on Aertal Ima ed Plants (D1 tion (D2) t (D5)	wo required)
Restrictive I Type: Depth (inc Remarks: YDROLO Wetland Hyd Primary Indk Surface High Wa Surface High Wa Surface High Wa Surface Aigal Ma Surface Ion Dep Nagal Ma Surface Wat Sparseh Field Obser Surface Wat Water Table Saturation P (includes ca)	Layer (if observed): Ches): (Jay K GY drology Indicators: cators (minimum of o Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial I y Vegetated Concave vations: er Present? Y Present? Y	0Y 0,4 h in ne is require imagery (B7 e Surface (B ies h ies h	ed: check ali that ap Water-Stal Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck) Gauge or N 8) Other (Exp lo Depth (in to Depth (in to Depth (in	ined Leavi luna (B13) tic Plants Sulfide Oc Rhizosphe of Reduce n Reducti Surface (Well Data Nain in Re ches): ches):	es (B9)) (B14) for (C1) res on Living id Iron (C4) on in Tilied So (C7) (D9) marks)	Roots (C3) oils (C6) Wetland I	Seconda Surf Drai Dry- Cray Satu Satu Satu Second FAC	ny Indicators ace Soll Craco nage Pattern Season Wate fish Burrows iration Visible led or Stress morphic Posi -Neutral Test	(minimum of ks (B6) s (B10) or Table (C2) (C8) o on Aertal Ima ed Plants (D1 tion (D2) t (D5)	wo required)

1

.

	ort of	- Caboca	۴.,	City/Country	Rome	c Co	Sampling Date: 12/8
Project/Sile:+ Applicant/Owner:	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	Davberry					Sampling Point: VPL Ca
							7 TOONRISE
		•	· ·			-	
							a):
							Datum:
•	-						fication:
Are climatic / hydrolo	-						
Are Vegetation	- •						"present? Yes No
Are Vegetation							vers in Remarks.)
SUMMARY OF F	INDINGS -	Attach site m	ap showing	sampling	point locat	ons, transect	ts, Important features, etc.
Hydrophytic Vegeta		Yes Yes		Is the	Sampled Area		
Hydric Soil Present Wetland Hydrology		Yes		within	a Wetland?	Yes	No
Remarks:	ag	field					
VEGETATION -	Use scientif	ic names of pla	nts.				
Tree Stratum (Plot	elzot			Dominant I Species?	Cloture	ninance Test wo	
1						ber of Dominant	Species /, or FAC: (A)
2						I Number of Dom	
3					1 1000	cies Across Ali St	
4			······ ·····		Peri	ent of Dominant	Species
5				· ·	Tha	Are OBL, FACW	
Sapling/Shrub Strat	um (Plot size:)	= Total Cove	r Pre	valence Index wo	orksheet:
1						Total % Cover of	: Multiply by:
2						•	x1=
3							x2=
		· · · · · · · · · · · · · · · · · · ·		· ·		species	×3= ×4=
5					<u> </u>	• •	×5=
Herb Stratum (Plo	t size:		<u></u>				(A) (B)
1							
2							ex = B/A =
3						Dominance Test	tion Indicators: ls >50%
4						Prevalence Index	
5 8						Morphological Ac	Japtations ¹ (Provide supporting
7						data in Rema	rks or on a separate sheet)
8						Problematic Hydr	rophylic Vegelation ¹ (Explain)
9						icators of huddo e	coil and wetland hydrology must
10					be r	resent, unless di	sturbed or problematic.
Woody Vine Stratu	m (Ploi size [.]	۱		_ = Total Cove	et 📃	5	
1		/				rophytic	
2					Veç	etation sent?	/es No
1				_ = Total Cove	1 1 4 9		

Midwest Region -- Interim Version

1475			Midwaet Persion	(W 1
_			-	
Project/Site: Part of Ca	<u>2-0059</u> ci	ty/County: <u>(ata</u>)	059 Sampli	
Applicant/Owner:	, , , , , , , , , , , , , , , , ,		State: 0 K Sampli	ng Point: Wellaud
Investigator(s): J. Caskey P	<u>, Ready</u> se			1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
Landform (hillstope, terrace, etc.):e	rrace	Local relief (co	ncave, convex, none):	naque
Slope (%): 3"/o Lat:	Lo	ong;	Datum:	
Soil Map Unit Name:	•	~ ~	NWI classification:	
Are climatic / hydrologic conditions on th				
Are Vegetation , Soil , or t		0		
· <u> </u>	lydrology naturally proble		ed, explain any answers in Rei	
SUMMARY OF FINDINGS - At	· · · · · ·	ampling point loc	ations, transects, impo	rtant features, etc.
Hydrophytic Vegetation Present?		Is the Sampled Ar	· /	
Hydric Soil Present? Wetland Hydrology Present?	Yes 🔗 No 🔿	within a Wetland?	Yes No	. <u> </u>
Remarks:				
·				
VEGETATION - Use scientific n	ames of plants.			
Tree Stratum (Plot size:		Canada O Chatria	ominance Test worksheet:	
1. Black Willow, Sa		The second secon	umber of Dominant Species hat Are OBL, FACW, or FAC:	(A)
		BAC FAC	otal Number of Dominant	2
3. Hackberry C.		EAC s	pecies Across All Strata:	(B)
4		P	ercent of Dominant Species	kon
5			hat Are OBL, FACW, or FAC:	(A/B)
Sapling/Shrub Stratum (Plot size:		Total Cover	revalence index worksheet:	
1	······		Total % Cover of:	Multiply by:
2		ACCULATION OF THE OWNER		$\frac{1}{2} = \frac{0}{30}$
3 4.			· · · · · · · · · · · · · · · · · · ·	3 = 183
5				4=
	0=	Total Cover U		5=
Herb Stratum (Plot size:) 	Yes Fac		A) <u>213</u> (B)
2. Solidead Sigan	+ La 20		Prevalence Index ≠ B/A =	2.8
3. green brian, 51	milan spop. 10		ydrophytic Vegetation Indic	ators:
4			1 - Rapid Test for Hydrophy	-
5			$2 \cdot \text{Dominance Test is } >50^{\circ}$ 3 - Prevalence Index is ≤ 3 .	
6			V 3 - Prevalence Index is \$3. 4 - Morphological Adaptatio	
7. 8.	· · · · ·		data in Remarks or on a	separate sheet)
9.			Problematic Hydrophytic V	egetation ¹ (Explain)
10			ndicators of hydric soil and we	tland hydrology must
Woody Vine Stratum (Plot size:	<u>• </u>		e present, unless disturbed or	
1. averting Tox Rad-		INO FAC	lydrophytic	
2. Vitis Sp.		NO FAC	lamatation - /	
. •		Total Cover	resent? Yes	_ No <u>O</u>
Remarks: (Include photo numbers her	re or on a separate sheet.)	tear burn	Lachan au	avda 7
Upland point -	-veg cedar, sili	-Jo, Durinu,	na giana , - ju	
	On Slape RI	cill pad	Shil LOWMONT HO	nes bious
				st Region - Version 2.0
US Army Corps of Engineers	¥			

SOIL

- · ·

bed and

Profile Desc	cription: (Describe	to the depth				or confirm	the absence of indica	tors.)
Depth	Matrix			Features			 .	_ .
(inches)	Color (moist)	<u>%</u>	Color (moist)		Type ¹		Texture	Remarks
0-16	10YR 3/2	<u>. 75 ´</u>	<u> 1.5 YR 4/6</u>	25	C	M	Silty Isam	
							· · ·	
							<u> </u>	
		·	· · · · · · · · · · · · · · · · · · ·	, <u> </u>				
		• <u>• • • • • • • • • • • • • • • • • •</u>	_ <u></u>					****
						8.8878387		
17			dunnel Materia MC	mblooked		<u>Electrony</u>	21 + + - K	
Hydric Soil	oncentration, D=Dep		souceu mauix, ma	-Maskeu	Sanu Gr	auns.	² Location: PL=Pon Indicators for Problem	ematic Hydric Soils ³ :
Histosol			C Sandu G	lound Mo	triv (CA)	1		-
	pipedon (A2)			leyed Ma edox (S5	• •		Coast Prairie Re	
	istic (A3)			Matrix (S	-		Iron-Manganese	•
	en Sulfide (A4)		Control 1	lucky Min				rk Surface (TF12)
	d Layers (A5)			Bleyed Ma			Other (Explain in	
	uck (A10)			i Matrix (F			and a second furthermore the	· · · · · · · · · · · · · · · · · · ·
	d Below Dark Surfac	e (A11)		ark Surfa				
$I = I \cdot I$	ark Surface (A12)	·	Depleted	i Dark Su	rface (F7))	³ Indicators of hydrop	hytic vegetation and
	lucky Mineral (S1)	•	🔲 Redox D	epression	15 (F8)			y must be present,
	icky Peat or Peat (S						unless disturbed	or problematic.
Restrictive	Layer (if observed):							
Type:	none							Yes No
Depth (in	ches):		_				Hydric Soil Present?	Yes No ()
Remarks:	·····						ļ	
			•					
HYDROLO	GY							
	drology Indicators:							
-	cators (minimum of o		· check all that an	nivi		÷	Secondary Indicate	ors (minimum of two required)
		ne is lequired			(80)	· · ·		
	Water (A1)		Water-Stain		• •			
	ater Table (A2)		Aquatic Fa				Drainage Patte	
Saturati								Ater Table (C2)
	larks (B1)						Crayfish Burro	
	nt Deposits (B2)	•	Oxidized R				<u> </u>	ible on Aerial Imagery (C9)
	posits (B3)		Presence of		•	•	Stunted or Str	
· ·	at or Crust (B4)					d Solis (C6		
	posits (B5)				•		L FAC-Neutral T	est (D5)
	ion Visible on Aerial I							
	y Vegetated Concavi	e Surface (B8)	Other (Exp	lain in Re	marks)			
Field Obser		\cap					۰.	
Surface Wat			Depth (inc					
Water Table	Present? Y		Depth (inc					
Saturation P		'es 🔔 No	Depth (inc	:hes):		Wetla	and Hydrology Present	? Yes 💇 No 🔘
Describe Re	pillary fringe) corded Data (stream	dauge monit	ring well seriel r	hotos pr	avioue ine	nections)	if available:	<i>r</i>
	Sector Date forom	Sacho Hundin	anna mont aonar h			, pooralis), i		
Remarks:					· · · · ·			
indina.								
			•					
			,					
L								

US Army Corps of Engineers

Ċ,	Wetland 2
	WETLAND DETERMINATION DATA FORM – Midwest Region (\mathcal{W}^2)
	Project/Site: Part of Cataosq City/County: Cataosq Sampling Date: 11 20 11 Applicant/Owner: Port of Catoosq State: OK Sampling Point: Multiplicand 2002) Investigator(s): J. Caspey, P. Ready Section, Township, Range:
	Hydrophytic Vegetation Present? Yes No Is the Sampled Area Hydric Soil Present? Yes No Is the Sampled Area Wetland Hydrology Present? Yes No Is the Sampled Area Remarks: No No No
	VEGETATION – Use scientific names of plants. Absolute Species? Status 1. Absolute Species? Dominant Indicator Species? Dominant Species That Are OBL, FACW, or FAC: 2 2. K sylel degrading 10 10 10 10 10 3. 10 10 10 10 10 10 4. 10 10 10 10 10 10 5. 10 10 10 10 10 10 10 1. 10 10 10 10 10 10 10 10 2. K sylel degrad transmitted of the system 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10<

4				······································
5				Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)
· · · · · ·	0	= Total Cover	·	, , ,
Sapling/Shrub Stratum (Plot size:)			ן	Prevalence Index worksheet:
1. Breelder, acerneguado	10		Acw	Total % Cover of: Multiply by:
2.				OBL species $20 \times 1 = 20$
3.				FACW species 20 x 2 = 40
4				FAC species $10 \times 3 = 30$
5.	<u>.</u>		<u> 292 S SI</u>	FACU species 30 x 4 = 120
· 0		= Total Cover	г	UPL species \underbrace{O} x 5 = \underbrace{O}
Herb Stratum (Plot size:)	10	KATAN CARGO ES		Column Totals: 0.80 (A) 210 (B)
1. Ssleardo gigantea	- 0-		<u>eac</u>	Prevalence Index = $B/A = 2b$
2. Caned Lupeling	30		0.30	
3. Chickweed Stalaria medi	<u>930</u>		KCU-	Hydrophytic Vegetation Indicators:
4.				1 - Rapid Test for Hydrophytic Vegetation
5			1.57	2 - Dominance Test is >50%
6				U 3 - Prevalence Index is ≤3.0 ¹
7				4 - Morphological Adaptations ¹ (Provide supporting
8				data in Remarks or on a separate sheet)
9			<u>*****</u>	Problematic Hydrophytic Vegetation ¹ (Explain)
10.	· ·		12.64	
· · ·	0	= Total Cover		¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Woody Vine Stratum (Plot size:)				
1				Hydrophytic
2.				Vegetation

0

2 - oak, maple poisming

= Total Cover

US Army Corps of Engineers

agland

Remarks: (Include photo numbers here or on a separate sheet.)

2.

Midwest Region - Version 2.0

Yes 🕺 No 🔿

Present?

fin on apale, sale dego, gra, burmuda grans

2,0

۶ SOIL

~

(inches)	Matrix			< Features			
	Color (moist)		olor (moist)	<u>%</u> <u>Type</u> ¹		Texture	Remarks
9-16	10.5 YR 2/1	00				Clay loan	
	¢ ·			203530		· (
		·	-				· · · · · ·
	· · · · · · · · · · · · · · · · · · ·						
				100			
·							
. <u> </u>	······		·····			·	
		·					· · · · · · · · · · · · · · · · · · ·
and the second sec	oncentration, D=Depi	etion, RM=Red	uced Matrix, MS	=Masked Sand Gr	ains.		ore Lining, M=Matrix.
Hydric Soil I	indicators:		_			Indicators for Pro	oblematic Hydric Soils ³ :
Histosol	(A1)		Sandy G	leyed Matrix (S4)		Coast Prairie	. ,
	oipedon (A2)		= .	tedox (S5)		Dark Surface	
Black Hi	• •			Matrix (S6)			se Masses (F12)
	n Sulfide (A4)			lucky Mineral (F1)			Dark Surface (TF12)
	Layers (A5)			Bleyed Matrix (F2)		Other (Explain	i în Remarks)
2 cm Mu				d Matrix (F3)			
	Below Dark Surface	e (A11)		ark Surface (F6)		3)	
	ark Surface (A12)			Dark Surface (F7)		ophytic vegetation and
	lucky Mineral (S1)			epressions (F8)			logy must be present, ed or problematic.
	icky Peat or Peat (S3					uniess distuit	eo or problematic.
	ayer (if observed):		-				
25 C	none	÷				Hydric Soil Preser	nt? Yes 🚫 No 🔘
Depth (inc	ches):						
Remarks:						•	
							•
l .							
HYDROLO	GV						· · · · · · · · · · · · · · · · · · ·
HIDKOLO	GI .						1
							· .
-	drology Indicators:						· .
Primary India	cators (minimum of o	ne is required: c	check all that ap	DİY)		Secondary Indic	ators (minimum of two required)
-	cators (minimum of o	ne is required: c		<u>ply)</u> ned Leaves (B9)		_	ators (minimum of two required) I Cracks (B6)
Primary Indic	cators (minimum of o	ne is required: c		ned Leaves (B9)		Surface So	
Primary Indic	cators (minimum of or Water (A1) ater Table (A2)	ne is required: c	Water-Stai	ned Leaves (B9)		Surface Sol	I Cracks (B6)
Primary Indic Surface	cators (minimum of or Water (A1) ater Table (A2)	ne is required: c	Water-Stai	ned Leaves (B9) una (B13)		Surface Sol	ll Cracks (B6) atterns (B10) 9 Water Table (C2)
Primary Indic Surface	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1)	ne is required: c	Water-Stai	ned Leaves (B9) una (B13) tic Plants (B14)	ving Roots	Surface Sol Drainage P Dry-Seasor	ll Cracks (B6) atterns (B10) 9 Water Table (C2)
Primary Indic Surface	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2)	ne is required: c	Water-Stai Aquatic Fa True Aquai Hydrogen S Oxidized R	ned Leaves (B9) una (B13) tic Plants (B14) Sulfide Odor (C1)	-	Surface So Drainage P Dry-Seasor Crayfish Bu (C3) Saturation V	ll Cracks (B6) atterns (B10) Water Table (C2) mows (C8)
Primary Indic Surface	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3)	ne is required: c	Water-Stai Aquatic Fa Aquatic Fa True Aquat Hydrogen S Oxidized R Presence of	ned Leaves (B9) una (B13) tic Plants (B14) Sulfide Odor (C1) thizospheres on Liv of Reduced Iron (C	4)	Surface So Drainage P Dry-Seasor Crayfish Bu Crayfish Bu Saturation V Stunted or S	I Cracks (B6) atterns (B10) water Table (C2) rrows (C8) /isible on Aerial Imagery (C9) Stressed Plants (D1)
Primary Indic Surface	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4)	ne is required: c	Water-Stai Aquatic Fa True Aquatic Hydrogen Oxidized R Presence of Recent Iror	ned Leaves (B9) una (B13) tic Plants (B14) Sulfide Odor (C1) thizospheres on Liv of Reduced Iron (C n Reduction in Tille	4)	Surface So	I Cracks (B6) atterns (B10) o Water Table (C2) rrows (C8) Visible on Aerial Imagery (C9) Stressed Plants (D1) c Position (D2)
Primary Indic Surface	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5)	- 	Water-Stai Aquatic Fa True Aquatic Hydrogen Oxidized R Presence of Recent Iron Thin Muck	ned Leaves (B9) una (B13) tic Plants (B14) Sulfide Odor (C1) thizospheres on Liv of Reduced Iron (C n Reduction in Tille Surface (C7)	4)	Surface So	I Cracks (B6) atterns (B10) water Table (C2) rrows (C8) /isible on Aerial Imagery (C9) Stressed Plants (D1)
Primary Indic Surface	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial II	magery (B7)	Water-Stai Aquatic Fa Aquatic Fa True Aquat Hydrogen S Oxidized R Presence G Recent Iron Thin Muck Gauge or N	ned Leaves (B9) una (B13) tic Plants (B14) Sulfide Odor (C1) thizospheres on Liv of Reduced Iron (C n Reduction in Tille Surface (C7) Well Data (D9)	4)	Surface So	I Cracks (B6) atterns (B10) o Water Table (C2) rrows (C8) Visible on Aerial Imagery (C9) Stressed Plants (D1) c Position (D2)
Primary India Surface	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial II y Vegetated Concave	magery (B7)	Water-Stai Aquatic Fa Aquatic Fa True Aquat Hydrogen S Oxidized R Presence G Recent Iron Thin Muck Gauge or N	ned Leaves (B9) una (B13) tic Plants (B14) Sulfide Odor (C1) thizospheres on Liv of Reduced Iron (C n Reduction in Tille Surface (C7)	4)	Surface So	I Cracks (B6) atterns (B10) o Water Table (C2) rrows (C8) Visible on Aerial Imagery (C9) Stressed Plants (D1) c Position (D2)
Primary India Surface	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial II y Vegetated Concave vations:	magery (B7) e Surface (B8)	Water-Stai	ned Leaves (B9) una (B13) tic Plants (B14) Sulfide Odor (C1) thizospheres on Lix of Reduced Iron (C n Reduction in Tille Surface (C7) Well Data (D9) Itain in Remarks)	4) ed Soils (Ce	Surface So	I Cracks (B6) atterns (B10) o Water Table (C2) rrows (C8) Visible on Aerial Imagery (C9) Stressed Plants (D1) c Position (D2)
Primary India Surface High Wa Saturatio Water M Sedimer Drift Dep Algat Ma tron Dep Inundati Sparsely Field Obser Surface Wat	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial In y Vegetated Concave vations: ater Present?	magery (B7) Surface (B8) es No	Water-Stai	ned Leaves (B9) una (B13) tic Plants (B14) Sulfide Odor (C1) thizospheres on Liv of Reduced Iron (C n Reduction in Tille Surface (C7) Well Data (D9) Main in Remarks)	4) ed Soils (C6	Surface So	I Cracks (B6) atterns (B10) o Water Table (C2) rrows (C8) Visible on Aerial Imagery (C9) Stressed Plants (D1) c Position (D2)
Primary India Surface	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial In y Vegetated Concave vations: ater Present?	magery (B7) e Surface (B8)	Water-Stai	ned Leaves (B9) una (B13) tic Plants (B14) Sulfide Odor (C1) thizospheres on Lix of Reduced Iron (C n Reduction in Tille Surface (C7) Well Data (D9) Itain in Remarks)	4) ed Soils (Ce	Surface Sol Trainage P Drainage P Crayfish Bu (C3) Stunted or 3 Sol FAC-Neutral	Il Cracks (B6) atterns (B10) a Water Table (C2) irrows (C8) Visible on Aerial Imagery (C9) Stressed Plants (D1) c Position (D2) al Test (D5)
Primary India Surface HighyWa Saturatio Water M Sedimer Drift Dep Algal Ma Iron Dep Inundatii Sparsely Field Obser Surface Wate Water Table Saturation P	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial II y Vegetated Concave vations: er Present? Present? Y	magery (B7) Surface (B8) es No	Water-Stai	ned Leaves (B9) una (B13) tic Plants (B14) Sulfide Odor (C1) thizospheres on Liv of Reduced Iron (C n Reduction in Tille Surface (C7) Well Data (D9) blain in Remarks) ches): <u>(, in ch</u> ches): <u>() in ch</u>	4) ed Soils (Ce	Surface So	Il Cracks (B6) atterns (B10) o Water Table (C2) irrows (C8) Visible on Aerial Imagery (C9) Stressed Plants (D1) c Position (D2) al Test (D5)
Primary India Surface High Wa Saturatio Water M Sedimer Drift Dep Algat Ma Iron Dep Inundati Sparsely Field Obser Surface Wate Water Table Saturation P (includes ca	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial II y Vegetated Concave vations: ter Present? Ye Present? Ye pillary fringe)	magery (B7) e Surface (B8) es No es No es No No	Water-Stai	ned Leaves (B9) una (B13) tic Plants (B14) Sulfide Odor (C1) thizospheres on Lix of Reduced Iron (C n Reduction in Tille Surface (C7) Well Data (D9) Main in Remarks) Ches): <u>(0 incl</u> iches): <u>0 incl</u> iches): <u>0 incl</u> iches):	4) ed Soils (Ce <u>h</u> weti	Surface Sol Trainage P Drainage P Dry-Seasor Crayfish Bu (C3) Saturation N Stunted or 3 FAC-Neutra And Hydrology Prese	Il Cracks (B6) atterns (B10) o Water Table (C2) irrows (C8) Visible on Aerial Imagery (C9) Stressed Plants (D1) c Position (D2) al Test (D5)
Primary India Surface High Wa Saturatio Water M Sedimer Drift Dep Algat Ma Iron Dep Inundati Sparsely Field Obser Surface Wate Water Table Saturation P (includes ca	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial II y Vegetated Concave vations: er Present? Present? Y	magery (B7) e Surface (B8) es No es No es No No	Water-Stai	ned Leaves (B9) una (B13) tic Plants (B14) Sulfide Odor (C1) thizospheres on Lix of Reduced Iron (C n Reduction in Tille Surface (C7) Well Data (D9) Main in Remarks) Ches): <u>(0 incl</u> iches): <u>0 incl</u> iches): <u>0 incl</u> iches):	4) ed Soils (Ce <u>h</u> weti	Surface Sol Trainage P Drainage P Dry-Seasor Crayfish Bu (C3) Saturation N Stunted or 3 FAC-Neutra And Hydrology Prese	Il Cracks (B6) atterns (B10) o Water Table (C2) irrows (C8) Visible on Aerial Imagery (C9) Stressed Plants (D1) c Position (D2) al Test (D5)
Primary Indic Surface High Wa Saturatic Water M Sedimer Drift Dep Algal Ma Iron Dep Inundati Sparsely Field Obser Surface Wat Water Table Saturation P (includes can Describe Re	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial II y Vegetated Concave vations: ter Present? Ye Present? Ye pillary fringe)	magery (B7) e Surface (B8) es No es No es No No	Water-Stai	ned Leaves (B9) una (B13) tic Plants (B14) Sulfide Odor (C1) thizospheres on Lix of Reduced Iron (C n Reduction in Tille Surface (C7) Well Data (D9) Main in Remarks) Ches): <u>(0 incl</u> iches): <u>0 incl</u> iches): <u>0 incl</u> iches):	4) ed Soils (Ce <u>h</u> weti	Surface Sol Trainage P Drainage P Dry-Seasor Crayfish Bu (C3) Saturation N Stunted or 3 Example Comparison FAC-Neutra and Hydrology Prese	Il Cracks (B6) atterns (B10) o Water Table (C2) irrows (C8) Visible on Aerial Imagery (C9) Stressed Plants (D1) c Position (D2) al Test (D5)
Primary India Surface High Wa Saturatio Water M Sedimer Drift Dep Algat Ma Iron Dep Inundati Sparsely Field Obser Surface Wate Water Table Saturation P (includes ca	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial II y Vegetated Concave vations: ter Present? Ye Present? Ye pillary fringe)	magery (B7) e Surface (B8) es No es No es No No	Water-Stai	ned Leaves (B9) una (B13) tic Plants (B14) Sulfide Odor (C1) thizospheres on Lix of Reduced Iron (C n Reduction in Tille Surface (C7) Well Data (D9) Main in Remarks) Ches): <u>(0 incl</u> iches): <u>0 incl</u> iches): <u>0 incl</u> iches):	4) ed Soils (Ce <u>h</u> weti	Surface Sol Trainage P Drainage P Dry-Seasor Crayfish Bu (C3) Saturation N Stunted or 3 Example Comparison FAC-Neutra and Hydrology Prese	Il Cracks (B6) atterns (B10) o Water Table (C2) irrows (C8) Visible on Aerial Imagery (C9) Stressed Plants (D1) c Position (D2) al Test (D5)
Primary Indic Surface High Wa Saturatic Water M Sedimer Drift Dep Algal Ma Iron Dep Inundati Sparsely Field Obser Surface Wat Water Table Saturation P (includes can Describe Re	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial II y Vegetated Concave vations: ter Present? Ye Present? Ye pillary fringe)	magery (B7) e Surface (B8) es No es No es No No	Water-Stai	ned Leaves (B9) una (B13) tic Plants (B14) Sulfide Odor (C1) thizospheres on Lix of Reduced Iron (C n Reduction in Tille Surface (C7) Well Data (D9) Main in Remarks) Ches): <u>(0 incl</u> iches): <u>0 incl</u> iches): <u>0 incl</u> iches):	4) ed Soils (Ce <u>h</u> weti	Surface Sol Trainage P Drainage P Dry-Seasor Crayfish Bu (C3) Saturation N Stunted or 3 Example Comparison FAC-Neutra and Hydrology Prese	Il Cracks (B6) atterns (B10) o Water Table (C2) irrows (C8) Visible on Aerial Imagery (C9) Stressed Plants (D1) c Position (D2) al Test (D5)
Primary Indic Surface High Wa Saturatic Water M Sedimer Drift Dep Algal Ma Iron Dep Inundati Sparsely Field Obser Surface Wat Water Table Saturation P (includes can Describe Re	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial II y Vegetated Concave vations: ter Present? Ye Present? Ye pillary fringe)	magery (B7) e Surface (B8) es No es No es No No	Water-Stai	ned Leaves (B9) una (B13) tic Plants (B14) Sulfide Odor (C1) thizospheres on Lix of Reduced Iron (C n Reduction in Tille Surface (C7) Well Data (D9) Main in Remarks) Ches): <u>(0 incl</u> iches): <u>(0 incl</u> iches): <u>(0 incl</u> iches): <u>(0 incliches)</u>	4) ed Soils (Ce <u>h</u> weti	Surface Sol Trainage P Drainage P Dry-Seasor Crayfish Bu (C3) Saturation N Stunted or 3 Example Comparison FAC-Neutra and Hydrology Prese	Il Cracks (B6) atterns (B10) o Water Table (C2) irrows (C8) Visible on Aerial Imagery (C9) Stressed Plants (D1) c Position (D2) al Test (D5)
Primary Indic Surface High Wa Saturatic Water M Sedimer Drift Dep Algal Ma Iron Dep Inundati Sparsely Field Obser Surface Wat Water Table Saturation P (includes can Describe Re	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial II y Vegetated Concave vations: ter Present? Ye Present? Ye pillary fringe)	magery (B7) e Surface (B8) es No es No es No No	Water-Stai	ned Leaves (B9) una (B13) tic Plants (B14) Sulfide Odor (C1) thizospheres on Lix of Reduced Iron (C n Reduction in Tille Surface (C7) Well Data (D9) Main in Remarks) Ches): <u>(0 incl</u> iches): <u>(0 incl</u> iches): <u>(0 incl</u> iches): <u>(0 incliches)</u>	4) ed Soils (Ce <u>h</u> weti	Surface Sol Trainage P Drainage P Dry-Seasor Crayfish Bu (C3) Saturation N Stunted or 3 Example Comparison FAC-Neutra and Hydrology Prese	Il Cracks (B6) atterns (B10) o Water Table (C2) irrows (C8) Visible on Aerial Imagery (C9) Stressed Plants (D1) c Position (D2) al Test (D5)
Primary Indic Surface High Va Saturatio Water M Sedimer Drift Dep Algal Ma Iron Dep Inuncati Sparsely Field Obser Surface Wate Water Table Saturation P (includes can Describe Re	cators (minimum of or Water (A1) ater Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial II y Vegetated Concave vations: ter Present? Ye Present? Ye pillary fringe)	magery (B7) e Surface (B8) es No es No es No No	Water-Stai	ned Leaves (B9) una (B13) tic Plants (B14) Sulfide Odor (C1) thizospheres on Lix of Reduced Iron (C n Reduction in Tille Surface (C7) Well Data (D9) Main in Remarks) Ches): <u>(0 incl</u> iches): <u>(0 incl</u> iches): <u>(0 incl</u> iches): <u>(0 incliches)</u>	4) ed Soils (Ce <u>h</u> weti	Surface Sol Trainage P Drainage P Dry-Seasor Crayfish Bu (C3) Saturation N Stunted or 3 Example Comparison FAC-Neutra and Hydrology Prese	Il Cracks (B6) atterns (B10) o Water Table (C2) irrows (C8) Visible on Aerial Imagery (C9) Stressed Plants (D1) c Position (D2) al Test (D5)

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

US Army Corps of Engineers

Midwest Region - Version 2.0

Sampling Point: _

Wetland 3

	WETLAND DETERMINAT	TION DATA FORM	– Midwest Region	
roject/Site: Port of			toocal Sampling Date: Wat	
plicant/Owner: Port 0-	+ratoosa		State: Sampling Point:	30/1
vestigator(s): J. Caska		Section, Township, Rar	- nge:	
ndform (hillslope, terrace, etc.):	· ·	Local relief (concave, convex, none):	ne?
ope (%): <u>3%</u> Lat:			Datum:	
il Map Unit Name:			NWI classification:	
e climatic / hydrologic conditions o		ear? Yes 🙆 No !	O (If no, explain in Remarks.)	
e Vegetation 🔀, Soil 🔀,			Normal Circumstances" present? Yes O I	vo 🔘
	or Hydrology naturally pr		eded, explain any answers in Remarks.) H_{CQF}	
	Attach site man showing		ocations, transects, important feature	
Hydrophytic Vegetation Present? Hydric Soil Present?	Yes <u>()</u> No <u>()</u> Yes <u>()</u> No <u>()</u>	Is the Sampled	Area	
Wetland Hydrology Present?	Yes OP No O	within a Wetlan	id? Yes 🙆 No 🔘	
Remarks:		I		
EGETATION - Use scientifi	c names of plants.		· · · · · · · · · · · · · · · · · · ·	
Tree Okaluma (DI-1-1-)	Absolute		Dominance Test worksheet:	
Tree Stratum (Plot size: 1. <u>Silinter in a stre</u>	Acersockhanner (Species? Status	Number of Dominant Species3	(A)
2. black willow				_ (~)
A MILLA GOVERNE P	Saut Midia - Con		Total Number of Dominant3	(B)
·*·	· · · · · · · · · · · · · · · · · · ·			
δ. · ·			Percent of Dominant Species That Are OBL, FACW, or FAC:	(A/B)
· · · · · · · · · · · · · · · · · · ·	0	_ = Total Cover		
Sapling/Shrub Stratum (Plot size:			Prevalence index worksheet:	
1 maple, Acer	Saccharinum [0			
<u>}</u>			OBL species (0) $x1 = (0)$ FACW species (20) $x2 = (40)$	
			FAC species $26 \times 3 = 75$	
			FACU species O x4 = O	_
	0	= Total Cover	UPL species O x 5 = O	÷
Herb Stratum (Plot size:		-	Column Totals: 045 (A) 115	(B)
1. <u>~~q</u>			21	
2			Prevalence Index = B/A =6	
3			Hydrophytic Vegetation Indicators:	,
4			1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50%	
5			$1 - 3$ - Prevalence Index is $\leq 3.0^1$	
5			4 - Morphological Adaptations ¹ (Provide su	pporting
7 3			data in Remarks or on a separate sheet	l)
6			Problematic Hydrophytic Vegetation ¹ (Expl	ain)
0.				
· · · · · · · · · · · · · · · · · · ·	0	= Total Cover	¹ Indicators of hydric soil and wetland hydrology be present, unless disturbed or problematic.	must
Noody Vine Stratum (Plot size: _)	-	be present, unless disarbed of problematic.	
1. grape Vit	<u>15 5p 5</u>	_ LINOL LAZ	Hydrophytic	
	Gnilax Gn X		Present? Yes No No	
2. mela bria		= Total Cover		

٠¢

Midwest Region - Version 2.0

OIL							Sampling Point:
Profile Des	cription: (Describe	to the depti	needed to docu	nent the indicator	or confirm	n the absence o	f indicators.)
Depth	Matrix			x Features	,		·
(inches)	Color (moist)	<u>%</u>	Color (moist)	<u>% Type</u> ¹	Loc ²	Texture	Remarks
0-16	10.5 4R3	190%	5424/6	10	Ms	Silty/oa	n
······		4 - L'ann ie	~			carefre -	
		<u> </u>					·
	•						
		+					
	·					<u> </u>	
	·						
ype: C=C	Concentration, D=De	ofetion, RM=F	Reduced Matrix, M	S=Masked Sand Gr	ains.	² Location:	PL=Pore Lining, M=Matrix.
	Indicators:						or Problematic Hydric Soils ³ :
] Histoso	I (A1)		🔲 Sandy (Gleyed Matrix (S4)		🔲 Coast Pi	rairie Redox (A16)
	pipedon (A2)			Redox (S5)		🔲 Dark Su	rface (S7)
] Black H	listic (A3)		Strippe	d Matrix (S6)			nganese Masses (F12)
] Hydroge	en Sulfide (A4)		🔲 Loamy	Mucky Mineral (F1)		🔲 Very Sh	allow Dark Surface (TF12)
	ed Layers (A5)			Gleyed Matrix (F2)			xplain in Remarks)
] 2 cm M	luck (A10)		🗹 Deplete	d Matrix (F3)			
Deplete	ed Below Dark Surface	æ (A11)	🔲 Redox I	Dark Surface (F6)			
] Thick D	ark Surface (A12)		🔲 Deplete	d Dark Surface (F7))	³ Indicators of	of hydrophytic vegetation and
	Mucky Mineral (S1)		🔲 Redox I	Depressions (F8)			hydrology must be present,
	ucky Peat or Peat (S					unless d	isturbed or problematic.
strictive	Layer (if observed)	:					
Туре:	writ		<u> </u>				
Depth (in	nches):	•		· .		Hydric Soil P	resent? Yes 🖉 No Օ
							· · · · ·
DROLC							
•	vdrology Indicators						
	icators (minimum of	one is require		•			v Indicators (minimum of two required
_	e Water (A1)		🛛 🕍 Water-Sta	ined Leaves (B9)		Surfa	ce Soil Cracks (B6)
	later Table (A2)		Aquatic Fa	auna (B13)		Drain:	age Patterns (B10)
	tion (A3)		=	itic Plants (B14)			eason Water Table (C2)
Water N	Marks (B1)		🔲 Hydrogen	Sulfide Odor (C1)		🔲 Crayfi	sh Burrows (C8)
Sedime	ent Deposits (B2)		Oxidized I	Rhizospheres on Liv	ing Roots	(C3) 🛄 Saturi	ation Visible on Aerial Imagery (C9)
] Drift De	eposits (B3)		🗖 Presence	of Reduced Iron (C4	4)	Stunte	ed or Stressed Plants (D1)
] Algal M	lat or Crust (B4)		Recent Irc	on Reduction in Tille	d Soils (Ce	5) 📈 Geom	orphic Position (D2)
	eposits (B5)			Surface (C7)	-	· / =	Neutral Test (D5)
=	tion Visible on Aerial	Imagery (B7)		Well Data (D9)			
	ly Vegetated Concav			plain in Remarks)			
eid Obse					T		······································
	iter Present?	Yes 🕑 N	o 🔘 Depth (in	(ches): $12^{(l)}$			
		CX.		ches): 10 °			
aturation F			o Depth (in			and Hydrology	Present? Yes 🚫 No 🔘
	apillary fringe)	103 <u></u>	v Depui (in	unca)	- ***	ana nyarology	, resenti 163 <u>/ _ NU</u>
	ecorded Data (strear	n gauge, mor	hitoring well, aerial	photos, previous ins	pections),	if available:	
			·				
emarks:							· · ·

J

,	JHARAUII	ERIZATION	1	1	T	1		· · · · · · · · · · · · · · · · · · ·		l
GPS ID:	E	<u>\</u>			Date:	1130	10			
Country	SW MD	BV HA	WD MJ		 Investigat		· · · · ·	-		
County:	BL LO		LI PO	1			[· · · ·		
·			· · · ·		<u> </u>	Carnen	RRIG	der		`
				. <u> </u>		,				
Circle Wat	terbody/Sti	ream Type	: <u>EPHE</u>	MERAL*		MITTENT	PERE	NNIAL		
Approvim	ate denth (of running	water**		 ·	Stream Fo	orms Prese	nt		
ubhrovitie	i I		IN/A				Pool(s)		ł	
	· · · ·									
Approxim	ate OHWM	1		-		· · · · · · · · · · · · · · · · · · ·	Run(s)	hore		
	· · · · · · · · · · · · · · · · · · ·		. <u> </u>				Riffles(s)	hore		
Approvim	ate width c	 of stream:	L	<u> </u>	<u>↓</u> ↓	<u> </u>	141103(3)	prope		· · · · · · · · ·
	of bank to					Stream Bo	the second s	•	· · · · ·	·····
top of ban		· .	·····	·		·	None	<50%	>50%	
•	- 4 • . • • • • • •	. Shambar () - 1		L	silt		<u> </u>		
Approxim	ate neight	of banks (channel de 1	ptn)*:	1	clay mud		<u> </u>		
left	te	[{. +	right	<u> </u>	€+	sand	······	v V		
	-					gravel				
Approxim	ate depth o					cobbles				
	<u> </u>	N/A		<u> </u>	<u> </u>	boulders bedrock				<u>.</u>
	· · · ·					VEGIOCK		·		
Dominant		} 	L .						4	L
Donmain	Plants Ad	jacent to S	tream* (sci	entific names)		Descriptio	on that bes	t fits the strea	am bank*	·
	Plants Ad		tream* (sci	entific names)		Descriptio			am bank* right	
	Jackber	try		entific names)	······			t fits the stre a /undercut		
	Jackber			entific names)			vertical	/undercut	right	
Trees:	Jackber Oak Cotton	try		entific names)	· · · · · · · · · · · · · · · · · · ·		vertical		right	
Trees:	lackber oak cottor nes:	usod		entific names)			vertical steeply s	/undercut	right	
Trees:	Lackber oak cottor nes:	try wood	4	entific names)			vertical steeply s	/undercut loped (>30%)	right	
Trees:	harleber oal rottor nes:	usod	4	entific names)			vertical steeply s gradual/no	/undercut loped (>30%) slope (<30%)		
Trees:	lackber oak cottor nes: 	inn in briar	ei Piele	entific names)			vertical steeply s gradual/no on that bes	/undercut loped (>30%) slope (<30%) t fits the strea	right	
Trees:	lackber oak cottor nes: 	in in briar	ei Piele	entific names)			vertical steeply s gradual/no	/undercut loped (>30%) slope (<30%) t fits the strea		
Trees:	lackber oak cottor nes: 	inn in briar	ei Piele	entific names)			vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees:	Lackber oak cottor nes: 	in in briar on a hudar	ey pule pule				vertical steeply s gradual/no on that bes	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees:	active action nes: <u>action</u> us: <u>Green</u> us: <u>Green</u> burn ategory the which vego	briar mudar at best des	endes the stri		n ROW:		vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees:	acluber acluber acluber acluber accent ac	in in briar on a hud a r	eule Pule o a mo o scribes the the stribes the stribes the stribes		n ROW:		vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees:	active action nes: <u>action</u> us: <u>Green</u> us: <u>Green</u> burn ategory the which vego	briar mudar at best des	endes the stri		n ROW:		vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees:	active call cottor nes: green us: freen burn burn ategory th which vege 0% 25%	briar mudar at best des	eule Pule o a mo o scribes the the stribes the stribes the stribes		n ROW:		vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees:	Active Color nes: Color nes: Color Color Active Active Color Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active Active	wood wood wood wood wood at best des etation sha	Cy Puls puls cribes the des the stu- 50% 75%	ream within	n ROW: 100% other		vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceo Pick the c extent to v	Active Color nes: Color nes: Color Color Active Color Act	wood wood wood wood wood at best des etation sha	eule Pule o a mo o scribes the the stribes the stribes the stribes	ream within	n ROW: 100% other		vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees:	Active Color nes: Color nes: Color Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Act	wood wood wood wood wood at best des etation sha	Cy Puls puls cribes the des the stu- 50% 75%	ream within	n ROW: 100% other		vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceo Pick the c extent to v	Active Color nes: Color nes: Color Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Act	wood wood wood wood wood at best des etation sha	Cy Puls puls cribes the des the stu- 50% 75%	ream within	n ROW: 100% other		vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceo Pick the c extent to v	Active Color nes: Color nes: Color Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Act	wood wood wood wood wood at best des etation sha	Cy Puls puls cribes the des the stu- 50% 75%	ream within	n ROW: 100% other		vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceo Pick the c extent to v	Active Color nes: Color nes: Color Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Active Color Act	wood wood wood wood wood at best des etation sha	Cy Puls puls cribes the des the stu- 50% 75%	ream within	n ROW: 100% other		vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	

•	CHARACTE					·				
GPS ID:	EZ				Date:	11 30	1	· · · · · · · · · · · · · · · · · · ·	· · ·	
County:	SW MD	BV HA	WD MJ	1	lnvestigat	ors:	L			
	BL LO		LI PO] ·			/		
					T	Casker	P,K	ady		
Circle Wat	 terbody/Sti	eam Type:	EPHEI	MERAL*	INTER	MITTENT	PERE	INNIAL		
-										
Approxim	ate depth o	of running			 	Stream Fo	Pool(s)		ŀ	ſ
	·		N/A	<u> </u>	} ·	·	1-00(5)	hone	_	
Approxim	i ate OHWM	L		· ·			Run(s)	none		
		· ·	n A-							
						1	Riffles(s)	none		<u> </u>
	ate width o	of stream:				Stream Bo	for			L
	of bank to		<u> </u>	3 +	<u>+</u>	jouean BC	None	<50%	>50%	
top of ban	inj -	ł .	[ļ	silt		X		
Approxim	ate height	of banks (channel de	pth)*:	L	clay		Ý		
			1			mud		Χ		
left	.2		right	- 2,		sand		X		· · ·
			L	[gravel cobbles		•		
Approxim	ate depth o	of pool(s): N/A	ſ			boulders				-
	<u> </u>			 		bedrock	<u></u>			· · · · · · · · · · · · · · · · · · ·
Dominant	Plants Adj	acent to S	tream* (scie	entific names)			on that bes	t fits the strea		·
Trees:	Hack	bein				left			right	
	Oah		ļ			ļ	vertical	/undercut		
							etoonly e	loped (>30%)	x	
Shrub s /Vi	inoc:		1	,			steepiy s		~	
SIITUUSIVI		en brit			•••••••••••••••••••••••••••••••••	· · · · · · · · · · · · · · · · · · ·	loradual/no	slope (<30%)		
	-4-3				•			[· .
Herbaceo	us:		<u></u>					· · · · · · · · · · · · · · · · · · ·		
	Fish	onap	ale			Descriptio		t fits the strea		the second s
		nuda.				• .	narrow, de	ер	wide, deep	X
			10			<u> </u>		-11		· · · · · · · · · · · · · · · · · · ·
			Antihon the				narrow, sh		wide, shallow	
Dials then a	, 		cinces uie	eam within	ROW:				Shanow	
Pick the c	ategory th	at beat use station sha	des the sti					······································		
Pick the c extent to	which vege	etation sha			100%) ·	1			
Pick the c extent to	ategory th which vege 0% 25%	etation sha	des the sti 50% 75%		100% other					1 .
extent to	which vege 0% 25%	etation sha	50%				· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		
Pick the c extent to Comment	which vege 0% 25%	etation sha	50% 75%		other		1			
extent to	which vege 0% 25%	etation sha	50% 75%	þ bira	other	le				
extent to	which vege 0% 25%	etation sha	50% 75%		other	lee				
extent to	which vege 0% 25%	etation sha	50% 75%		other	 e				
extent to	which vege 0% 25%	etation sha	50% 75%		other					
extent to	which vege 0% 25%	etation sha	50% 75%		other	lee				

GPS ID: County:		RIZATION					,		.	1
_ 	E3		·		Date:	11/30	11			
	= 2	1]					
	SW MD	BV HA	WD MJ	I	Investigat	ors:	<u>.</u>	· · ·		
· ·		KF OK	LI PO	[] • •					
					J. Cc	sky -	P. Rec	ides.		
						J				
Circle Wat	erbody/St	ream Type	EPHE	MERAL*	INTER	MITTENT	PERE	ENNIAL		
å nn rovin	to donth a	of running	wator*		<u> </u>	Stream Ec	orms Prese	nt ·		<u> </u>
Abhtoruus	ate depuir c		N/A			Sucamit	Pool(s)	the second se	1	[
		<u>~</u>						<u> </u>	· · · · · ·	
Approxim	ate OHWM	L				·····	Run(s)	inne		· ·
			NA							
	a -1		l <u>.</u>				Riffles(s)	hone		
	ate width c			104	<u>+-</u>	Oferen D		ł	i	
	of bank to		· · ·			Stream Bo	None	<50%	>50%	
top of ban	N)	ļ				· silt		×00/0 ×	- 00 /0	
Approxima	ate height	l of banks ((channel de	nth)*:	L	clay		$\overline{\chi}$		
		4-]			mud		X		
left			right	lo -f	+	sand		\checkmark		-
						gravel		-		
Approxim	ate depth c					cobbles			· · · · · ·	
· · · · · · · · · · · · · · · · · · ·		N/A	ļ			boulders bedrock			····-	·
Trees:	hack k					left	vertical	/undercut	right	· · · · · · · · · · · · · · · · · · ·
· · · · · · · · · · · · · · · · · · ·	elm				······					
	ach					V	steeply s	loped (>30%)	V	
Shrubs/Vi	nes:]			/~			L	
	DOS DA	ive					gradual/no	slope (<30%)		
	arrana	r " gre	en brid	1			ļ			
Herbaceo						Decorintic	j on that has	t fits the strea	am channo	r i
	tigh a	man		 			Inarrow, de		wide, deep	
	<u>Du n</u> n	huda	pan	1		· · · · · ·				
			L				narrow, sh	allow	wide,	
			cribes the						shallow	· · · · · · · · · · · · · · · · · · ·
		tation sha	des the str	eam withir		.				
	0%		50%	· · · · · · · · · · · · · · · · · · ·	100%				· · · · · ·	
	25%		75%		other		· ·	•		· · ·
		1	!	ł	<u>1</u>	<u> </u>	J	· ·		· · · · · · · · · · · · · · · · · · ·
	R	1 .1	Id hi	10 mm	b			1		
	S (ANNOM	ft to a			E					
	onnec-	5 70 0								
Comment	(onnec	15 70 0					ļ	 		
Comment	CONNEC	fs 70 6								
Comment	(onnec	15 To 6				-				
Comment	Connec	5 70 6								

		ERIZATI			-		1		1		1	1
GPS ID:	E4						Date:	11/30	111			
						1]	·	,			
County:	SW MD BL LO	BV H			MJ PO	1	Investiga	ors:	[<u> </u>
	DL LV			-9			5.0	astron	D.R	eads		
		1						0		1		
Circle Wat	terbody/St	ream Ty	pe:	(EI	PHE	MERAL*	INTER	MITTENT	PERE	INNIAL'	·	
.	ita dante d	 		-4				Stroom Er] orms Prese	nt		<u> </u>
Abbloxille	ate depth d			aler : I/A					Pool(s)		ļ	[
• • • . •		<u>├</u>	<u> </u>					-		· · · · · · · · · · · · · · · · · · ·		
Approxim	ate OHWM	L							Run(s)	Lone		· ·
	·			- Y \	A				D(0 - 1)			
Annewim	ato width -	fetroar	_ ۳۰					i	Riffles(s)	none,		· · · · · · · · · · · · · · · · · · ·
	ate width o of bank to		·!			15	<u>F4</u> .	Stream Bo	ottom	i	ł .	L
top of ban		et di .	·	•	· ·		<u> </u>]	None	<50%	>50%	
	· ·	ł.,	F		_			silt		V		
Approxim	ate height	of bank	<u>s (c</u> h	anne	el de	pth)*:	·····	clay		X		
left		- (+-			right	· · · · · · · · · · · · · · · · · · ·	, f /	mud sand	the second s			
		·]			nynt			gravel				
Approxim	ate depth	of pool(s	в):					cobbles				
		N/A				151	nchs	boulders				· · · · · · · · · · · · · · · · · · ·
	<u> </u>						<u> </u>	bedrock	<u> </u>			
Dominant	Diamin Anti		1	*	(ecit	1		J	1]	L
	Plants An	iacent to	o Stri			antific names		Descriptio	in that besi	t fits the strea	am bank* 🛛	
Trees:		acent to	o Stro	Balli	loov	entific names,	 	Descriptio	n that bes	fits the strea	am bank* right	[
	plants Au	1		Palli	1904	entific names,		_ •		fits the strea /undercut	•	
	all	leer		9a(11	lanu				vertical	/undercut	right	
Trees:	Jak Jack	leer	n					left	vertical	, 	right	
	Jak Jack	leer	n						vertical steeply s	/undercut loped (>30%)	right	
Trees:	Jak Jack	leer	n						vertical steeply s	/undercut	right	
Trees: Shrubs/Vi	nes:	pon 1	241	ñл					vertical steeply s	/undercut loped (>30%)	right	
Trees:	nes: an	pon 1	ru 	<u>à</u> n				left	vertical steeply s gradual/no on that bes	/undercut loped (>30%) slope (<30%) t fits the stre t	right	
Trees: Shrubs/Vi	nes: an	pon 1	ru 	<u>à</u> n				left	vertical steeply s gradual/no	/undercut loped (>30%) slope (<30%) t fits the stre t	right	
Trees: Shrubs/Vi	nes: an	pon 1	ru 	<u>à</u> n				left	vertical steeply s gradual/no n that bes t narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceo	nes: nes: nes: nes: nes: nes: nes: nes:	leer ben l hud	2	à.s				left	vertical steeply s gradual/no on that bes	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceo Pick the c	nes: 20 pail ategory th	een l hudo	2 i bay	<u>a</u> 	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			left	vertical steeply s gradual/no n that bes t narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceo Pick the c	nes: and pail	een l hudo	n desci	n m ribes es th	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		n ROW: 100%	left	vertical steeply s gradual/no n that bes t narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceo Pick the c	nes: and point ategory the which vego	een l hudo	n desci	ribes	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		n ROW:	left	vertical steeply s gradual/no n that bes t narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceo Pick the c extent to	ategory th which vege	een l hudo	n desci	n m ribes es th	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		n ROW: 100%	left	vertical steeply s gradual/no n that bes t narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceo Pick the c	ategory th which vego 0%	at best of	2 c i Uty i Uty desci shadi	2 ~ ribes es th 0% 5%	the sti	ream withi	n ROW: 100% other	left	vertical steeply s gradual/no n that bes t narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceo Pick the c extent to	ategory th which vego 0%	at best of	2 c i Uty i Uty desci shadi	2 ~ ribes es th 0% 5%	the sti		n ROW: 100% other	left	vertical steeply s gradual/no n that bes t narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceo Pick the c extent to	ategory th which vego 0%	at best of	2 c i Uty i Uty desci shadi	2 ~ ribes es th 0% 5%	the sti	ream withi	n ROW: 100% other	left	vertical steeply s gradual/no n that best narrow, de narrow, shi	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceo Pick the c extent to	ategory th which vego 0%	at best of	2 c i Uty i Uty desci shadi	2 ~ ribes es th 0% 5%	the sti	ream withi	n ROW: 100% other	left	vertical steeply s gradual/no n that best narrow, de narrow, shi	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceo Pick the c extent to	ategory th which vego 0%	at best of	2 c i Uty i Uty desci shadi	2 ~ ribes es th 0% 5%	the sti	ream withi	n ROW: 100% other	left	vertical steeply s gradual/no n that best narrow, de narrow, shi	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceo Pick the c extent to	ategory th which vego 0%	at best of	2 c i Uty i Uty desci shadi	2 ~ ribes es th 0% 5%	the sti	ream withi	n ROW: 100% other	left	vertical steeply s gradual/no n that best narrow, de narrow, shi	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	

CTDEAM (CHARACTE	RIZATION								
SINCHUR				1			1	1		
GPS ID:	E58	6			Date:	- 11/3	0/11			
]	1				
County:		BV HA	WD MJ		Investigat	ors:	r			ļ
·	BL LO	KF OK	LI PO							
				<u> </u>	J, (asku	F P 7	Reade		·
Circle Wat	i terbody/Sti	eam Tyne	EPHE	MERAL	INTER	MITTENT	PERE	INNIAL		
VIICIE Hal		cam rype								
Approxim	i ate depth o	of running [•]	water*:			Stream Fo	orms Prese	nt 👘	• -	· · · · · · · · · · · · · · · · · · ·
	ŀ		N/A				Pool(s)	none		
				•						
Approxim	ate OHWM	• •	NA		<u> </u>		· Run(s)	hone		
····							Riffles(s)	4 10 1	· · · · ·	
Approvim	ate width o	f stream:	L	12.5	<u> </u>	·	141100(3)	hone	<u> </u>	
	of bank to	n galealle		1 CT		Stream Bo	ottom	I	l .	L
top of ban			· · · ·				None	<50%	>50%	
	· .		[silt		X		
Approxim	ate height	of banks (d	channel de	pth)*:		clay	·	<u> </u>		
		~ff		<u>~</u>	FF-	mud		<u>X</u>		
left			right	•.•		sand gravel		<u>X.</u>		·····
Annrovim	ate depth o	f nool(s)	l		 	cobbles				
					ļ	the second se				
]	boulders	X			
	- M	N/A				boulders bedrock]·····			
· · · · · · · · · · · · · · · · · · ·		N/A				bedrock	У			
Dominant	Plants Adj	N/A	tream* (scie	entific names)	· · · · · · · · · · · · · · · · · · ·	bedrock Descriptio	У	t fits the strea		
· · · · · · · · · · · · · · · · · · ·	Plants Adj	N/A acent to S	tream* (scie	entific names)	· · · · · · · · · · · · · · · · · · ·	bedrock	on that bes	·	a m bank* right	
Dominant	Plants Adj	N/A	tream* (scie	ntific names)		bedrock Descriptio	on that bes	t fits the stre a /undercut		
Dominant	Plants Adj	N/A acent to S	tream* (scie	entific names)		bedrock Descriptio	on that bes	/undercut	right	
Dominant Trees:	Plants Adj	N/A acent to S	tream* (scie	entific names)		bedrock Descriptio	on that bes	·	right	
Dominant Trees:	Plants Adj	N/A acent to S berry				bedrock Descriptio	on that best vertical steeply s	/undercut loped (>30%)	right	
Dominant Trees:	Plants Adj Og b h ach nes: anape	N/A acent to S berry	No.e.	entific names)		bedrock Descriptio	on that best vertical steeply s	/undercut	right	
Dominant Trees:	Plants Adj Og la h ach nes: grape	N/A acent to S berry				bedrock Descriptio	on that bes vertical steeply s gradual/no	/undercut loped (>30%) slope (<30%)	right	
Dominant Trees: Shrubs/Vi Herbaceo	Plants Adj Og la h ach nes: grape	N/A acent to S berry ep he	ia .			bedrock Descriptio	on that best vertical steeply s gradual/no on that best	/undercut loped (>30%) slope (<30%) t fits the strea	right	
Dominant Trees: Shrubs/Vi Herbaceo	Plants Adj Og b hack nes: mes: grape gra us:	N/A acent to S berry e.h.h.	ia .	ser m		bedrock Descriptio	on that bes vertical steeply s gradual/no	/undercut loped (>30%) slope (<30%) t fits the strea	right	
Dominant Trees: Shrubs/Vi Herbaceo	Plants Adj Og b hack nes: mes: grape gra us:	N/A acent to S berry e.h.h.	proce i à s	ser m		bedrock Descriptio	on that bes vertical steeply s gradual/no on that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the strea ep	right	
Dominant Trees: Shrubs/Vi Herbaceon	Plants Adj Oals hack nes: grape grape grape fich on her:	N/A acent to S berry berry ep hs ep hs nuda c	pre ig : Cl Mary	scr ml		bedrock Descriptio	on that best vertical steeply s gradual/no on that best	/undercut loped (>30%) slope (<30%) t fits the strea ep allow	right	
Dominant Trees: Shrubs/Vi Herbaceou Pick the c	Plants Adj Og b hade nes: Mape geo us: fish or besi ategory the	N/A acent to S berry en here nuda control at best des	ià . Cribes the	ser m		bedrock Descriptio	on that bes vertical steeply s gradual/no on that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the strea ep allow	right	
Dominant Trees: Shrubs/Vi Herbaceon Pick the c extent to v	Plants Adj Og & hack nes: mes: grape g g g g g g g g g g g g g g g g g g g	N/A acent to S berry en here nuda control at best des	i à . i à . Cr scribes the des the str	ser m		bedrock Descriptio	on that bes vertical steeply s gradual/no on that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the strea ep allow	right	
Dominant Trees: Shrubs/Vi Herbaceon Pick the c extent to v	Plants Adj Og b hade nes: Mape geo us: fish or besi ategory the	N/A acent to S berry en here nuda control at best des	ià . Cribes the	ser m	ROW: 100% other	bedrock Descriptio	on that bes vertical steeply s gradual/no on that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the strea ep allow	right	
Dominant Trees: Shrubs/Vi Herbaceon Pick the c extent to v	Plants Adj Og la h ack nes: grape us: fich or berry ategory the which vege 0%	N/A acent to S berry en here nuda control at best des	Cribes the str 50%	ser m	100%	bedrock Descriptio	on that bes vertical steeply s gradual/no on that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the strea ep allow	right	
Dominant Trees: Shrubs/Vi Herbaceon Pick the c extent to v	Plants Adj Og k h adu nes: mes: mes: mes: mes: mes: mes: mes: m	N/A acent to S berry en here nuda control at best des	Cribes the str 50%	ser m	100%	bedrock Descriptio	on that bes vertical steeply s gradual/no on that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the strea ep allow	right	
Dominant Trees: Shrubs/Vi Herbaceou Pick the c extent to y	Plants Adj Og k h adu nes: mes: mes: mes: mes: mes: mes: mes: m	N/A acent to S berry en here nuda control at best des	Cribes the str 50%	ser m	100%	bedrock Descriptio	on that bes vertical steeply s gradual/no on that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the strea ep allow	right	
Dominant Trees: Shrubs/Vi Herbaceou Pick the c extent to y	Plants Adj Og k h adu nes: mes: mes: mes: mes: mes: mes: mes: m	N/A acent to S berry en here nuda control at best des	Cribes the str 50%	ser m	100%	bedrock Descriptio	on that bes vertical steeply s gradual/no on that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the strea ep allow	right	
Dominant Trees: Shrubs/Vi Herbaceou Pick the c extent to y	Plants Adj Og k h adu nes: mes: mes: mes: mes: mes: mes: mes: m	N/A acent to S berry en here nuda control at best des	Cribes the str 50%	ser m	100%	bedrock Descriptio	on that bes vertical steeply s gradual/no on that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the strea ep allow	right	
Dominant Trees: Shrubs/Vi Herbaceou Pick the c extent to y	Plants Adj Og k h adu nes: mes: mes: mes: mes: mes: mes: mes: m	N/A acent to S berry en here nuda control at best des	Cribes the str 50%	ser m	100%	bedrock Descriptio	on that bes vertical steeply s gradual/no on that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the strea ep allow	right	
Dominant Trees: Shrubs/Vi Herbaceou Pick the c extent to y	Plants Adj Og k h adu nes: mes: mes: mes: mes: mes: mes: mes: m	N/A acent to S berry en here nuda control at best des	Cribes the str 50%	ser m	100%	bedrock Descriptio	on that bes vertical steeply s gradual/no on that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the strea ep allow	right	
Dominant Trees: Shrubs/Vi Herbaceou Pick the c extent to y	Plants Adj Og k h adu nes: mes: mes: mes: mes: mes: mes: mes: m	N/A acent to S berry en here nuda control at best des	Cribes the str 50%	ser m	100%	bedrock Descriptio	on that bes vertical steeply s gradual/no on that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the strea ep allow	right	
Dominant Trees: Shrubs/Vi Herbaceou Pick the c extent to y	Plants Adj Og k h adu nes: mes: mes: mes: mes: mes: mes: mes: m	N/A acent to S berry en here nuda control at best des	Cribes the str 50%	ser m	100%	bedrock Descriptio	on that bes vertical steeply s gradual/no on that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the strea ep allow	right	

STREAM C	HARACTE	RIZATION								· ·
. I										
GPS ID:	巨 7				Date:	11/30/	11			
1				·····	1.					
County:	SW MD	BV HA	WD MJ	· · · · · · · · · · · · · · · · · · ·	Investigat	ors:				
	BL LO	KF OK	LI PO] .					
					J. P.	upey,	P.R.	ader		
						Ø			ļ	
Circle Wat	erbody/Str	eam Type	EPHEI	MERAD*	INTER	MITTENT	PERE	NNIAL		
Approxim	ate depth o	of running			4 in	Stream Fo				<u>+</u>
			N/A		ļ		Pool(s)	X		
· · 1		·	<u> </u>	, 	<u></u>					
Approxima	ate OHWM	* *	ha-		<u> </u>		Run(s)	X		
		ļ	ļ		ļ	Į				
			L		<u> </u>		Riffles(s)			
	ate width o	or stream:				Character D	Hom		1	l
(from top				3	ft ·	Stream Bo		<50%	>50%	
top of ban	к)	1	· · ·	ļ	+	silt	None	<50%	-50%	·
• • • • • • • •		- f h	 		L	···· ·		<u> </u>		
Approxima	ate neight	UT DANKS ((channel de	pui):	1	clay mud				
3 - 54	f	oft-	right		GFF	sand		X		·
left	· · · ·	P1 -	<u>i ngrit</u>		<u>e</u> i i	gravel		X		· · · · · · · · · · · · · · · · · · ·
A noncortino	i nin daath c	f nool(s):	l	····		cobbles	<u>_</u>	<u>×</u>		
Approxim	ate depth o	N/A	[6	na.	boulders		× ×		
·				<u> </u>	<u> </u>			~		
		4	ſ		1	bedrock	2		1 ·	
		1				bedrock	· ×			
Dominant	Diante Adi	acent to S	tream* (scie	ntific names)				fits the stre	am bank*	
-	Plants Adj	acent to S	tream* (scie	entific names)		Descriptio		fits the strea		
Trees:			tream* (scie	entific names)		Descriptio	n that bes		am bank right	
Trees:	ucano	0 5-			`	Descriptio	n that bes	t fits the stre a		
Trees:		0 5-				Descriptio	on that bes vertical	/undercut	right	
Trees:	ycamo	0 5-				Descriptio	on that bes vertical		right	
Trees:	ycamo	0 5-				Descriptio	n that bes vertical steeply s	/undercut loped (>30%)	right	
Trees:	ycamo	0 5-				Descriptio	n that bes vertical steeply s	/undercut	right	
Trees:	nes:	0 5-				Descriptio	n that bes vertical steeply s	/undercut loped (>30%)	right	
Trees:	ucano culiun nes: us: joh	e so	grano			Descriptio	n that bes vertical steeply s gradual/no	/undercut loped (>30%) slope (<30%)		
Trees:	ucano ciliun nes: us: joh	e so	grano			Descriptio	n that bes vertical steeply s gradual/no n that bes	/undercut loped (>30%) slope (<30%) t fits the stre a	right	
Trees:	ucamo ciliiin nes: us: joh Sa Ba	o So Maga Maga Lideys Blue	en ano			Descriptio	n that bes vertical steeply s gradual/no	/undercut loped (>30%) slope (<30%) t fits the stre a		
Trees:	ucamo ciliiin nes: us: joh Sa Ba	o So Maga Maga Lideys Blue	grano			Descriptio	n that bes vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees:	ucano celien nes: us: joh so Ba	e S map noon le deux o Rue serence	eo grano Atta de gra			Descriptio	n that bes vertical steeply s gradual/no n that bes	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees:	u <u>came</u> culium nes: us: joch Sa Ba ategory the	e son ma p inter le de un e sur le at best des	e o contra contr			Descriptio	n that bes vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceou Pick the c extent to v	us: John ategory the which vege	e son ma p inter le de un e sur le at best des	and a stribes the		n ROW:	Descriptio	n that bes vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceou Pick the c extent to v	nes: us: joh ategory the which vege	e son ma p inter le de un e sur le at best des	scribes the str 50%		ROW: 100%	Descriptio	n that bes vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceou Pick the c extent to v	us: John ategory the which vege	e son ma p inter le de un e sur le at best des	and a stribes the		n ROW:	Descriptio	n that bes vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees:	ucano celien nes: us: joh So us: joh So So So So So So So So So So So So So	e son ma p inter le de un e sur le at best des	scribes the str 50%		ROW: 100%	Descriptio	n that bes vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees: Shrubs/Vi Herbaceou Pick the c extent to v	ucano cultur nes: us: joh So us: joh So So So So So So So So So So So So So	e son ma p inter le de un e sur le at best des	scribes the str 50%		ROW: 100%	Descriptio	n that bes vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees:	ucano cultur nes: us: joh So us: joh So So So So So So So So So So So So So	e S	scribes the str 50%		ROW: 100%	Descriptio	n that bes vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees:	ucano cultur nes: us: joh So us: joh So So So So So So So So So So So So So	e son ma p inter le de un e sur le at best des	scribes the str 50%		ROW: 100%	Descriptio	n that bes vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees:	ucano cultur nes: us: joh So us: joh So So So So So So So So So So So So So	e S	scribes the str 50%		ROW: 100%	Descriptio	n that bes vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees:	ucano cultur nes: us: joh So us: joh So So So So So So So So So So So So So	e S	scribes the str 50%		ROW: 100%	Descriptio	n that bes vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees:	ucano celien nes: us: joh So us: joh So So So So So So So So So So So So So	e S	scribes the str 50%		ROW: 100%	Descriptio	n that bes vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees:	ucano celien nes: us: joh So us: joh So So So So So So So So So So So So So	e S	scribes the str 50%		ROW: 100%	Descriptio	n that bes vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees:	ucano celien nes: us: joh So us: joh So So So So So So So So So So So So So	e S	scribes the str 50%		ROW: 100%	Descriptio	n that bes vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	
Trees:	ucano celien nes: us: joh So us: joh So So So So So So So So So So So So So	e S	scribes the str 50%		ROW: 100%	Descriptio	n that bes vertical steeply s gradual/no n that bes narrow, de	/undercut loped (>30%) slope (<30%) t fits the stre t ep	right	

DELINEATION OF POTENTIALLY JURISDICTIONAL WATERBODIES REPORT, EVALUATION OF HISTORIC WETLANDS, and THREATENED, ENDANGERED and PROTECTED SPECIES POTENTIAL HABITAT

POTENTIAL MITIGATION SITE TULSA PORT OF CATOOSA ROGERS COUNTY, OKLAHOMA

Portions of Sections 4 and 5 of Township 20 North, Range 15 East Rogers County, Oklahoma

> February 3, 2012 Revised March 19, 2012

Copyright 2012 Kleinfelder All Rights Reserved

UNAUTHORIZED USE OR COPYING OF THIS DOCUMENT IS STRICTLY PROHIBITED BY ANYONE OTHER THAN THE CLIENT FOR THE SPECIFIC PROJECT.

A Report Prepared for:

Dewberry 600 Parsippany Road, Suite 301 Parsippany, NJ 07054-3715

DELINEATION OF POTENTIALLY JURISDICTIONAL WATERBODIES REPORT, EVALUATION OF HISTORIC WETLANDS, and THREATENED, ENDANGERED and PROTECTED SPECIES POTENTIAL HABITAT

POTENTIAL MITIGATION SITE PORT OF CATOOSA ROGERS COUNTY, OKLAHOMA

Portions of Sections 4 and 5 of Township 20 North, Range 15 East of the Indian Meridian, Rogers County, Oklahoma

Kleinfelder Project # 114800

Prepared by:

olly Ready

Polly Ready Environmental Scientist

Reviewed by:

Blain Bal

Blair Baker Senior Environmental Professional

KLEINFELDER 10835 East Independence, Suite 102 Tulsa, Oklahoma 74116 p| 918.627.6161 f| 918.627.6262

TABLE OF CONTENTS

<u>Chapte</u>	er Pa	ge
1.0	INTRODUCTION	1
2.0	REGULATORY FRAMEWORK	1
3.0	SETTING 3.1 ECOREGIONS	
4.0	METHODS AND LIMITATIONS	4
5.0	SITE CHARACTERIZATION	8 8
6.0	FINDINGS6.1THREATENED, ENDANGERED AND PROTECTED SPECIES6.2POTENTIALLY JURISDICTIONAL WATERBODIES6.3HISTORIC WETLANDS	10 13
7.0	REFERENCES	18
FIGUR	ES1General Vicinity Map2Aerial Photography Map3USGS Topographic Map4National Wetland Inventory (NWI) Map5Level IV Ecoregion Map6NRCS Soils Map7FEMA FIRM8Potentially Jurisdictional Waters Map9Historic Wetlands Map	
TABLE	 Soil Map Units within Study Area Plant Species Observed within Study Area Animal Species Observed within Study Area Rogers County, OK Listed and Protected Species Potentially Jurisdictional Waterbodies within Study Area 	
APPEN	IDICES A Photographic Record	
	 B Historic Aerial Photographs C Wetland Delineation Forms 	

1.0 INTRODUCTION

Kleinfelder was contracted by Dewberry to conduct an assessment of United States Army Corps of Engineers (USACE) waters of the United States (Waters), including wetlands; historic wetlands; and the presence of potential habitat for federally threatened or endangered (listed) and protected species. The environmental study area (study area) may be used as a mitigation site by the Tulsa Port of Catoosa, in Rogers County, Oklahoma (Figure 1). The study area is approximately 115 acres. The center of the study area is located at 36.145035 N, -95.432674° W (Figure 2). This report documents the results of the delineation for the benefit of Dewberry and the Tulsa Port of Catoosa and may be relied upon by their successors and/or assignees associated with the transaction for which this report was commissioned.

The study area is located within portions of: the N 1/2 of Sections 4 and 5 of Township 20 North, Range 15 East, Indian Meridian, Rogers County, Oklahoma. The study area is mapped on the 1980 photorevised Catoosa, OK quadrangle United States Geological Survey (USGS) 7.5-Minute Series Topographic Map (Figure 3).

Kleinfelder biologists (Mr. Blair Baker, Ms. Elisa Hotz, and Mr. Jason Caskey) conducted an assessment to characterize and map potentially jurisdictional Waters within the study area. Potentially jurisdictional Waters, including wetlands, were found within the study area. The survey was conducted on December 9, 10 and 12, 2011 and consisted of a focused pedestrian field survey within the study area. The study area was also evaluated for historic wetlands and for the presence of potential habitat for federally threatened or endangered (listed) and protected species for Rogers County, OK. Prior to conducting the field survey, Kleinfelder reviewed site maps, historic aerial photographs, natural resource database accounts, National Wetlands Inventory (NWI) maps (Figure 4), the U.S. Fish and Wildlife Service (USFWS) Project Review of federally listed species and designated critical habitat areas in Rogers County, Oklahoma, and other relevant scientific literature to determine the potential existence of known wetland features and listed and protected species in the study area.

This report is based on knowledge of the special-status resources in the region, a review of relevant background literature, and a focused field survey of the study area. A discussion of plant and animal species observed on site is included in this report. Information in this report is intended to provide the biological information that is necessary to avoid or minimize impacts to Waters that are potentially jurisdictional. This information may also be used in support of permit applications associated with impacts to these Waters.

2.0 REGULATORY FRAMEWORK

2.1 WATERS OF THE U.S.

The following section provides an overview of the regulatory framework involved with impacts to Waters (including wetlands) associated with the study area. Wetlands and riparian communities are considered to have special ecological status and are also considered a declining resource by several regulatory agencies, including the USACE. Wetlands serve significant biological functions by providing nesting, breeding, foraging, and spawning habitat for a wide variety of resident and migratory animal species. Wetlands also provide for the movement of water and sediments, nutrient cycling, groundwater recharge, water purification, storage of storm water runoff, recreation and transportation.

According to Section 404 of the Clean Water Act (CWA) of 1977, work (dredging) within navigable waters and the placement of fill material into Waters, including intermittent streams and wetlands, requires authorization by the USACE (EPA, 1972). The type of authorization (e.g., individual permit, nationwide permit, regional permit, or letter of permission from the District Engineer) depends on the acreage, volume, linear distance along a stream course, and purpose of the activity.

Under Section 404 of the CWA, and Section 10 of the Rivers and Harbors Act of 1899, the Environmental Protection Agency (EPA) and the USACE share regulatory authority over Waters. Waters includes all waterbodies that are, have, or may be used for interstate and/or international commerce, including all water that is subject to the ebb and flow of tide; all waters that are rivers, streams, sloughs, lakes, mudflats, sandflats, wetlands, wet meadows, prairie potholes, playa lakes, or natural ponds and the use, degradation, or destruction, of the aforementioned, which could affect interstate and international commerce; all impoundments of above mentioned; all tributaries of above mentioned; territorial seas; and all wetlands adjacent to above mentioned Waters. The width of Waters is defined as that portion which falls within the limits of the ordinary high water mark (OHWM). Field indicators of OHWM are clear and natural lines on opposite sides of the banks, scouring, sedimentary deposits, drift lines, exposed roots, shelving, destruction of terrestrial vegetation, and the presence of litter debris. Typically, the OHWM corresponds to the two-year flood event.

The USACE retains jurisdiction over wetlands that are Waters, and definitions and regulations for the identification and delineation of wetlands were published in the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987). This 1987 manual is the current federal delineation manual used in the CWA Section 404 regulatory program for the identification and delineation of wetlands. The 1987 manual has been clarified and updated through a series of regional supplements, guidance documents and memoranda from the USACE. The Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region is used for southeastern Oklahoma (USAERDC, 2008). The USACE defines wetlands as:

"Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

Thus, the interaction of hydrology, hydrophytic vegetation and hydric soil conditions results in the development of characteristics unique to wetlands. For a wetland to exist, it must have: 1) prevalent hydrophytic vegetation (plants that are adapted to grow, compete, reproduce and persist under anaerobic soil conditions); 2) hydric soils (those that possess characteristics associated with reducing soil conditions); and 3) a source of hydrology (frequently inundated or saturated during the biological growing season). The USACE clearly states, "Except in certain situations defined in this manual, evidence of a minimum of one positive wetland indicator from each parameter (hydrology, soil, and vegetation) must be found in order to make a positive wetland determination."

2.2 THREATENED, ENDANGERED, AND PROTECTED SPECIES

Where activity would require federal authorization or be contingent upon some other federal action, consultation under the Endangered Species Act (ESA) of 1973 is necessary. The ESA prohibits any person from taking, which includes harassing, harming, pursuing, hunting,

shooting, wounding, killing, trapping, capturing, relocating, collecting, or attempting to engage in any such conduct, of any federally listed threatened or endangered species. Significant habitat modification or degradation that results in death or injury to federally protected species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering is also prohibited. Federal agencies are required to comply with the provisions and use their authorities to conserve species. Section 7 of the ESA states that every federal agency taking an action that may affect listed species must consult with the U.S. Department of the Interior, USFWS, or the National Marine Fisheries Service (NMFS). Consultation allows the USFWS to provide their expertise to ensure that the agency is making effective choices to conserve listed species, and that the proposed action would not jeopardize the continued existence of listed species.

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c), enacted in 1940, and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb (USFWS, 1940)."

The Migratory Bird Treaty Act of 1918 decreed that all migratory birds and their parts (including eggs, nests, and feathers) were fully protected. The Migratory Bird Treaty Act (MBTA) is the domestic law that affirms, or implements, the United States' commitment to four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. Each of the conventions protect selected species of birds that are common to both countries (i.e., they occur in both countries at some point during their annual life cycle). A List of Migratory Birds protected by the MBTA is available.

3.0 SETTING

The general setting of the study area is within the floodplain of the Verdigris River. The study area is rural and consists primarily of forested, improved grassland, agricultural fields, excavated ponds, and developed areas including roads and associated right-of-ways (ROW).

The study area has an elevation range of approximately 568 feet above MSL at the northern end and 545 feet above MSL at the southern end, as shown on the 1980 photorevised Catoosa, OK quadrangle, USGS 7.5-Minute Series Topographic Map. The climate in this area is primarily influenced by movement of moist air from the Gulf of Mexico, hot and dry air from the desert southwest and cold air from the Arctic. The region undergoes seasonal variations in temperature and precipitation and typically experiences long, humid summers and short mild winters. The average annual precipitation for Rogers County is 43.45 inches, the average annual temperature is 60 degrees Fahrenheit, and the annual growing season is 208 days (OCS, 2010).

Habitats within the study area included mixed-age bottomland forest, mixed-age upland forest, dissected upland dominated by grasses, developed areas, and waterbodies. Within the bottomland forest dominant plant species included Pecan (*Carya illinoensis*), Boxelder (*Acer negundo*), American elm (*Ulmus americana*), Sycamore (*Platanus occidentalis*), Hackberry (*Celtis occidentalis*), Black willow (*Salix nigra*), Deciduous holly (*Ilex decidua*), and Northern red oak (*Quercus rubra*). The forested wetland is included in this habitat type. The upland forest site was dominated by Post oak (*Quercus stellata*), Blackjack oak (*Quercus marilandica*), Gum Bully

(*Sideroxylon lanuginosum*), Buckbrush (*Symphoricarpos orbiculatus*), Frost flower (*Verbesina virginica*), and Saw Greenbrier (*Smilax bona-nox*). The waterbodies did not have plants specifically associated with them. Introduced and invasive plant species were common in disturbed areas and were observed predominantly within mowed or maintained ROWs. These species included Sericea Lespedeza (*Lespedeza cuneata*), Bermudagrass (*Cynodon dactylon*), and Johnsongrass (*Sorghum halepense*).

3.1 ECOREGIONS

Level 4 Ecoregions of Oklahoma Information

The study area is located within the Osage Cuestas, a subregion of the Central Irregular Plains ecoregion (#40) of Oklahoma (Figure 5).

40b. Osage Cuestas

The Osage Cuestas ecoregion is an irregular to undulating plain that is underlain by interbedded, westward-dipping sandstone, shale, and limestone. East-facing cuestas and low hills occur. Topography is distinct from the nearby Flint Hills, Ozark Highlands, and Cherokee Plains ecoregions. Natural vegetation is mostly tall grass prairie, but a mix of tall grass prairie and oak–hickory forest is native to eastern areas. Overall, the mosaic of natural vegetation is unlike the neighboring Cross Timbers and Ozark Highlands ecoregions. Today, rangeland, cropland, riparian forests, and on rocky hills, oak woodland or oak forest occur; cropland is not as common as in the neighboring Cherokee Plains Ecoregion. (Woods et al, 2005).

Potential natural vegetation for this ecoregion consists mostly of tallgrass prairie (dominants: big bluestem, little bluestem, switchgrass, and Indiangrass), grading eastward into a mosaic of tall grass prairie and oak-hickory forest; on rocky hilltops, cross timbers (dominants: blackjack oak, post oak, and little bluestem). Tallgrass prairie is native on deep loams derived from shale or limestone. Bottomland forests are native on floodplains and low terraces. Currently, on rocky hills, dry upland forest and woodland is found. Dry prairie composed of short and tall grasses occurs on shallow, gravelly soils of limestone scarps. In riparian areas are forests containing boxelder, silver maple, bur oak, Shumard oak, American elm, hackberry, pecan, walnut, sycamore, and eastern cottonwood.

Land cover and land use for this ecoregion is a mixture of rangeland, grassland, cropland, and especially in more rugged areas, woodland. Wooded riparian corridors occur on wettest bottomlands. Wheat, soybeans, grain sorghum, and alfalfa hay are major crops. Livestock (especially cattle) farming is important. Strip mining for coal and oil production have degraded water quality in some streams (Woods et al., 2005).

4.0 METHODS AND LIMITATIONS

The USACE has prescribed methodologies for delineating "waters of the United States" and wetlands pursuant to the CWA of 1977 (EPA, 1972). Determination of Waters is based on definitions and descriptions found in the Code of Federal Regulation (CFR) at 33 CFR 328. Methods for delineating wetlands are detailed in the USACE Wetland Delineation Manual (Environmental Laboratory, 1987) and require that, under normal circumstances, an area possess three technical criteria to be designated as a jurisdictional wetland. Those criteria are:

1) the prevalence of hydrophytic vegetation, 2) the presence of hydric soils, and 3) the presence of wetland hydrology.

The evaluation of any on-site stream features for the jurisdictional determination was conducted in accordance with the policy, practice, and procedures set forth in 33 CFR 328, which determines the extent of jurisdiction of the USACE over Waters. The definitions for jurisdictional determination consist of the following:

- A. The term *"waters of the United States"* means:
 - 1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
 - 2. All interstate waters including interstate wetlands;
 - 3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
 - Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
 - From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
 - Which are used or could be used for industrial purpose by industries in interstate commerce;
 - 4. All impoundments of waters otherwise defined as waters of the United States under the definition;
 - 5. Tributaries of Waters identified in paragraphs (a)(1)-(4) of this section;
 - 6. The territorial seas;
 - 7. Wetlands adjacent to Waters (other than Waters that are themselves wetlands) identified in paragraphs (a)(1)-(6) of this section.
 - 8. Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 123.11(m) which also meet the criteria of this definition) are not Waters of the United States.
 - 9. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with the EPA.

Limits of jurisdictional authority are as follows:

- A. *Territorial Seas* The limit of jurisdiction in the territorial seas is measured from the baseline in a seaward direction a distance of three nautical miles. (See 33 CFR 329.12)
- B. *Tidal Waters of the United States* The landward limits of jurisdiction in tidal waters:

- Extends to the high tide line, or
- When adjacent non-tidal waters of the United States are present, the jurisdiction extends to the limits identified in paragraph (c) of this section.
- C. Non-Tidal Waters of the United States The limits of jurisdiction in non-tidal waters:
 - In the absence of adjacent wetlands, the jurisdiction extends to the ordinary high water mark, or
 - When adjacent wetlands are present, the jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands.
 - When the water of the United States consists only of wetlands, the jurisdiction extends to the limit of the wetland.

The wetland assessment and delineation was conducted in accordance with the Corps of Engineers Wetlands Delineation Manual and the Midwest Region supplement (USAERDC, 2008). The delineation form for the Midwest region was used and the wetland assessment consisted of the following:

- A desktop review was undertaken to identify areas that were previously mapped as wetlands, streams, or other waterbodies. A pedestrian survey was conducted within the study area to locate potential jurisdictional waterbodies. When these areas were encountered, the routine determination method described in the 1987 USACE Wetland Delineation Manual and Midwest Region supplement was employed, and sample plots were used to determine wetland or non-wetland status. Visual observations were used to identify vegetation, soil, and hydrological characteristics within the vicinity of the sample plots.
- Plant community types in proximity to potential wetland boundaries were identified. Dominant plant species were identified within the visually perceived wetland boundary or until the nearest significant vegetative community change. The biologist selected a representative observation area for each plant community, visually selected the dominant species from each stratum of the community, evaluated the percent cover of plant species in each stratum, and recorded the wetland indicator status of the dominant species. A determination was then made as to whether the vegetation was hydrophytic based on the plant's indicator status and a minimum of two evaluation methods. If no potential jurisdictional waterbodies were observed, upland plant communities were mapped and characterized.
- Hydrophytic vegetation dominates areas where the frequency and duration of inundation or soil saturation exerts a controlling influence on the plant species present. Plant species were assigned wetland indicator status according to the probability of species occurring in wetlands (USFWS, 1988). More than fifty percent of the dominant species must have been hydrophytic to have met the wetland vegetation criterion. Hydrophytic plant indicator status designations conform to the following:
 - OBL Plants that occur almost always (estimated probability >99 percent) in wetlands under natural conditions, but may also occur rarely (estimated probability <1) in non-wetlands.

- FACW Plants that occur usually (estimated probability >67 percent to 99 percent) in wetlands under natural conditions, but also occur (estimated probability 1 percent to 33 percent) in non-wetlands.
- FAC Plants with a similar likelihood (estimated probability 33 to 67 percent) of occurring in both wetlands and non-wetlands.
- FACU Plants that occur sometimes (estimated probability 1 percent to <33 percent) in wetlands, but occur more often (estimated probability >67 percent to 99 percent) in non-wetlands.
- UPL Plants that occur rarely (estimated probability <1 percent) in wetlands, but almost always occur (estimated probability >99 percent) in non-wetlands under natural conditions.
- Soil pits were dug at sample plots for the potential wetlands being investigated. Munsell Soil Color Charts (MacBeth, 1994) were used to evaluate the color, hue, and chroma of representative soils and associated redox features. The redox features were also characterized by their size, distinction, and frequency of occurrence. Soil indicators from the samples were then recorded and it was determined if the soils are hydric. Reducing conditions on site were indicated by the presence of oxidized root channels, positive reaction from Alpha-Alpha Dipyradil, sulfidic odor, or gleyed soils. Also noted were other hydrological indicators, such as soil saturation within the upper 12 inches of the soil, standing water existing within the soil pits, and the depth to inundated or saturated soil. If no hydric soils or potential jurisdictional waterbodies were observed within the study area, no soil pits were dug.

If potential jurisdictional waterbodies are observed, appropriate jurisdictional wetland boundaries would be derived from wetland sampling plot analysis and subsequently recorded using a Trimble GeoXHTM global positioning system (GPS). When satellites cannot be detected by GPS or when there is poor satellite geometry, the boundaries of Waters are marked on aerial photography and field measurements are taken for reference. For areas between sample points, the wetland/upland boundary would be determined by interpolation of the position of vegetation, soil, and hydrologic indicators. This geospatially corrected information would then be digitally overlaid onto a representative aerial photograph and a topographic map using ArcGIS software to display the cumulative, on-site jurisdictional area. Wetland feature polygons, wetland soil pits, and upland soil pits would be identified on the maps and identified with a corresponding label. Digital photographs were taken to document on-site conditions and are provided in Appendix A.

A variety of data sources were reviewed with regard to the location of historic wetlands within the study areas. These data sources included:

- NRCS historic aerial photographs
- NRCS Web Soil Survey data including
 - hydric ratings
 - soil physical features
 - flooding frequency
- NRCS 2009 Hydric Soils List for Oklahoma
- Google Earth Pro
- USFWS NWI maps
- USGS Topographic maps

The historic aerial photographs acquired from the NRCS were taken in 1958, 1972, 1979, 1991, 1995, 2002, and 2005 and are included in Appendix B.

5.0 SITE CHARACTERIZATION

The study area can be generally characterized as rural, wooded, agricultural, with small maintained/mowed areas surrounding roads or utility ROWs, with streams, ponded water and wetlands interspersed throughout. The site is bordered by Highway 266 to the north, by a commercial development to the east, by the Verdigris River to the south, and by agricultural fields to the west. The southern half of the site is an improved pasture while the northern half of the site is characterized by areas of bottomland forest, intermittent streams, upland areas and constructed ponds.

5.1 SOILS AND DRAINAGE

Soils within the study area consist mainly of clay loams and silty clay loams. The parent material consists of clayey or silty alluvium and loamy residuum from weathered limestone. These soils occur on floodplains and are occasionally or frequently flooded. The natural drainage class is well drained and poorly or somewhat poorly drained. The specific soil types for the study area are listed in Table 1 below. Of these soil types, Osage clay and Verdigris clay loam are considered to be partially hydric soils (USDA, 2009) (Figure 6). Portions of the study area occur within the 100-year floodplain of the Verdigris River. FEMA Flood Insurance Rate Maps are included (Figure 7).

	Table 1: Soil Map Units within Study Area				
Map Unit Symbol	Map Unit Name	Slope	Drainage / Hydric		
Os	Osage clay	0 to 1 percent	Poorly drained / partially hydric		
SuC	Apperson and Summit	3 to 5 percent	Somewhat poorly drained / not hydric		
Ve	Verdigris clay loam	0 to 1 percent	Well drained / partially hydric		
Vf	Verdigris silty clay loam	0 to 2 percent	Well drained / not hydric		
WagB	Wagstaff silty clay loam	1 to 0 percent	Moderately well drained / not hydric		

5.2 VEGETATION ASSESSMENT (PLANT COMMUNITIES)

The dominant plant communities within the study area include bottomland forest, a forested wetland, upland forest, ponds, improved grassland and mowed or maintained areas within ROWs and along roads. The table below summarizes the plant species observed within the study area.

Table 2: Plant Species Observed within Study Area				
Common Name	Scientific Name	Vegetation Type	NWI Status	
American Elm	Ulmus americana	t	FAC	
American Sycamore	Platanus occidentalis	t	FAC	
Bermuda Grass	Cynodon dactylon	h	FACU	
Blackberry	Rubus sp.	h	NI	
Black Oak	Quercus velutina	t	-	
Blackjack Oak	Quercus marilandica	t	-	
Black Willow	Salix nigra	t	FACW	

Common Name	2: Plant Species Observed with Scientific Name	Vegetation Type	NWI Status
Boxelder	Acer negundo	t	FACW
Bristlegrass	Setaria sp.	h	FAC
Buckbrush	Symphoricarpos orbiculatus	S	FACU
Buttonbush	Cephalanthus occidentalis	S	OBL
Elderberry	Sambucus canadensis	t	FAC
Grape	<i>Vitis</i> sp.	V	FAC
Giant Goldenrod	Solidago gigantea	h	FAC
Giant Ragweed	Ambrosia trifida	h	FAC
Green Ash	Fraxinus pennsylvanica	t	FACW-
Hackberry	Celtis occidentalis	t	FAC
Hop Sedge	Carex lupulina	h	OBL
Johnsongrass	Sorghum halepense	h	FACU
Little Bluestem	Schizachyrium scoparium	h	FACU
Multiflora Rose	Rosa multiflora	h	UPL
Northern Red Oak	Quercus rubra	t	FACU
Osage Orange	Maclura pomifera	t	UPL
Pecan	Carya illinoensis	t	FAC
Pennsylvania Smartweed	Polygonum pennsylvanicum	h	FACW
Plum	Prunus americana	t	NI
Poison Ivy	Toxicodendron radicans	V	FAC
Post Oak	Quercus stellata	t	NA
Red Maple	Acer rubrum	t	FACW
Rush	Juncus sp.	Н	-
Saw Greenbrier	Smilax bona-nox	V	FAC
Sericea Lespedeza	Lespedeza cuneata	S	NI
Silver Maple	Acer saccharinum	t	FAC
Switchgrass	Panicum virgatum	h	FACW
Tall Fescue	Schedonorus phoenix	Н	FAC
Virginia Wildrye	Elymus virginicus	h	FAC

5.3 WILDLIFE ASSESSMENT

Wildlife species observed during field survey within the study area are summarized in Table 3 below.

Table 3: Animal Species Observed within Study Area		
Common Name	Scientific Name	
Birds (Sibley, 2000)		
American Crow	Corvus brachyrhynchos	
American Goldfinch	Spinus tristis	
Blue Jay	Cyanocitta cristata	
Cedar Waxwing	Bombycilla cedrorum	

Table 3: Animal Species Observed within Study Area		
Common Name	Scientific Name	
Red-tailed Hawk	Buteo jamaicensis	
Mammals (Caire et al., 1989)		
American Beaver	Castor canadensis	
Eastern Cottontail	Sylvilagus floridanus	
Eastern Gray Squirrel	Sciurus carolinensis	
Nine-banded Armadillo	Dasyppus novemcinctus	
White-tailed Deer	Odocoileus virginianus	

6.0 FINDINGS

6.1 THREATENED, ENDANGERED, AND PROTECTED SPECIES

In order to evaluate the study area for the potential presence of protected species, the USFWS list of federally listed species and designated critical habitat areas in Rogers County, Oklahoma was reviewed (USFWS, 2009). These sources were reviewed to determine if listed species and their associated habitat had the potential to occur within the study area or if adverse effects associated with the potential mitigation activities may occur. Based upon the habitat descriptions of those species that were indicated to occur in Rogers County, a qualitative comparison to the habitat present within the subject site that could increase the potential for listed species to be present or adjacent to the study area was made during field reconnaissance efforts. The qualitative comparison was based upon regional and local ecological characteristics including soils, terrain, hydrology, and vegetation. The USFWS was not directly contacted.

Notes were also taken on livestock grazing, development, pollution and other disturbances that could decrease the potential for listed species to be present. Table 4 includes listed and candidate species that are either present, have the potential to be present, or have been observed in the past in Rogers County.

Table 4: Rogers County, Oklahoma Listed and Protected Species					
Common Name	Scientific Name	Federal Listing	Critical Habitat		
American Burying Beetle	Nicrophorus americanus	E	No		
Interior Least Tern	Sterna antillarum	E	No		
Piping Plover	Charadrius melodus	Т	No		
Whooping Crane	Grus americana	E	No		
Neosho Mucket Mussel	Lampsilis rafinesaqueana	С	No		
Rabbitsfoot Mussel	Quadrula cylindrica	С	No		
Arkansas Darter	Etheostoma cragini	С	No		
Bald Eagle	Haliaeetus leucocephalus	DL*	No		
T = threatened, E = endan *Bald Eagle is protected u	T = threatened, E = endangered, C = candidate, DL = delisted *Bald Eagle is protected under the Bald and Golden Eagle Protection Act				

No critical habitat has been designated for the eight species listed above in Rogers County, Oklahoma (USFWS Critical Habitat Mapper).

American Burying Beetle: The American Burying Beetle (ABB) is federally listed as endangered. This species is found in 22 counties in eastern Oklahoma. An additional six Oklahoma counties lie within the historic range of the ABB and two others have had unconfirmed sightings since 1992. This insect species is present on less than 10% of its original range. This scavenger needs small vertebrates (from 50-200 grams in size) to feed upon. Habitat requirements for the ABB include areas with loose, well-drained soils with a well-formed litter layer from oak-hickory and oak-pine forests, as well as open native grassland and open native fields along forest edges. According to the USFWS, pastures where native grasses have been displaced by cultivation of Bermuda grass (*Cynodon dactylon*) are not expected to support the ABB. There is no Critical Habitat designated for the ABB in Rogers County (USFWS, 1991).

Findings of Survey Results for ABB: Mature deciduous forest adjacent to open grass fields that could provide suitable reproductive and foraging habitat for the ABB occur within the study area. There are approximately 115 acres of forested and upland grassland plant communities that provide potentially suitable ABB habitat within the study area.

Interior Least Tern: The Interior Least Tern is federally listed as endangered (USFWS, 1985a). The Interior Least Tern is a frequent summer resident that occurs along sand bars within the braided channels of the Canadian, Red, Cimarron, and Arkansas rivers (USFW, 1990). In Oklahoma, the largest populations occur at the Salt Plains National Wildlife Refuge in Alfalfa County. Nesting colonies occur on sparsely vegetated sandbars on large rivers or salt flats with some natural debris. Most nesting occurs in May-June.

Findings of Survey Results for Interior Least Tern: The study area does not contain sparsely vegetated sandbars on large rivers or salt flats with the natural debris required by the Interior Least Tern for both nesting and feeding. Suitable habitat for the Interior Least Tern was not observed to be present on or in the immediate vicinity of the study area.

Piping Plover: The Piping Plover is federally listed as endangered within the Great Lakes Region, and threatened in the remainder of its range, including Oklahoma. Preferred habitats include sandy beaches along the ocean or lakes, and bare areas of islands or sandbars along large rivers. They also nest on the pebbly mud of interior alkali lakes and ponds. This shorebird migrates through Oklahoma each spring and fall. Sight records of migratory Piping Plovers exist for many central and eastern Oklahoma counties. Rogers County is not located in the probable migratory pathway between breeding and winter habitats (USFWS, 1985b).

Findings of Survey Results for Piping Plover: The study area does not contain sparsely vegetated sandbars on large rivers with the natural debris required by the Piping Plover for both nesting and feeding. No suitable habitat for the Piping Plover was observed to be present on or in the immediate vicinity of the study area. Nesting Piping Plovers are only known pre-1997, from the Oklahoma panhandle and do not nest in Rogers County (GMSARC, 2009).

Whooping Crane: The Whooping Crane is federally listed as endangered (USFWS, 1967). Critical Habitat has been designated for this species in Oklahoma at the Salt Plains National Wildlife Refuge (NWR) in northwestern Oklahoma. This wading bird is ecologically dependent on freshwater wetlands and, in the winter, on coastal brackish wetlands. The Whooping Crane migrates through western Oklahoma in the spring and fall (Austin, 2001). During migration, Whooping Cranes are sometimes found in Oklahoma outside of the Salt Plains NWR along

rivers, grain fields, or in shallow wetlands. There is no critical habitat designated for the Whooping Crane in Rogers County, OK.

Findings of Survey Results for Whooping Crane: All areas within and adjacent to the study area were examined during field survey effort for the presence of suitable Whooping Crane foraging and roosting habitat. No preferred foraging or roosting habitat for this species was observed within or in areas adjacent to the study area.

Neosho Mucket Mussel: The Neosho Mucket is federally listed as a candidate species. It lives in freshwater and has an elongated, slightly rounded shell and is approximately 4 inches wide. In Oklahoma, living Neosho muckets were found along 55 miles of the Illinois River from the Oklahoma/Arkansas state line, downstream to the headwaters of Tenkiller Lake, Cherokee County, Oklahoma (Mather, 1990). Reproduction and recruitment rates of this species are low and the Neosho muckets is relatively rare in the Fall, Verdigris, Neosho, and North Fork Spring Rivers, and Shoal Creek, in northeastern Oklahoma. There is no critical habitat designated for the Neosho mucket in Rogers County.

Findings of Survey Results for Neosho Mucket Mussel: Surveys conducted at 32 sites on the Verdigris River found no live Neosho mucket mussels. The results of these surveys suggest the Neosho mucket has been extirpated from the Verdigris River in Oklahoma (Mathers 1990). Researchers at Oklahoma State University have revisited these sites in the Verdigris River in the 1990's and confirmed that the species is now extirpated from this river in Oklahoma.

Rabbitsfoot Mussel: The Rabbitsfoot is federally listed as a candidate species. In Oklahoma, living Rabbitsfoot mussels are found within the Illinois and Verdigris Rivers in the northeastern portion of the state, as well as in the Little, Glover, and Mountain Fork Rivers in the southeastern portion of the state. Rabbitsfoot mussels exhibit seasonal movement, migrating toward shallower water during brooding periods (Fobian 2007). Threats to the species are primarily reduction of habitat due to impoundment, sedimentation, agricultural pollutants, and lead and zinc mining. There is no critical habitat designated for the Rabbitsfoot in Rogers County.

Findings of Survey Results for Rabbitsfoot Mussel: Surveys for the presence of the Rabbitsfoot mussel were conducted by Vaughn (1998) and the Oklahoma Department of Wildlife Conservation (2006-2009). This species was previously thought to be extirpated from the Verdigris River. However, the surveys found the lower Verdigris River (below Lake Oologah) supported the most dense assemblages of the Rabbitsfoot mussel in Oklahoma, Missouri, and Kansas (ODWC 2009).

Arkansas Darter: The Arkansas Darter is federally listed as a candidate species. It occurs in the Arkansas River drainage from Arkansas to Colorado; numerous viable populations exist, but recent declines have occurred and many populations are threatened by continuing loss of habitat, especially through dewatering. Historically this fish was never very common. Preferred habitat includes spring-fed creeks with cool, clear water with herbaceous aquatic vegetation, or pools with sand, fine gravel, or organic detritus substrate. Surveys in 1994-1997 in south-central Kansas and adjacent Oklahoma recorded this species from 67 of the 108 localities that were sampled within the general historical range of the species (Eberle and Stark 2000).

Findings of Survey Results for Arkansas Darter: The study area does not contain spring-fed creeks with cool clear water, aquatic herbaceous vegetation, and gravel bottoms, as required by the Arkansas Darter. Suitable habitat for the Arkansas Darter was not observed to be present on or in the immediate vicinity of the study area.

Bald Eagle: The Bald Eagle is a large predatory bird that occupies large trees along major rivers and streams during their winter distribution (December through March) in Oklahoma. In August 2007, the Bald Eagle was delisted by the USFWS from the Federal List of Endangered and Threatened Wildlife (USFWS, 2007). Since delisting, the Bald Eagle continues to be protected by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act (USFWS, 1940). Bald Eagles nest in tall trees usually within one or two miles of large rivers, streams and lakes where fish are abundant. Although nesting eagles are concentrated in eastern Oklahoma, their nesting range appears to be expanding. Bald Eagles were not observed during this survey.

Findings of Survey Results for Bald Eagle: There is a perennial stream (Verdigris River) with tall trees within the study area. Based on information from the G.M. Sutton Avian Research Center, the closest occupied Bald Eagle nest is located approximately four miles northeast of the study area along the Verdigris River (GMSARC, 2011). No Bald Eagle nests were observed within or adjacent to the study area. Suitable nesting, roosting, and foraging habitat for the Bald Eagle was observed in the study area. While suitable nesting, roosting, and foraging habitat is present within the study area, disturbance would only be associated with temporary construction activities.

6.2 POTENTIALLY JURISDICTIONAL WATERBODIES

Based on Kleinfelder's assessment, specific locations within the study area met the technical criteria for jurisdictional wetlands. Following the U.S. Supreme Court's decision in Rapanos v. United States and Carabell v. United States (2006), new technical standards have been implemented for determining the limit of Waters. The new technical standards have: 1) rejected the argument that the term "waters of the United States" is limited to only those waters that are navigable in the traditional sense and their abutting wetlands, and 2) asserted that regulatory authority should extend only to "relatively permanent, standing or continuously flowing bodies of water" connected to traditional navigable waters, and to "wetlands with a continuous surface connection to" such relatively permanent waters (USACE, 2007).

The study area contains ten (10) potentially jurisdictional waterbodies. One (1) mapped, unnamed, blue-line perennial stream, three (3) mapped, blue-line intermittent streams, one (1) unmapped intermittent stream, two (2) wetlands and three (3) ponds; were observed during field investigations within the study area (Figure 8). Wetland delineation data forms for the wetland features and their adjacent upland features are located in Appendix C. A summary of all Waters within the study area is shown in Table 5.

	Table 5: Potentially Jurisdictional Waterbodies within the Study Area						
Water- body	USGS Topo or NWI Classifica- tion	Length /Area	Field Observa- tions	Potentially Jurisdic- tional	Cowardin Classifi- cation	OHWM / Avg. Width Observed	Comments
Stream 1	Intermittent, blue-line stream	904 ft. 0.06 acres	Intermittent stream	Yes	R4UB3	3 feet	Unconsolidated, mud bottom, vegetated banks, average 6 inches deep
Stream 2	Intermittent, blue-line stream	693 ft. 0.03 acres	Intermittent stream	Yes	R4UB3	2 feet	Unconsolidated, vegetated banks, dry at time of survey
Stream 3	Intermittent, blue-line stream	539 ft. 0.04 acres	Intermittent stream	Yes	R4UB3	3 feet	Unconsolidated, mud bottom, steep, vegetated banks, dry at time of survey
Stream 4	Perennial, blue-line stream	2261 ft. 0.21 acres	Perennial stream	Yes	R3UB3	4 feet	Unconsolidated, steep, vegetated banks, dry at time of survey
Stream 5	Intermittent stream	404 ft. 0.06 acres	Intermittent stream	Yes	R4UB3	6 feet	Slow flow, un- consolidated mud bottom, vegetated banks, average 1 ft. deep
Wetland 1	PFO1A	65.70 acres	Forested Wetland	Yes	PFO1A	NA	Forested wetland, bordered by the Verdigris River on south edge
Wetland 2	Unmapped	0.04 acres	Emergent Wetland	Yes	PEM1A	NA	Emergent (fringe) wetland around Pond 1
Pond 1	Unmapped	0.20 acres	Freshwater Pond	Yes	-	Unknown (less than 3 feet)	Freshwater Pond associated with Wetland 2 and stream 4
Pond 2	Freshwater Pond	4.47 acres	Freshwater Pond	Yes	-	Unknown (more than 3 feet)	Freshwater Pond associated with streams 1-3
Pond 3	Unmapped	0.20 acres	Freshwater Pond	Yes	-	Unknown (less than 3 feet)	Freshwater Pond, western part of forested wetland
Approx. Totals		4,801 Linear Feet / 71.01 Acres of Waters					

Two forested wetlands and a pond are identified on current NWI maps. Approximately **71.01** acres of potentially jurisdictional Waters (**0.40 acres** of streams, **4.87 acres** of ponds and **65.74** acres of forested/emergent wetland were identified and are located within the study area (Figure 8).

Stream 1 – (904 linear feet) This waterbody is located within the north central part of the study area. It is a mapped, blue-line intermittent stream that flows from the northeast to southwest This waterbody has an unconsolidated mud bottom with vegetated banks. At the time of the survey, the stream was moderately flowing and the depth of the water was six (6) inches. Dominant vegetation associated with this waterbody included Pecan, Oak, Hackberry, and American elm (Figure 8).

This intermittent stream may be subject to USACE jurisdiction. This stream has direct hydrologic connection with the Verdigris River through Pond 2 and Stream 3.

Stream 2 – (693 linear feet) This waterbody is located within the northwest portion of the study area. It is a mapped, unnamed intermittent stream that flows from northwest to southeast. This waterbody has an unconsolidated bottom with vegetated banks. At the time of the survey, the stream was dry. Dominant vegetation associated with this waterbody included Hackberry, Green ash, American elm, Greenbrier, Bermuda grass and Poison ivy (Figure 8).

This intermittent stream may be subject to USACE jurisdiction. This stream has direct hydrologic connection with the Verdigris River through Pond 2 and Stream 3.

Stream 3 – (539 linear feet) This waterbody is located within the south central part of the study area. It is a mapped, blue-line intermittent stream that flows from northwest to southeast into the Verdigris River. The waterbody has an unconsolidated mud bottom with steep vegetated banks. At the time of the survey, the stream was mostly dry. Dominant vegetation associated with this waterbody included Red maple, Pecan, American elm and blackberry (Figure 8).

This intermittent stream may be subject to USACE jurisdiction because it has direct hydrologic connection with the Verdigris River.

Stream 4 – (2,261 linear feet) This waterbody is located within the eastern part of the study area. It is an unnamed blue-line perennial stream that flows from northeast to southwest and is connected to the Verdigris River. The waterbody has an unconsolidated bottom, with large rock rip-rap and steep vegetated banks. At the time of the survey the stream was mostly dry. Dominant vegetation associated with this waterbody included Red maple, Pecan, American elm and blackberry (Figure 8).

This perennial stream may be subject to USACE jurisdiction because it has direct hydrologic connection with the Verdigris River.

Stream 5 – (404 linear feet) This waterbody is located within the eastern part of the study area. It is an unmapped intermittent stream that flows from east to west and is connected to Stream 4. This waterbody has an unconsolidated mud bottom with steep vegetated banks. At the time of the survey, the stream was moderately flowing with a water depth of 1 foot. Dominant

vegetation associated with this waterbody included Hackberry, American elm, Pecan, Post oak, Hackberry and Plum (Figure 8).

This intermittent stream may be subject to USACE jurisdiction because it has direct hydrologic connection with the Verdigris River through Stream 4.

Wetland 1 – (65.70 acres) Wetland 1 is located within the northern half of the study area. Based on attributes seen during the field investigation, the wetland is classified as a PFO1A (palustrine, forested, broad-leaved deciduous, temporarily flooded) wetland (Cowardin, 1979). Wetland 1 is mapped on the NWI map. The plant community was dominated by hydrophytic species that included Black willow, American elm, Red maple, Pecan, Hackberry and Cottonwood. Hydrologic indicators consisted of drift deposits, surface water, water marks, stained leaves and saturated soil beginning at zero inches. From 0-16 inches, the soil matrix was 10YR 3/1 with redox features of 5YR 4/6 compared to Munsell color charts and is classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 8).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction because it has direct hydrologic connection with the Verdigris River.

Wetland 2 – (0.04 acres) Wetland 2 is located within the northeastern portion of the study area. Based on attributes seen during the field investigation, the wetland is classified as a PEM1A (palustrine, emergent, temporarily flooded) wetland (Cowardin, 1979). Wetland 2 is a fringe wetland to Pond 1 that is not mapped on the NWI map. The plant community was dominated by hydrophytic species that included Giant ragweed, Tall fescue, Pennsylvania smartweed, and an unknown rush species. Hydrologic indicators consisted of reduced iron and saturated soil beginning at zero inches. From 0-16 inches, the soil matrix was 2.5YR 2.5/1 with redox features of 2.5YR 2.5/4 when compared to Munsell color charts and is classified as hydric. All three criteria were met (hydrophytic vegetation, hydrology, and hydric soils) to classify this area as a potentially jurisdictional wetland (Figure 8).

This wetland is potentially jurisdictional and may be subject to USACE jurisdiction due to its direct hydrologic connection with the Verdigris River.

Pond 1 – (0.20 acres) Pond 1 is an excavated and artificially impounded freshwater pond located on the northeastern part of the study area. Based on attributes seen during the field investigation, this is a freshwater pond that is not mapped on the NWI map. The surrounding plant community is dominated by various oaks and sedges. This pond is associated with fringe Wetland 2 and is located within forested Wetland 1 (Figure 8).

This pond is potentially jurisdictional and may be subject to USACE jurisdiction due to its direct hydrologic connection with Wetland 1 and the Verdigris River through Stream 4.

Pond 2 – (4.47 acres) Pond 2 is an excavated and artificially impounded freshwater pond located in the center of the study area and is connected to Stream 1, Stream 2 and Stream 3. Based on attributes seen during the field investigation, this is a freshwater pond and is mapped on the NWI map. The surrounding plant community is dominated by Pecan, Oak, American elm and American sycamore (Figure 8). This pond is within forested Wetland 1.

This pond is potentially jurisdictional and may be subject to USACE jurisdiction due to its direct hydrologic connection with the Verdigris River through Streams 1, 2 and 3.

Pond 3 – (0.20 acres) Pond 3 is an excavated and artificially impounded freshwater pond located on the western edge of the study area. Based on attributes seen during the field investigation, this is a freshwater pond that is located within forested Wetland 1. Pond 3 is not mapped on the NWI map. The surrounding plant community is dominated by Pecan, Oak, American elm, American sycamore and grape vines (Figure 8).

This pond is potentially jurisdictional and may be subject to USACE jurisdiction because it is hydrologically connected to Wetland 1. In this area, sheet flow appears to collect in the pond. Overflow from the pond contributes to the hydrology of the wetland. The pond and wetland are also in close proximity to the Verdigris River.

6.3 HISTORIC WETLANDS

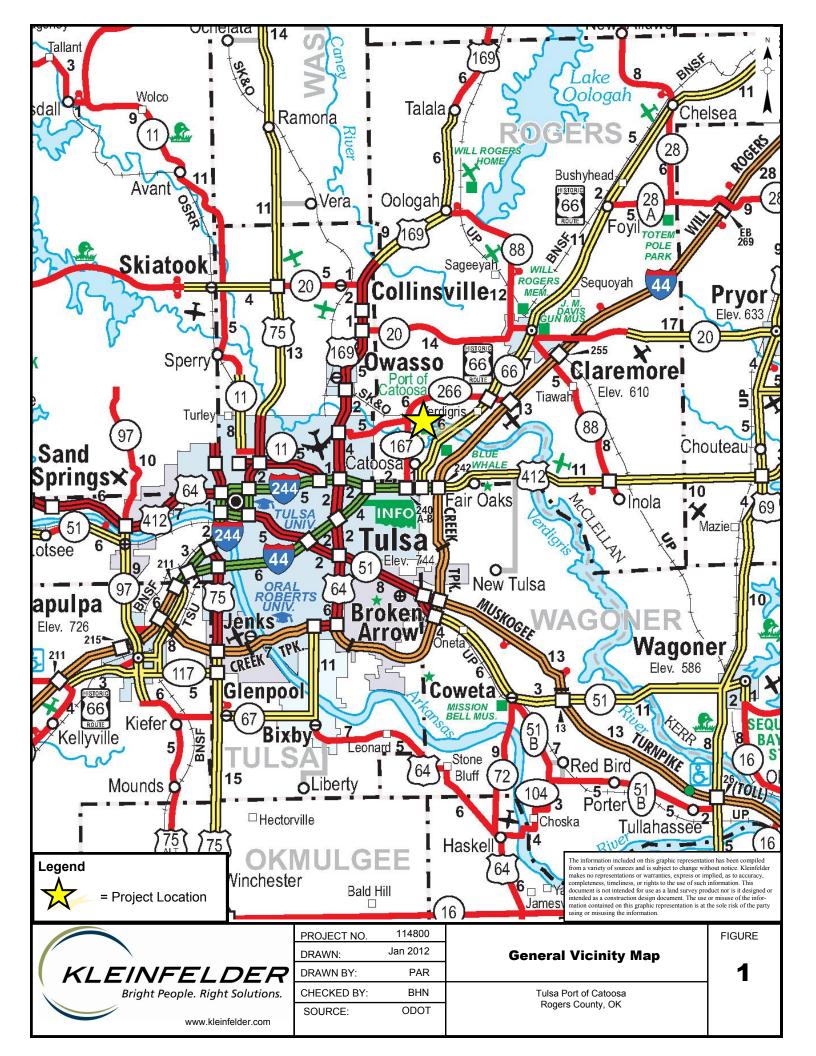
Based on the review of NRCS aerial photographs (Appendix B); NRCS Web Soil Survey data, Oklahoma counties hydric soils list; Google Earth Pro; NWI maps, and USGS Topographic maps in combination with the presence of hydric soils over large portions of the study area, a majority of the area could historically be classified as either forested or emergent wetlands (see Figure 9).

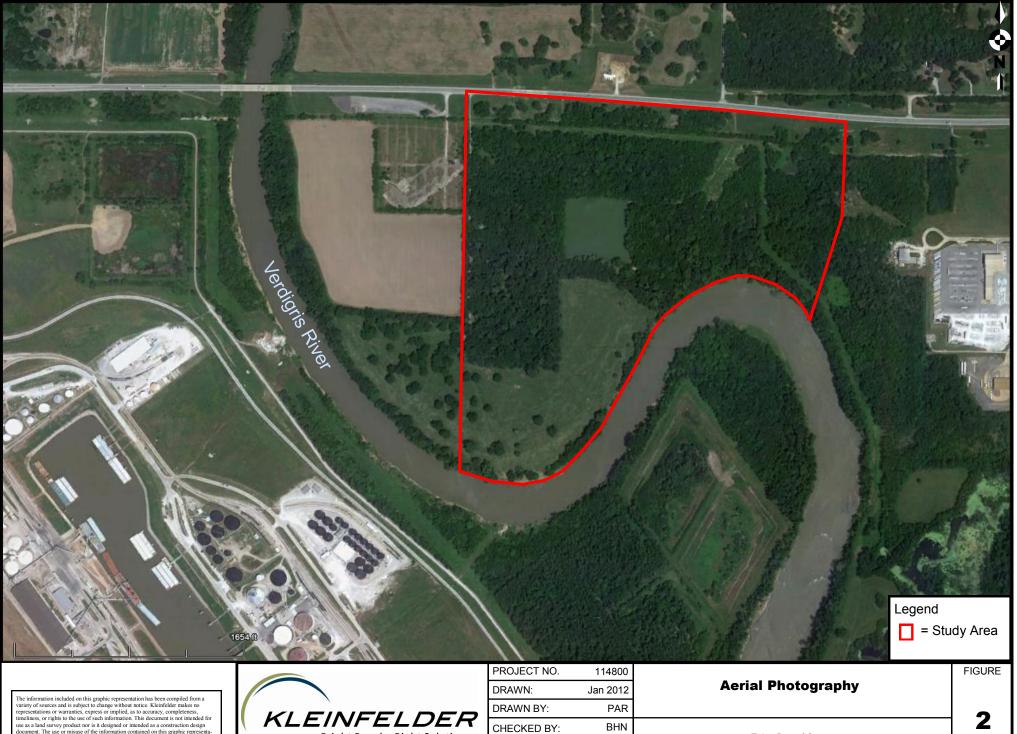
7.0 REFERENCES

- Caire, W., B.P Glass, M.A. Mares, and J.D. Tyler. 1989. *Mammals of Oklahoma*. First Edition. University of Oklahoma Press. Norman, OK
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31, U.S. Fish and Wildlife Service, Washington, DC.103pp.
- Eberle, M. E., and W. S. Stark. 2000. Status of the Arkansas darter in south-central Kansas and adjacent Oklahoma. Prairie Naturalist 32:103-113.
- Environmental Laboratory. 1987. Corps of Engineers Wetland Delineation Manual. Technical Report Y-87-1, U.S. Army Corps of Engineers Waterways Experiment Station, Vicksburg, Mississippi.
- G.M.Sutton Avian Research Center (GMSARC). 2011. Personal communication (email) with Alan Jenkins regarding the location and proxmity of occupied Bald Eagle within or near the Tulsa Port of Catoosa study areas.
- MacBeth Division, Kollmorgen Instruments Corporation (MacBeth). 1994. *Munsell Soil Color Charts*. Baltimore, Maryland.
- Mather, C. 1990. Status survey of the western fanshell and the Neosho mucket in Oklahoma. Final Report to the Oklahoma Department of Wildlife Conservation. Project No. E-7, Oklahoma. 22 pp
- Oklahoma Climatological Survey (OCS). 2010. Rogers County Climate Summary, accessed at: <u>http://climate.mesonet.org/county_climate/Products/QuickFacts/Rogers.pdf</u>.
- Oklahoma Department of Wildlife Conservation (ODWC). 2009. *Status of Macroinvertebrate and Fish Assemblages in the Small Rivers of the Tall Grass Prairie.* Federal Aid Grant No. T-40-P-1. Accessed at: <u>http://www.wildlifedepartment.com/wildlifemgmt/wildlifegrants/T-40-P-1%20Final%20APR%20FY10%203-24-10%20Report%20Only.pdf.</u>
- Sibley, David A. 2000. National Audubon Society *The Sibley Guide to Birds*. First Edition. Chanticleer Press, Inc. New York
- U.S. Army Corps of Engineers (USACE). 2007. Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States. At: <u>http://www.usace.army.mil/cw/cecwo/reg/cwa_guide/rapanos_guide_memo.pdf</u>.
- U.S. Army Engineer Research and Development Center (USAERDC). 2008. Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region. Available at: <u>http://el.erdc.usace.army.mil/elpubs/pdf/trel08-27.pdf</u>
- U.S. Department of Agriculture, NRCS (USDA). 2009. PLANTS Database (http://plants.usda.gov, 24 September 2009). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

- U.S. Department of Agriculture (USDA). 2008. Soil Survey for Rogers County, Oklahoma. Natural Resources Conservation Service in Cooperation with Oklahoma Agricultural Experiment Station. Available at: <u>http://websoilsurvey.nrcs.usda.gov</u>.
- U.S. Environmental Protection Agency (EPA). 1972. Clean Water Act (amended 1977 and 1987). 33 U.S.C. §§ 1251-1387.
- U.S. Fish and Wildlife Service (USFWS). 2009. Oklahoma Ecological Services Field Office. County Occurrences of Oklahoma Federally-Listed Endangered, Threatened, Proposed and Candidate Species. Accessed at: http://www.fws.gov/southwest/es/oklahoma.
- U.S. Fish and Wildlife Service (USFWS). 2007. Endangered and Threatened Wildlife and Plants; Removing the Bald Eagle in the Lower 48 States. From the List of Endangered and Threatened Wildlife. Federal Register 72(130): 37345-37372.
- U.S. Fish and Wildlife Service (USFWS). 1990. Recovery Plan for the Interior Population of the Least Tern (Sterna antillarum). Grand Island, Nebraska. 95pp.
- U.S. Fish and Wildlife Service (USFWS). 1992. Western Prairie Fringed Orchid (*Platanthera praeclara*) Fact Sheet. At: <u>http://www.fws.gov/southwest/es/oklahoma/orchid1.htm</u>.
- U.S. Fish and Wildlife Service (USFWS). 1991. American Burying Beetle (*Nicrophorus americanus*) Recovery Plan. Newton Corner, Massachusetts. 80 pp.
- U.S. Fish and Wildlife Service (USFWS). 1988. 1988 National List of Plant Species that Occur in Wetlands. Available at: http://www.fws.gov.nwi/bha.download.1988region2.txt
- U.S. Fish and Wildlife Service (USFWS). 1985a. Interior Population of Least Tern Determined to be Endangered. Federal Register 50:21784-21792.
- U.S. Fish and Wildlife Service (USFWS). 1985b. Determination of Endangered and Threatened Status for the Piping Plover: Final Rule. Federal Register 50(238): 50726-50734.
- U.S. Fish and Wildlife Service (USFWS). 1940. Bald and Golden Eagle Protection Act. 16 U.S.C. §§ 668-668d, as amended 1959, 1962, 1972, and 1978.
- Vaughn, C.C. 1997. Determination of the status and habitat preference of the Neosho mucket in Oklahoma. Annual Performance Report submitted to Oklahoma Department of Wildlife Conservation, Oklahoma City, Oklahoma.
- Woods, A.J., Omernik, J.M., Butler, D.R., Ford, J.G., Henley, J.E., Hoagland, B.W., Arndt, D.S., and Moran, B.C., 2005, Ecoregions of Oklahoma (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,250,000).

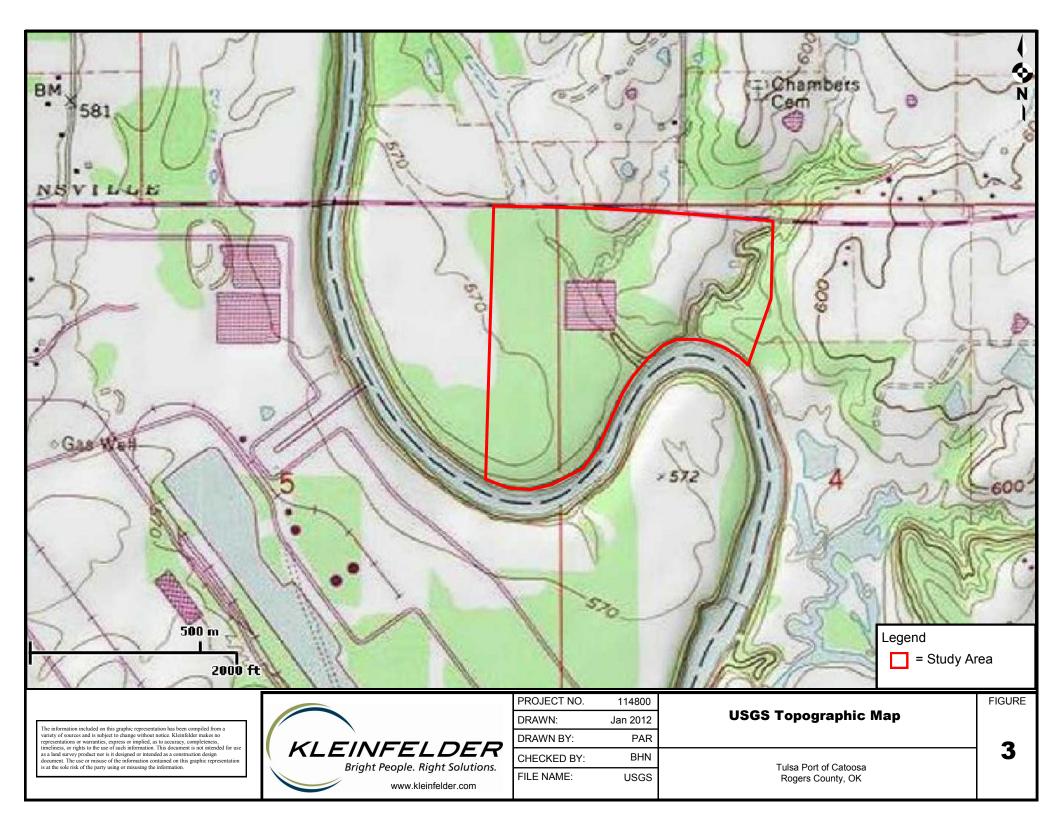
FIGURES

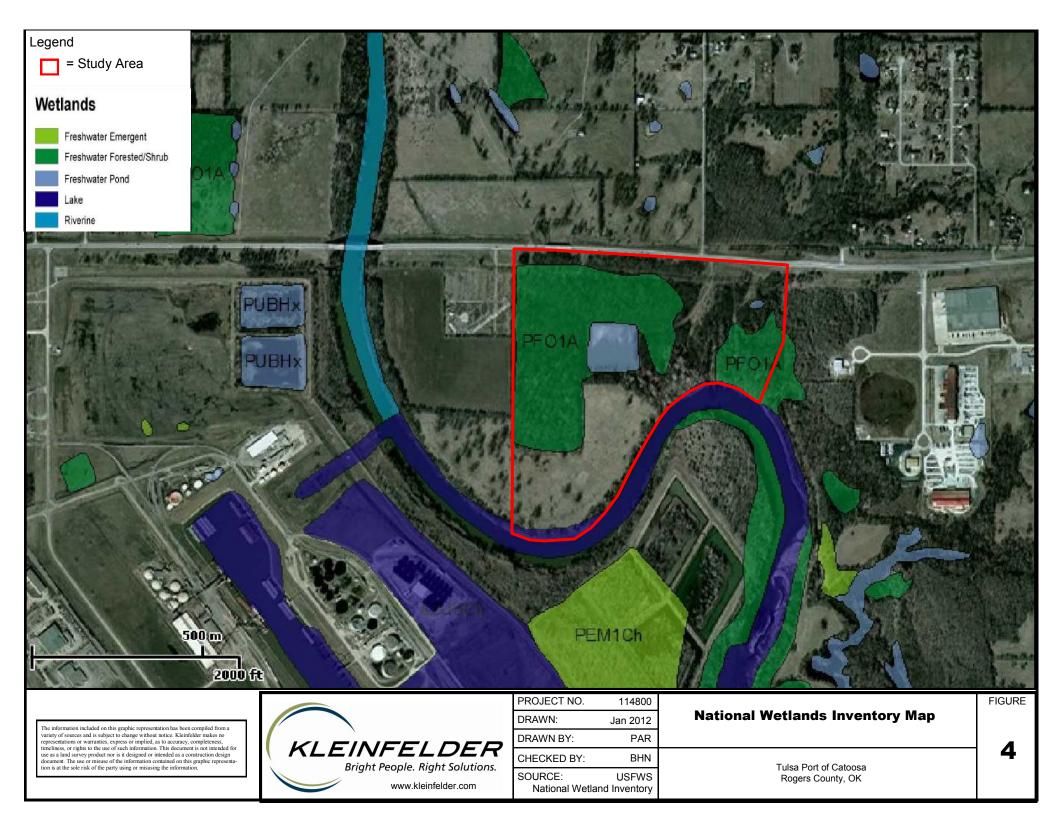


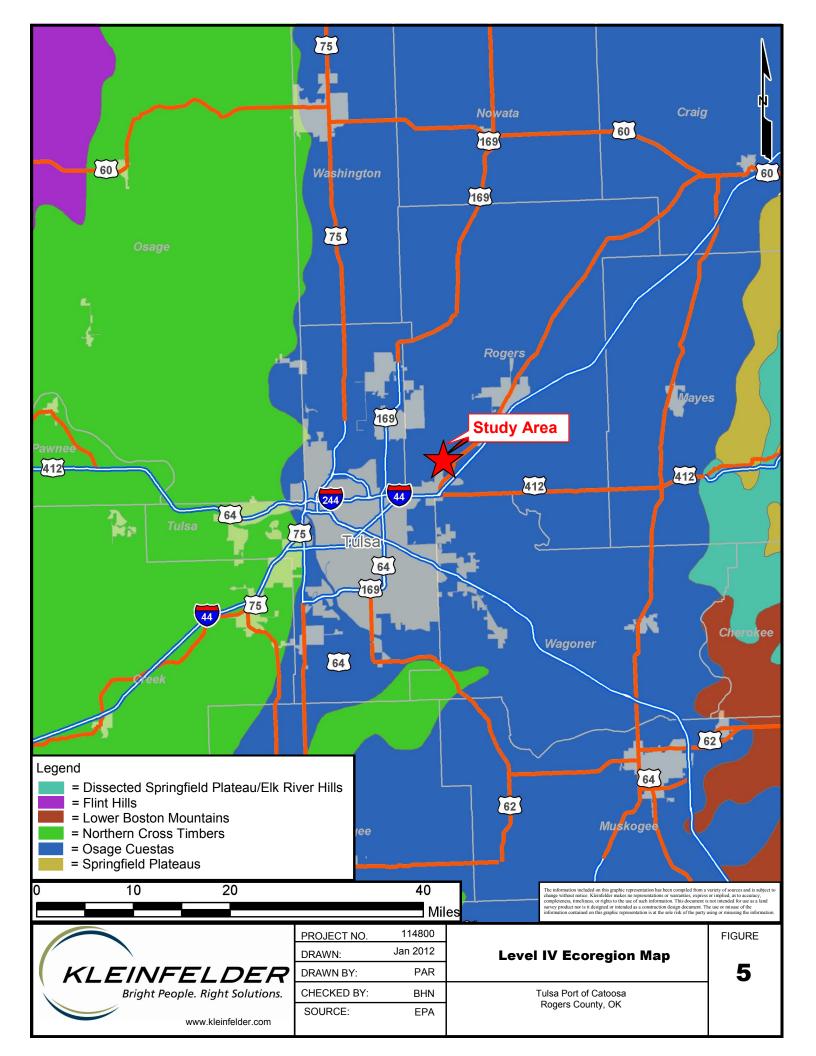


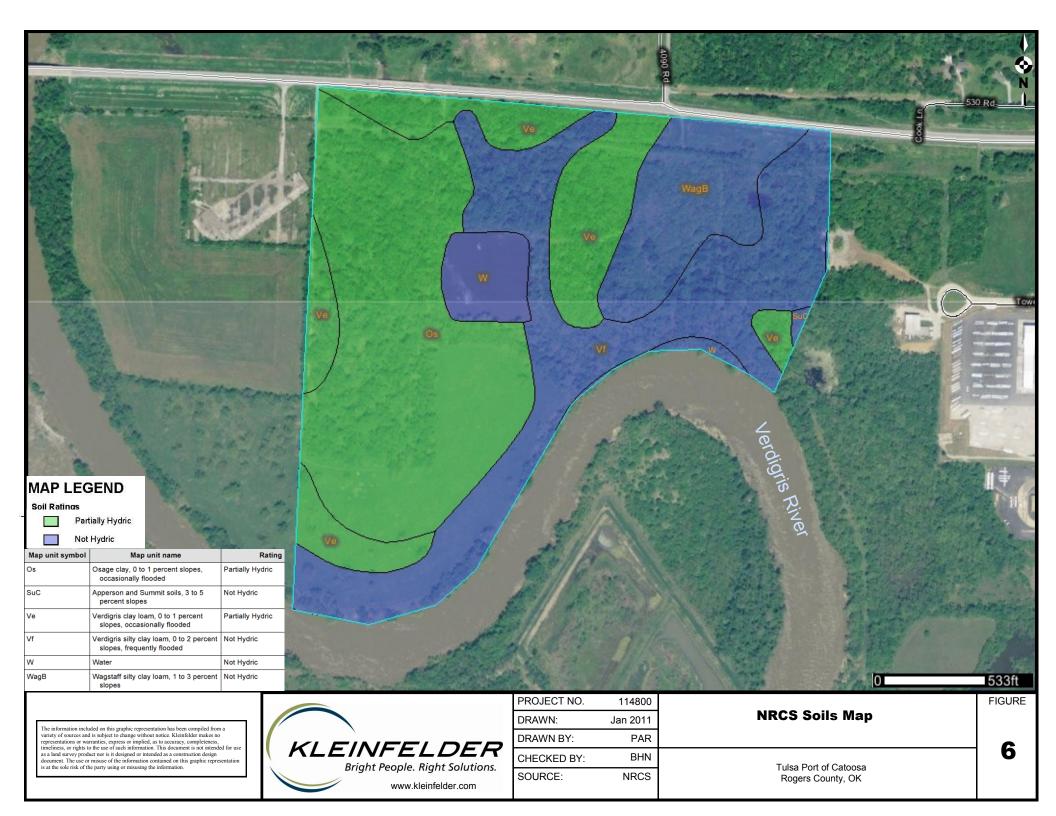


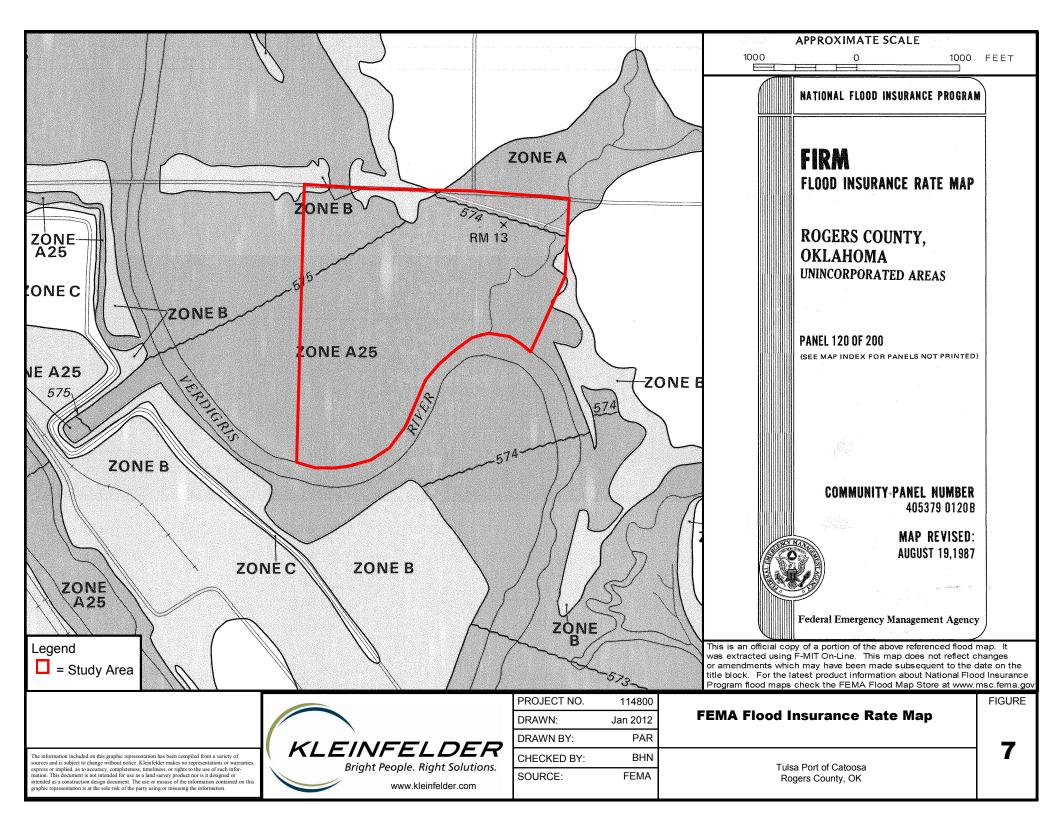
DJECT NO.	114800	
AWN:	Jan 2012	
AWN BY:	PAR	
ECKED BY:	BHN	
E NAME: Google Earth	ı Pro	

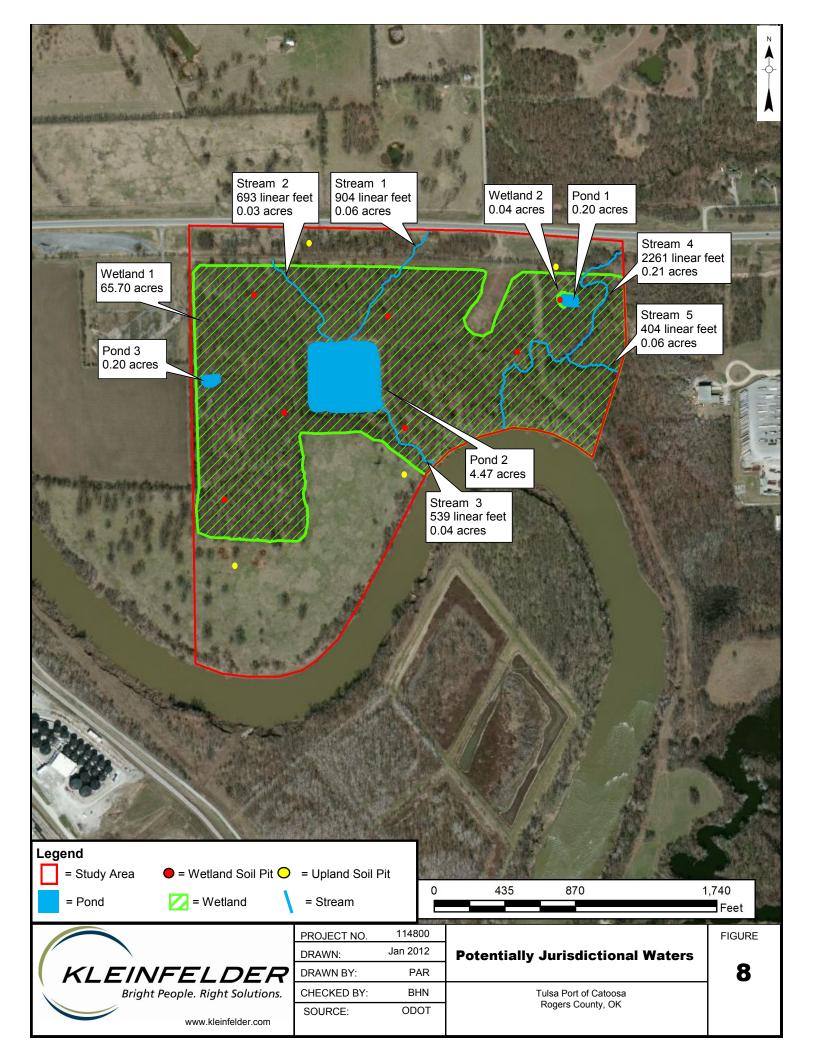


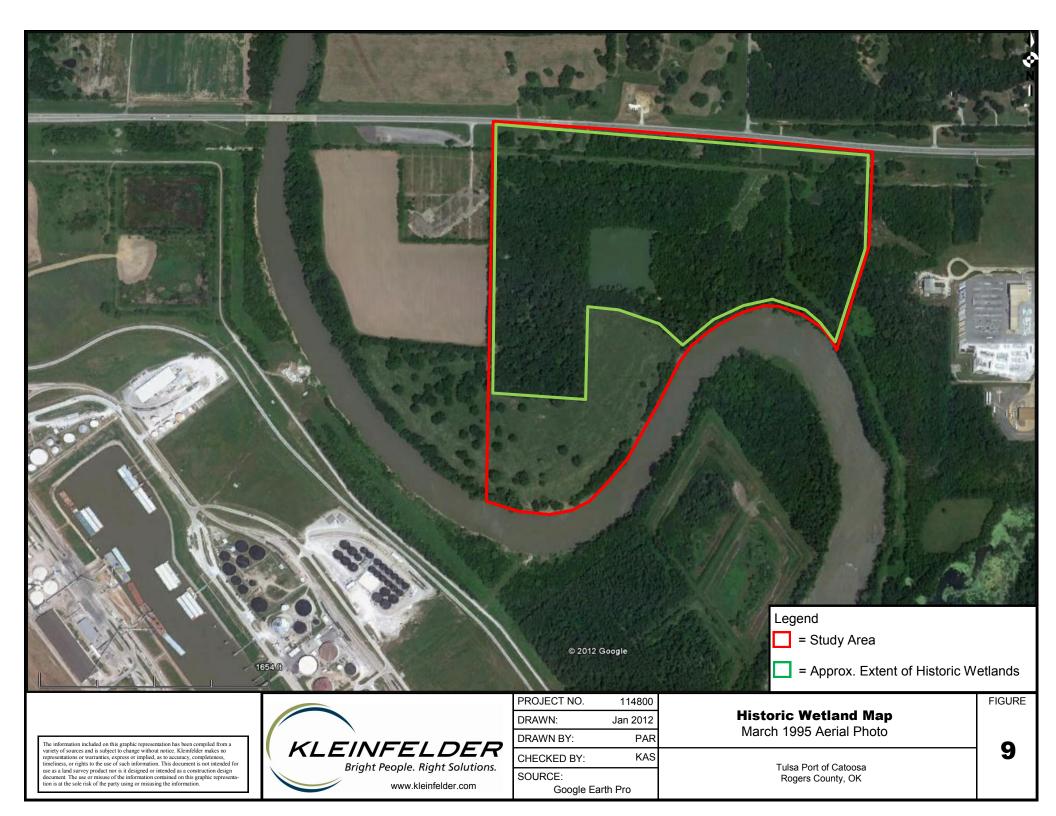












APPENDIX A PHOTOGRAPHIC RECORD



Photo 1 – View south; Pond 3.



Photo 3 – View north; Wetland 1 from north of Pond 2.



Photo 2 – View north; Pond 3.



Photo 4 – View south, Wetland 1 from northwest corner of site.



Project Number: 114800 Photos: December 2011 Tulsa Port of Catoosa Rogers County, Oklahoma

Site Photographs





Photo 5 – Wetland 1: soil sample



Photo 7 – Stream 1, Downstream from culvert at north property boundary.



Photo 6 – Upland adjacent to Wetland 1: soil sample.



Photo 8 – Stream 1, Facing north, view upstream.



Project Number: 114800 Photos: December 2011 Tulsa Port of Catoosa Rogers County, Oklahoma

Site Photographs

Appendix A



Photo 9 – View east; Pond 1.

Photo 10 – View south, Wetland 2.



Photo 11 – Stream 5, Upstream.



Photo 12 – Stream 5, Downstream



Project Number: 114800 Photos: December 12, 2011 Tulsa Port of Catoosa Rogers County, Oklahoma

Site Photographs



Photo 13 – Stream 4, Upstream.



Photo 14 – Stream 4, Downstream.



Photo 15 – Stream 2, Upstream.



Photo 16 – Stream 2, Downstream, and Pond 2.



Project Number: 114800
 Photos: December 12, 2011

Tulsa Port of Catoosa Rogers County, Oklahoma

Site Photographs

Appendix A



Photo 17 – Stream 3, Downstream to Verdigris River.



Photo 18 – Stream 3, Upstream.



Photo 19 – View north, Pond 2.



Project Number: 114800 Photos: December 12, 2011 Tulsa Port of Catoosa Rogers County, Oklahoma

Site Photographs

Appendix A

APPENDIX B HISTORIC AERIAL PHOTOGRAPHS





PROJECT NO.	114800	
DRAWN:	Jan 2012	
DRAWN BY:	PAR	
CHECKED BY:	BHN	
SOURCE:	USDA NRCS	

1958 Historic Aerial Photograph





THE R. LEWIS CO., LANSING MICH.		1.000
PROJECT NO.	114800	
DRAWN:	Jan 2012	
DRAWN BY:	PAR	
CHECKED BY:	BHN	
SOURCE:	USDA NRCS	

1972 Historic Aerial Photograph

N





CONTRACTOR OF CONTRACTOR CONTRACTOR		
PROJECT NO.	114800	
DRAWN:	Jan 2012	
DRAWN BY:	PAR	
CHECKED BY:	BHN	
SOURCE:	USDA NRCS	

1979 Historic Aerial Photograph

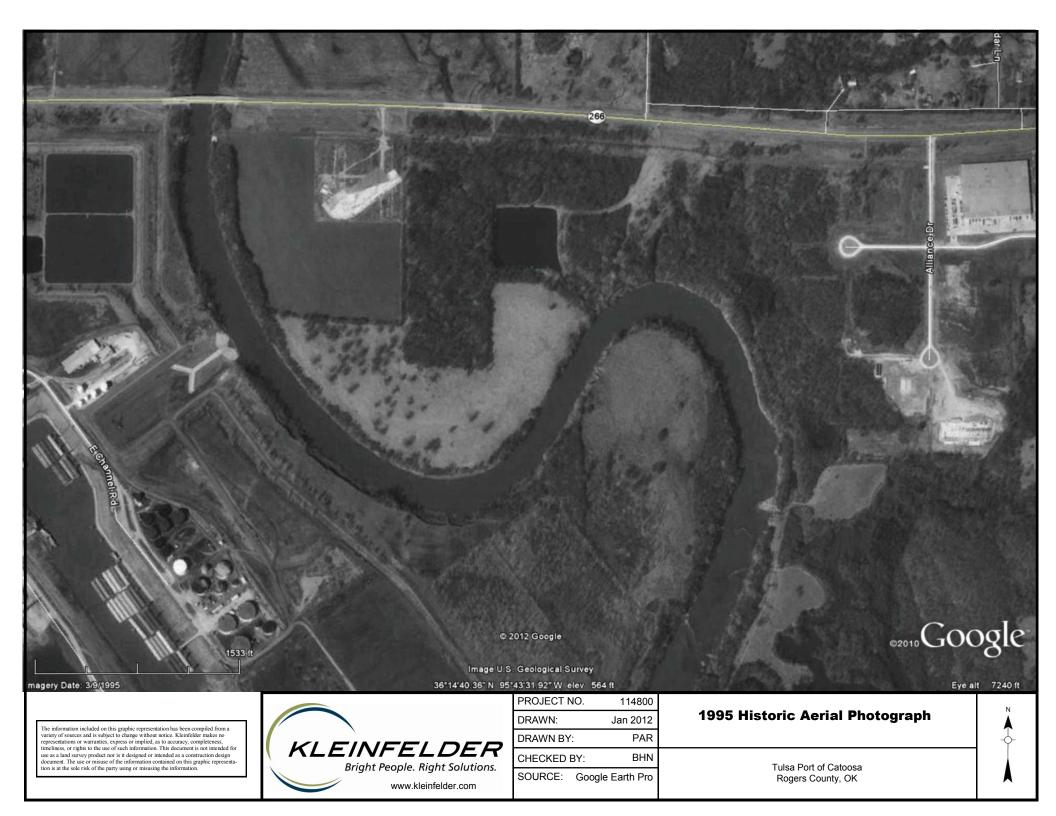
Ν

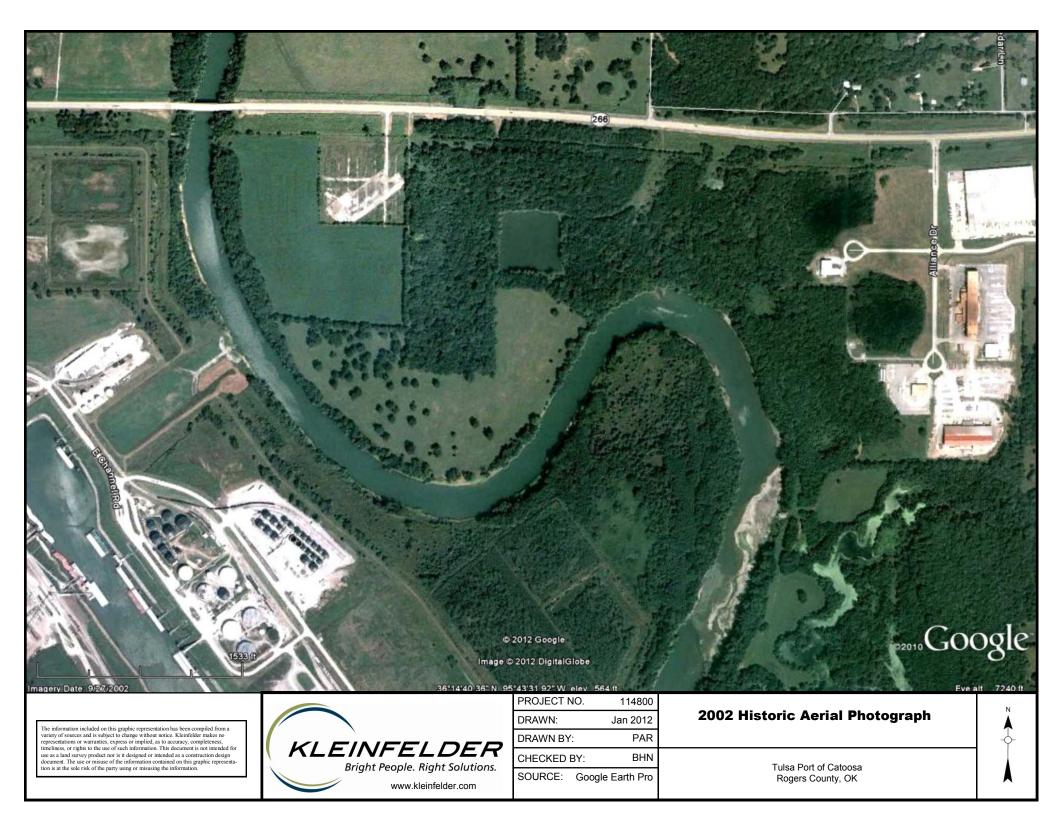


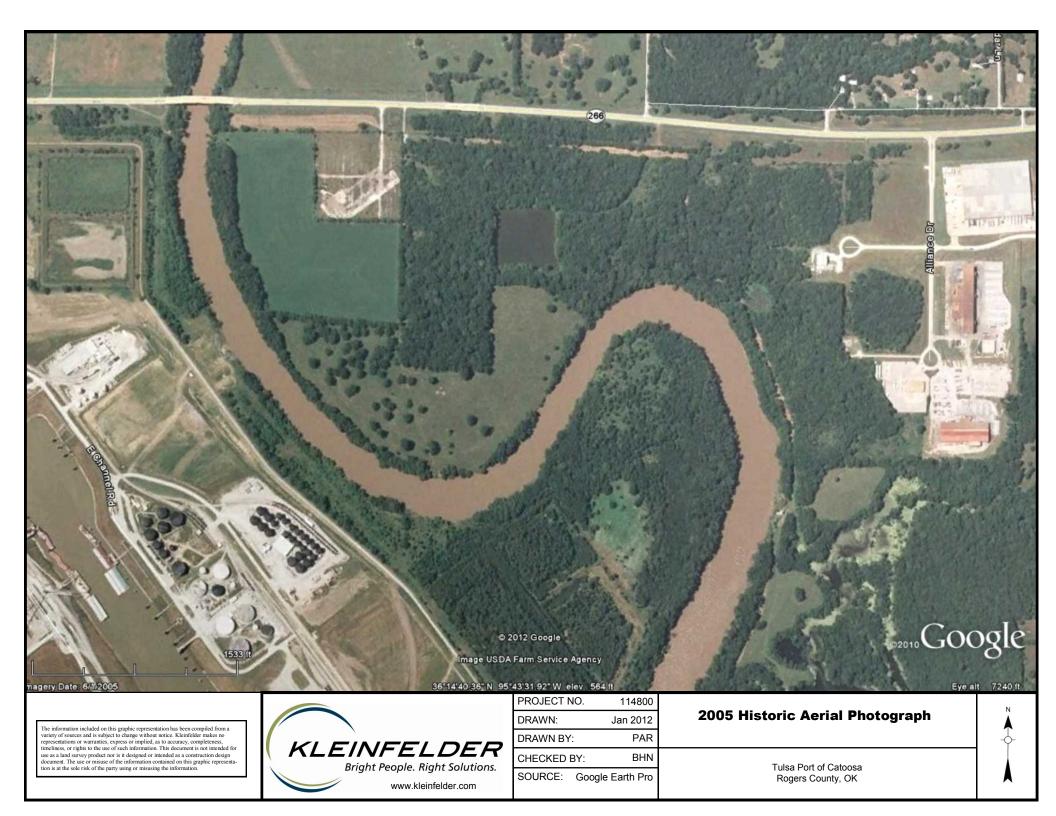


ROJECT NO.	114800	
RAWN:	Jan 2012	
RAWN BY:	PAR	
HECKED BY:	BHN	
OURCE:	USDA NRCS	

1991 Historic Aerial Photograph







APPENDIX C WETLAND DELINEATION FORMS

-	ile: R 1208 ture: Soil		7 1100	and.	
			ί	÷	
WETLA oject/Site: <i>Port of Catasa Site</i> oplicant/Owner: <u>Corps</u> vestigator(s): <u>Blair Paker</u> , F indform (hillslope, terrace, etc.): <u>hillslo</u>	1 Trib 1 Pil	2 City/Cour	nty: Roge	- Midwest Region	_ Sampling Date: 12/8/20
vestigator(s): Blair Baker, E	lisa totz	Section,	Township, Ra	nge:	upland p
Indform (hillslope, terrace, etc.): hillslop)		_ Local relief	(concave, convex, none)	: Concave
ope (%): <u>30</u> Lat:		Long:			Datum:
il Map Unit Name:					cation:
e climatic / hydrologic conditions on the site t					
e Vegetation, Soil, or Hydrolo					
e Vegetation, Soil, or Hydrolo	gy naturally p	roblematic	? (If ne	eded, explain any answ	ers in Remarks.)
UMMARY OF FINDINGS – Attach	site map showin	g sampl	ing point l	ocations, transect	s, important features, etc
	No No No	1201	the Sampled ithin a Wetlar		No /
EGETATION – Use scientific names	Absolute _% Cove	r Species	ant Indicator s? <u>Status</u>	Dominance Test wor Number of Dominant S	
Quercus rubra			-FICH		or FAC: (A)
). 				Total Number of Domi	
3				Species Across All Str	ata: (B)
l	(<u></u> _			Percent of Dominant S	
		_ = Total (Cover	That Are OBL, FACW,	
Sapling/Shrub Stratum (Plot size:) @~~.			Prevalence Index wo	
Sumphorocarpos orbic	" labie 20		1721		Multiply by: x 1 =
	•		_ 4 -		x2=
· · · · · · · · · · · · · · · · · · ·					x 3 =
					x 4 =
		_ = Total C	Cover	· ·	x 5 =
ierb Stratum (Plot size:)	20	V		Column Totals:	(A) (B)
Smilar Johnson Grass	3 6	- <u>-</u>	_ FACU	Prevalence Inde	x = B/A =
·				Hydrophytic Vegetat	
·		_		Dominance Test i	s >50%
				Prevalence Index	is ≤3.0 ¹
				Morphological Ada	aptations ¹ (Provide supporting
•					ks or on a separate sheet) Ophytic Vegetation ¹ (Explain)
le					shuare academicu (Exhigin)
)				¹ Indicators of hydric so	il and wetland hydrology must
0				be present, unless dis	
Noody Vine Stratum (Plot size:)	_= Total (Jover		
· · · · · · · · · · · · · · · · ·				Hydrophytic	
l				Vegetation	· • • • •
1 · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · · ·				Present? V	
1 2		_ = Total (Cover	Present? Ye	es No/

L

rofile Descript	ion: (Describe	to the dept	h needed to docum	ent the i	ndicator	or confii	m the absence	of indicators.)	
Depth	Matrix		Redox	Feature	5		_		
(inches)	Color (moist)	%	Color (moist)	%	<u>Type¹</u>	Loc2		Rema	arks
<u>)-/6"</u>	<u>59R2/1</u>	100	<u>.</u> .				Clay Loam	upland,	Dit
		· ·		<u> </u>			- <u> </u>		
		· ·					- <u> </u>		
Type: C=Conce		letion, RM=	Reduced Matrix, CS	=Covered	d or Coate	d Sand (cation: PL=Pore Lini for Problematic Hy	
-								-	and sons :
Histosol (A1			Sandy G	-	• •			Prairie Redox (A16)	- 4 - 2
Histic Epipe			Sandy R					anganese Masses (I	•
Black Histic			Stripped				Other ((Explain in Remarks))
Hydrogen S				-	ieral (F1)				
Stratified La	• • •		Loamy G	-					
2 cm Muck (Depleted	•	•				
	low Dark Surfac	e (A11)	Redox D		• •		3		
	Surface (A12)				rface (F7)			of hydrophylic vege	
	y Mineral (S1)		Redox D	epressio	าs (F8)			d hydrology must be	
	Peat or Peat (S						unless	disturbed or problem	natic.
Restrictive Lay	er (if observed):	= NA							
Type:					•			د	
Depth (inches	s):						Hydric Soil	Present? Yes	<u>▼No 入</u>
Remarks:	· ·								

HYDROLOGY

4

Wetland Hydrology Indicators:		
Primary Indicators (minimum of one is required; check	all that apply)	Secondary Indicators (minimum of two required)
Surface Water (A1)	Water-Stained Leaves (B9)	Surface Soil Cracks (B6)
High Water Table (A2) /	Aquatic Fauna (B13)	Drainage Patterns (B10)
Saturation (A3)	True Aquatic Plants (B14)	Dry-Season Water Table (C2)
X Water Marks (B1)	Hydrogen Sulfide Odor (C1)	Crayfish Burrows (C8)
X Sediment Deposits (B2)	Oxidized Rhizospheres on Living R	Roots (C3) Saturation Visible on Aerial Imagery (C9)
Drift Deposits (B3)	Presence of Reduced Iron (C4)	Stunted or Stressed Plants (D1)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled Soi	ils (C6) Geomorphic Position (D2)
Iron Deposits (B5) `	Thin Muck Surface (C7)	FAC-Neutral Test (D5)
Inundation Visible on Aerial Imagery (B7)	Gauge or Well Data (D9)	
Sparsely Vegetated Concave Surface (B8)	Other (Explain in Remarks)	
Field Observations:		
Surface Water Present? Yes No X	Depth (inches):	
Water Table Present? Yes No X	Depth (inches): Depth (inches):	k V
Saturation Present? Yes X No	Depth (inches):	Wetland Hydrology Present? Yes No
(includes capillary fringe)		· · · · · · · · · · · · · · · · · · ·
Describe Recorded Data (stream gauge, monitoring w	vell, aerial photos, previous inspecti	ions), if available:
Remarks:		
· · · · · · · · · · · · · · · · · · ·		

.

WETLAND DE	TERMINATION D	ATA FORM -	Great Plains Region
ect/site: POf Catoosa Site	Crib City	County: <u>Ro</u>	5 = 15 Sampling Date: 12/8/
licant/Owner: Cocps			State: <u>UK</u> Sampling Point: <u> UK</u> nge: <u>PiF</u>
stigator(s): Bla: iBeky, Elsse	. Hotz Sect	ion, Township, Rar	nge:
dform (hillslope, terrace, etc.):	Loc	al relief (concave, c	convex, none): Slope (%):
region (LRR):	Lat:	· · ·	_ Long: Datum:
Map Unit Name:			NWI classification:PFO
climatic / hydrologic conditions on the site typical	for this time of year?	Yes <u>×</u> No_	(If no, explain in Remarks.)
Vegetation <u>N</u> , Soil <u>N</u> , or Hydrology <u>/</u>	🔽 significantly distu	irbed? Are "	Normal Circumstances" present? Yes No
Vegetation, Soil, or Hydrology	/ naturally problen	natic? (If ne	eded, explain any answers in Remarks.)
MMARY OF FINDINGS – Attach site	map showing sa	mpling point k	ocations, transects, important features, et
	- <u> </u>		
/drophytic Vegetation Present? Yes <u>X</u> /dric Soil Present? Yes X		Is the Sampled	
/dric Soil Present? Yes X etland Hydrology Present? Yes X	No ·	within a Wetlar	nd? Yes <u>No</u> No
emarks:			
GETATION – Use scientific names of	nlante		
GETATION – Use scientific names of		minant Indicator	Dominance Test worksheet:
ee Stratum (Plot size: 30 puts)		ecies? <u>Status</u>	Number of Dominant Species
Salix niara	40	y FACU-	That Are OBL, FACW, or FAC 2
Ulmus americana		in FAC	(excluding FAC-):
<u>(eldis sp.</u>			Total Number of Dominant (B)
Fraxing Spennsylanica	~~ _~_~	TACU-	· · · · · · · · · · · · · · · · · · ·
Carya il Nocusio apling/Shrub Stratum (Plot size:	_) = 1		Percent of Dominant Species
Minns Americana		<u> </u>	Prevalence Index worksheet:
·		<u> </u>	Total % Cover of: Multiply by:
		·	OBL species x1 =
			FACW species $45 \times 2 = 90$
·		otal Cover	FAC species $12 \times 3 = 26$
erb Stratum (Plot size: 15 wetze	·		FACU species $25 \times 4 = 100$
Symphorocarpos Orbicalat	<u>\$5</u> _	FACU_	UPL species $V = \frac{1}{100} \times 5 = \frac{1}{1000}$
raguerd Ambresa			Column Totals: 142 (A) 1406 (B)
Darshum halaperst	<u></u>	y FACU	Prevalence Index = B/A =8
Passim vice Hassiflora (11) Poke Phylologia american			Hydrophytic Vegetation Indicators:
Edden rod Solidaen D			1 - Rapid Test for Hydrophytic Vegetation
<u>Cana na contra go p</u>			
· · · · · · · · · · · · · · · · · · ·	·		<u>✓</u> 3 - Prevalence Index is ≤3.0 ¹
•	· · · · · · · · · · · · · · · · · · ·	,	4 - Morphological Adaptations ¹ (Provide supportin data in Remarks or on a separate sheet)
0			Problematic Hydrophytic Vegetation ¹ (Explain)
Voody Vine Stratum (Plot size: 5 mm		otal Cover	¹ Indicators of hydric soil and wetland hydrology must
	dicans 1	FAC	be present, unless disturbed or problematic.
Dorradention radians		<u> </u>	Hydrophytic
	==	Total Cover	Vegetation Present? Yes X No
6 Bare Ground in Herb Stratum			

	ription: (Describe	to the depth	needed to docu	nent the l	ndicator c	or confirm	m the absence	of indicators.)	
Depth	Matrix		Redo	x Features			·		
(inches)	Color (moist)		Color (moist)		Type'	Loc ²	<u>Texture</u> כוג ש	Remarks	
0 - 16''	104R31	100 _	·				. ipam	wothand plat	
4-(6"	-10YR 21-			·			- clean	undarge in t	
<u> </u>									
· · · · · · · · · · · · · · · · · · ·	· · · ·	·				-	·	·	
		· — — —					- <u>.</u>		·
	oncentration, D=Dep					d Sand G	Grains. ² Lo	cation: PL=Pore Lining, M=Mat	rix.
Hydric Soil I	ndicators: (Applie	able to all Li	RRs, unless othe	rwise note	ed.)		Indicators	s for Problematic Hydric Soils ³	
Histosol	(A1)		Sandy	Gleyed Ma	itrix (S4)	- N - S	1 cm	Muck (A9) (LRR I, J)	
Histic Ep	pipedon (A2)			Redox (S5				t Prairie Redox (A16) (LRR F, G	, H)
Black Hi	stic (A3)		Strippe	d Matrix (S	6)			Surface (S7) (LRR G)	
	n Sulfide (A4)			Mucky Mir				Plains Depressions (F16)	
	Layers (A5) (LRR			Gleyed Ma			•	RR H outside of MLRA 72 & 73)
	ick (A9) (LRR F, G,	•		ed Matrix (I	•			ced Vertic (F18)	
	Below Dark Surfac	ce (A11)		Dark Surfa				Parent Material (TF2)	
	ark Surface (A12)			ed Dark Su	• •			Shallow Dark Surface (TF12)	
	lucky Mineral (S1)	(00) /I DD C		Depression lains Depre		(6)		· (Explain in Remarks) s of hydrophytic vegetation and	
	Aucky Peat or Peat icky Peat or Peat (\$		•	LRA 72 & 7	•	-		nd hydrology must be present,	
	icky Feat OF Feat (a		(111			,			
	Layer (if present):		A-	10		r653	Hydric Soi	s disturbed or problematic. Il Present? Yes <u>X</u> No	
Restrictive I Type: Depth (ind		N +	A Jon: canto	70,00	-50 - 5 70 - 70	r653		Il Present? Yes <u>X</u> No ruhri downat Acut	
Restrictive I Type: Depth (ind Bemarks:	ches):	N +	A	<u> </u>		r653	Hydric Soi	ll Present? Yes <u>×</u> No	
Restrictive I Type: Depth (ind Remarks: Remarks: TYDROLO	ches): planplatore GY	N + : /	A	70,00		YG\$3	Hydric Soi	Il Present? Yes <u>X</u> No ruhru downat Acut	
Restrictive I Type: Depth (in Bemarks: Bemarks: TYDROLO Wetland Hy	ches): planpland pi 		A- 			r653	Hydric Soi / Que rl 63	Il Present? Yes <u>X</u> No rubri downat Acut 4010	
Restrictive I Type: Depth (in: Bemarks: Bemarks: TYDROLO Wetland Hy Primary India	ches): 					r653	Hydric Soi / Que vi 6 3	il Present? Yes <u>X</u> No ruhri Aonsan Actur 4010 lary Indicators (minimum of two	
Restrictive I Type: Depth (ind Bemarks: Bemarks: TYDROLO Wetland Hy Primary India Surface	ches): plant pro- gy GY drology Indicators cators (minimum of Water (A1)		Salt Crus	ly) t (B11)	2010	r653	Hydric Soi / Que vi 63	il Present? Yes <u>ک</u> No <u>ruhri down</u> Acu <u>40</u> <u>10</u> Hary Indicators (minimum of two refrace Soil Cracks (B6)	required)
Restrictive I Type: Depth (ind Bemarks: Frimarks: TYDROLO Wetland Hy Primary India Surface High Wa	ches): p + - p + - p + - p + - p + p +		Salt Crus Aquatic Ir	ly) t (B11) wertebrate	30 10 Pes (B13)	7653	Hydric Soi / Que vi u 2	Il Present? Yes X No	required)
Restrictive I Type: Depth (ind Bemarks: Frimarks: TYDROLO Wetland Hy Primary India Surface High Wa Saturati	ches):		Salt Crus Aquatic Ir Hydroger	ily) t (B11) nvertebrate	30 10 es (B13) dor (C1)		Hydric Soi / Que v/ 6.3 Second Su: Sp: Dra	Il Present? Yes X No	required)
Restrictive I Type: Depth (ind Remarks: Frimarks: TYDROLO Wetland Hy Primary India Surface High Wa Saturati Saturati Water M	ches):		Salt Crus Aquatic Ir Hydroger Dry-Seas	iv) t (B11) nvertebrate n Sulfide Or on Water T			Hydric Soi / Que v/ 6.3 Second Su Sp Dra Ox	Il Present? Yes X No	required)
Restrictive I Type: Depth (in: Remarks: Femarks: TYDROLO Wetland Hy Primary India Wetland Hy Primary India Surface High Wa Surface Saturati Sedime	ches): GY drology Indicators cators (minimum of Water (A1) ater Table (A2) on (A3) Marks (B1) nf Deposits (B2)		Salt Crus Aquatic Ir Hydroger Dry-Seas Oxidized	ly) t (B11) nvertebrate n Sulfide O on Water 1 Rhizosphe	es (B13) dor (C1) Table (C2) eres on Livi		Hydric Soi / Que v/ 6.5	Il Present? Yes X No	required)
Restrictive I Type: Depth (in: Bemarks: Frimarks: Primary India Wetland Hy Primary India Surface High Wa Saturati Saturati Sedime Drift De	ches): GY drology Indicators cators (minimum of Water (A1) ater Table (A2) on (A3) Marks (B1) nf Deposits (B2) posits (B3)		Salt Crus Aquatic Ir Hydroger Dry-Seas Oxidized (where	ily) t (B11) nvertebrate n Sulfide O on Water T Rhizosphe not tilled)	es (B13) dor (C1) Table (C2) eres on Liv	ing Roots	Hydric Soi / Que v/ 6.5	Il Present? Yes X No	required) Ice (B8) Loots (C3)
Restrictive I Type: Depth (in Bemarks: Primary India Surface Kigh Wa Saturati Saturati Saturati Saturati Algal Ma	ches): GY drology Indicators cators (minimum of Water (A1) ater Table (A2) on (A3) Marks (B1) nf Deposits (B2) posits (B3) at or Crust (B4)		Salt Crus Aquatic Ir Hydroger Dry-Seas Oxidized Oxidized Presence	t (B11) nvertebrate n Sulfide Or on Water T Rhizosphe not tilled) e of Reduce	es (B13) dor (C1) Table (C2) eres on Livi ed iron (C4	ing Roots	Hydric Soi / Que vi 6 3 - Second - Sui - Sp - Dra - Dra - Cra - Cra - Sa	il Present? Yes <u>X</u> No rubri Xowny Active VOTO lary Indicators (minimum of two re- rface Soil Cracks (B6) arsely Vegetated Concave Surfa ainage Patterns (B10) idized Rhizospheres on Living R where tilled) ayfish Burrows (C8) turation Visible on Aerial Imager	required) Ice (B8) Loots (C3)
Restrictive I Type: Depth (in: Bemarks: Primary India Surface Kigh Wa Saturati Saturati Saturati Saturati Algal Ma Iron Dep	ches): GY drology Indicators cators (minimum of Water (A1) ater Table (A2) on (A3) Marks (B1) nf Deposits (B2) posits (B3) at or Crust (B4) posits (B5)	<u>one required;</u>	Salt Crus Aquatic Ir Hydroger Dry-Seas Oxidized (where Presence Thin Muc	ly) t (B11) nvertebrate n Sulfide Or on Water 7 Rhizosphe not filled) of Reduce k Surface (es (B13) dor (C1) Table (C2) eres on Livi ed iron (C4 (C7)	ing Roots	Hydric Soi / Que v/ 6-3 	il Present? Yes <u>X</u> No ruhri Xownigh ACU <u>40</u>70 lary Indicators (minimum of two responses) rface Soil Cracks (B6) arsely Vegetated Concave Surfa ainage Patterns (B10) idized Rhizospheres on Living R where tilled) ayfish Burrows (C8) turation Visible on Aerial Imager comorphic Position (D2)	required) Ice (B8) Loots (C3)
Restrictive I Type: Depth (ind Bemarks: Permarks: TYDROLO Wetland Hy Primary India Surface High Wa Saturati Saturati Algal Ma Iron Dej Inundati	ches): GY drology Indicators cators (minimum of Water (A1) ater Table (A2) on (A3) Marks (B1) nf Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aeria	<u>one required;</u> I Imagery (B7)	Salt Crus Aquatic Ir Hydroger Dry-Seas Oxidized (where Presence Thin Muc	ly) t (B11) nvertebrate n Sulfide Or on Water 7 Rhizosphe not filled) of Reduce k Surface (es (B13) dor (C1) Table (C2) eres on Livi ed iron (C4 (C7)	ing Roots	Hydric Soi / Que v/ 6-3 / Que v/ 6-3 	Il Present? Yes X No	required) lice (B8) licots (C3) y (C9)
Restrictive I Type: Depth (ind Remarks: Primary India Metland Hy Primary India Surface K High Wa Saturati Water N Sedimel Drift De Algal Ma Iron De Inundati Water S	ches):	<u>one required;</u> I Imagery (B7)	Salt Crus Aquatic Ir Hydroger Dry-Seas Oxidized (where Presence Thin Muc	ly) t (B11) nvertebrate n Sulfide Or on Water 7 Rhizosphe not filled) of Reduce k Surface (es (B13) dor (C1) Table (C2) eres on Livi ed iron (C4 (C7)	ing Roots	Hydric Soi / Que v/ 6-3 / Que v/ 6-3 	il Present? Yes <u>X</u> No ruhri Xownigh ACU <u>40</u>70 lary Indicators (minimum of two responses) rface Soil Cracks (B6) arsely Vegetated Concave Surfa ainage Patterns (B10) idized Rhizospheres on Living R where tilled) ayfish Burrows (C8) turation Visible on Aerial Imager comorphic Position (D2)	required) lice (B8) licots (C3) y (C9)
Restrictive I Type: Depth (im Bemarks: Frimary India Wetland Hy Primary India Water M Surface M High Wa Surface M High Wa Saturati M Sedime Mater M Mater M Mater S Field Obser	ches):	<u>one required;</u> I Imagery (B7)	Salt Crus Aquatic Ir Hydroger Dry-Seas Oxidized (where Presence Thin Muc) Other (E)	ily) t (B11) nvertebrate n Sulfide O on Water T Rhizosphe not tilled) of Reduce k Surface (cplain in Re	es (B13) dor (C1) Table (C2) eres on Livi ed iron (C4 (C7)	ing Roots	Hydric Soi / Que v/ 6-3 / Que v/ 6-3 	Il Present? Yes X No	required) lice (B8) licots (C3) y (C9)
Restrictive I Type: Depth (im Bemarks: Frimary India Wetland Hy Primary India Surface Migh Wa Saturati Surface Migh Wa Saturati Surface Inundati Water S Field Obser Surface Water	ches): GY drology Indicators cators (minimum of Water (A1) ater Table (A2) on (A3) Marks (B1) nf Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aeria Stained Leaves (B9) rvations: ter Present?	one required; Imagery (B7) 	Salt Crus Aquatic Ir Hydroger Dry-Seas Oxidized (where Presence Thin Muc 0 Other (E)	ily) t (B11) nvertebrate n Sulfide O on Water T Rhizosphe not tilled) o of Reduce k Surface (splain in Re nches):	es (B13) dor (C1) Table (C2) eres on Livi ed iron (C4 (C7)	ing Roots	Hydric Soi / Que v/ 6-3 / Que v/ 6-3 	Il Present? Yes X No	required) lice (B8) licots (C3) y (C9)
Restrictive I Type: Depth (inter- Depth (inter- Permarks: IYDROLO Wetland Hy Primary India Surface High Wa Saturation Surface Algal Ma Iron Dep Inundation Surface Water Surface Water Surf	ches): GY drology Indicators cators (minimum of Water (A1) ater Table (A2) on (A3) Marks (B1) ni Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aeria Stained Leaves (B9) rvations: ter Present?	one required; I Imagery (B7) Yes N Yes N	Salt Crus Aquatic Ir Hydroger Dry-Seas Oxidized (where Presence Thin Muc 0 Other (Ex 0 Depth (ii	hty) t (B11) nvertebrate n Sulfide Or on Water T Rhizosphe not tilled) of Reduce k Surface (cplain in Re- nches): nches):	es (B13) dor (C1) Table (C2) eres on Livi ed iron (C4 (C7)	ing Roots	Hydric Soi / Que r/ 6-3 	Il Present? Yes X No rubri down y Active York Hary Indicators (minimum of two r rface Soil Cracks (B6) arsely Vegetated Concave Surfa ainage Patterns (B10) idized Rhizospheres on Living R where tilled) ayfish Burrows (C8) turation Visible on Aerial Imagen comorphic Position (D2) C-Neutral Test (D5) ost-Heave Hummocks (D7) (LRI	required) lice (B8) loots (C3) y (C9) R F)
Restrictive I Type: Depth (im Bemarks: IYDROLO Wetland Hy Primary India Surface High Wa Saturati Saturati Algal Ma Iron Dej Inundati Water S Field Obset Saturation F	ches): GY drology Indicators cators (minimum of Water (A1) ater Table (A2) on (A3) Marks (B1) ni Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aeria Stained Leaves (B9) vations: ter Present? Present?	one required; I Imagery (B7) Yes N Yes N	Salt Crus Aquatic Ir Hydroger Dry-Seas Oxidized (where Presence Thin Muc 0 Other (E)	hty) t (B11) nvertebrate n Sulfide Or on Water T Rhizosphe not tilled) of Reduce k Surface (cplain in Re- nches): nches):	es (B13) dor (C1) Table (C2) eres on Livi ed iron (C4 (C7)	ing Roots	Hydric Soi / Que r/ 6-3 	Il Present? Yes X No	required) lice (B8) loots (C3) y (C9) R F)
Restrictive I Type: Depth (im Bemarks: IYDROLO Wetland Hy Primary India Surface High Wa Surface High Wa Saturation Algal Ma Iron Dep Inundation Field Obsert Surface Water Surface Water Saturation F (includes ca	ches): GY drology Indicators cators (minimum of Water (A1) ater Table (A2) on (A3) Marks (B1) ni Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aeria Stained Leaves (B9) rvations: ter Present?	one required; I Imagery (B7) Yes N Yes _X N Yes _X N	Salt Crus Aquatic Ir Hydroger Dry-Seas Oxidized (where Presence Thin Muc 0 Other (Es Other (Es Depth (i to Depth (i	ily) t (B11) nvertebrate n Sulfide O on Water T Rhizosphe not tilled) o of Reduce k Surface (cplain in Re nches): nches):	es (B13) dor (C1) Table (C2) eres on Livi ed iron (C4 (C7) emarks)	ing Roots	Hydric Soi / Que v/ 6.5 Second Su Sp S	Il Present? Yes X No rubri down y Active York Hary Indicators (minimum of two r rface Soil Cracks (B6) arsely Vegetated Concave Surfa ainage Patterns (B10) idized Rhizospheres on Living R where tilled) ayfish Burrows (C8) turation Visible on Aerial Imagen comorphic Position (D2) C-Neutral Test (D5) ost-Heave Hummocks (D7) (LRI	required) lice (B8) loots (C3) y (C9) R F)
Restrictive I Type: Depth (im Bemarks: IYDROLO Wetland Hy Primary India Surface High Wa Surface High Wa Saturation Algal Ma Iron Dep Inundation Field Obsert Surface Water Surface Water Saturation F (includes ca	ches): GY GY drology Indicators cators (minimum of Water (A1) ater Table (A2) on (A3) Marks (B1) nf Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aeria Stained Leaves (B9) rvations: ter Present? Present? Present? pillary fringe)	one required; I Imagery (B7) Yes N Yes _X N Yes _X N	Salt Crus Aquatic Ir Hydroger Dry-Seas Oxidized (where Presence Thin Muc 0 Other (Es Other (Es Depth (i to Depth (i	ily) t (B11) nvertebrate n Sulfide O on Water T Rhizosphe not tilled) o of Reduce k Surface (cplain in Re nches): nches):	es (B13) dor (C1) Table (C2) eres on Livi ed iron (C4 (C7) emarks)	ing Roots	Hydric Soi / Que v/ 6.5 Second Su Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp Sp S	Il Present? Yes X No ruhri down Active Active Volto Hary Indicators (minimum of two r rface Soil Cracks (B6) arsely Vegetated Concave Surfa ainage Patterns (B10) idized Rhizospheres on Living R where tilled) ayfish Burrows (C8) turation Visible on Aerial Imager somorphic Position (D2) C-Neutral Test (D5) ost-Heave Hummocks (D7) (LRI gy Present? Yes X No	required) lice (B8) loots (C3) y (C9) R F)

۴v

ж*и*

•	ND DETERMINATION		•		
oject/Site: <u>Port of (cts</u> plicant/Owner: vestigator(s): <u>Blerr Bckcr, F</u>	City/	County: i	sheving s	ampling Date:	91
plicant/Owner:			State:	ampling Point: <u> </u>	<u> </u>
estigator(s): <u>Blen r Bc kcr, F</u>	Lise Horz Sect	ion, Township, Ra	1ge:		•
ndform (hillslope, terrace, etc.):					
pe (%): Lat:	Long	j:	D	atum:	
Map Unit Name:			NWI classification	on:	
climatic / hydrologic conditions on the site					. ,
vegetation <u>19</u> , Soil <u>9</u> , or Hydrold Vegetation, Soil, or Hydrold	ogy significantly distu	rbed? Are "	Normal Circumstances" pres	sent? Yes No	X
e Vegetation, Soil, or Hydrold	ogy naturally problem	natic? (If ne	eded, explain any answers i	in Remarks.)	r
MMARY OF FINDINGS - Attach	site map showing sar	mpling point l	ocations, transects, i	mportant features	, etc.
				•	•
lydrophytic Vegetation Present? Yes lydric Soil Present? Yes	s No s No	Is the Sampled			
/etland Hydrology Present? . Yes		within a Wetlan	d? Yes	No	
emarks:					
<u></u>					
GETATION – Use scientific names	s of plants.				
ee Stratum (Plot size:)		minant Indicator ecies? Status	Dominance Test worksh		
Gring illing chais		$\frac{BCHEST}{L}$ FAC	Number of Dominant Spec That Are OBL, FACW, or I		(A)
Platanes occidentalis	25	5			
	-		Total Number of Dominant Species Across All Strata:		(B)
			Percent of Dominant Spec		• •
			That Are OBL, FACW, or I		(A/B)
apling/Shrub Stratum (Plot size:	, = То	otal Cover	Prevalence Index works	neet.	
			Total % Cover of:		
			OBL species	x1=	
			FACW species	x 2 =	
			FAC species	x 3 =	
		·	FACU species		
erb Stratum (Plot size:		otal Cover	UPL species		
Cocculus carelinus		V FACU	Column Totals:	(A)	(B)
			Prevalence Index =	B/A =	
			Hydrophytic Vegetation	Indicators:	
			Dominance Test is >5		
			Prevalence Index is ≤		
				tions ¹ (Provide supportir	ıg
			Morphological Adapta data in Remarks or	r on a separate sheet)	
	······································		Morphological Adapta data in Remarks or Problematic Hydrophy) · (
			data in Remarks or) ·
			data in Remarks or Problematic Hydrophy ¹ Indicators of hydric soil ar	rtic Vegetation ¹ (Explain) nd wetland hydrology mu	
			data in Remarks or Problematic Hydrophy	rtic Vegetation ¹ (Explain) nd wetland hydrology mu	
			data in Remarks or Problematic Hydrophy ¹ Indicators of hydric soil ar be present, unless disturbe	rtic Vegetation ¹ (Explain) nd wetland hydrology mu	
0			data in Remarks or Problematic Hydrophy ¹ Indicators of hydric soil ar be present, unless disturbe Hydrophytic Vogotation	rtic Vegetation ¹ (Explain nd wetland hydrology mu ed or problematic.	
			data in Remarks or Problematic Hydrophy ¹ Indicators of hydric soil ar be present, unless disturbe Hydrophytic Vogotation	rtic Vegetation ¹ (Explain) nd wetland hydrology mu	

Midwest Region - Interim Version

SOL

- -

	to the depth	needed to document			the absence o	Tindicators.)
epth <u>Matrix</u> nches) Color (moist)	%	Redox Fea	tures		Texture	Remarks
						remains
-16" 104R 2/2	- 480 -				<u></u> _	
· · · · · ·						
· · ·	,					
pe: C=Concentration, D=Dep			wered or Coste	 d Sand Gr		tion: Di = Para Lining M-Matrix
dric Soil Indicators:		educed Matrix, C3~COV	eled of Coale			tion: PL=Pore Lining, M=Matrix. or Problematic Hydric Soils ³ :
Histosol (A1)		Sandy Gleyed	1 Matrix (S4)			airie Redox (A16)
Histic Epipedon (A2)		Sandy Redox				nganese Masses (F12)
Black Histic (A3)		Stripped Matr				xplain in Remarks)
Hydrogen Sulfide (A4)		Loamy Mucky	/ Mineral (F1)			
Stratified Layers (A5)		Loamy Gleye				
2 cm Muck (A10)		Depleted Mat				
Depleted Below Dark Surfac	e (A11)	Redox Dark S	• •		³ Indiactors o	f huden hude ve setation and
Thick Dark Surface (A12) Sandy Mucky Mineral (S1)		Redox Depre	k Surface (F7)			f hydrophytic vegetation and hydrology must be present,
5 cm Mucky Peat or Peat (S	3)					isturbed or problematic.
strictive Layer (if observed)						F
Type:						
Depth (inches):					Hydric Soil P	resent? Yes No
marks:						
marks:						
DROLOGY						
DROLOGY tland Hydrology Indicators						
DROLOGY tland Hydrology Indicators		; check all that apply)			Secondary	Indicators (minimum of two require
DROLOGY tland Hydrology Indicators: mary Indicators (minimum of o Surface Water (A1)		Water-Stained L	• •		Surfac	e Soil Cracks (B6)
DROLOGY tland Hydrology Indicators: mary Indicators (minimum of o Surface Water (A1) High Water Table (A2)		Water-Stained L Aquatic Fauna (B13)		Surfac	ce Soil Cracks (B6) age Patterns (B10)
DROLOGY etland Hydrology Indicators: mary Indicators (minimum of of Surface Water (A1) High Water Table (A2) Saturation (A3)		Water-Stained L Aquatic Fauna (True Aquatic Pla	B13) ants (B14)		Surfac Draina Dry-Se	ce Soil Cracks (B6) age Patterns (B10) eason Water Table (C2)
DROLOGY tland Hydrology Indicators: mary Indicators (minimum of of Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1)		Water-Stained L Aquatic Fauna (True Aquatic Pla Hydrogen Sulfid	B13) ants (B14) e Odor (C1)		Surfac Draina Dry-S Crayfi	ce Soil Cracks (B6) age Patterns (B10) eason Water Table (C2) sh Burrows (C8)
DROLOGY etland Hydrology Indicators: mary Indicators (minimum of o Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2)		Water-Stained L Aquatic Fauna (Aquatic Fauna (True Aquatic Pla Hydrogen Sulfid Oxidized Rhizos	B13) ants (B14) e Odor (C1) pheres on Livi		Surfac Draina Dry-S Crayfi C3) Satura	e Soil Cracks (B6) age Patterns (B10) eason Water Table (C2) sh Burrows (C8) ation Visible on Aerial Imagery (C9)
DROLOGY tland Hydrology Indicators: mary Indicators (minimum of of Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3)		Water-Stained L Aquatic Fauna (True Aquatic Pla Hydrogen Sulfid Oxidized Rhizos Presence of Rec	B13) ants (B14) e Odor (C1) pheres on Livi duced Iron (C4)	C3) Cash Cash Cash Cash Cash Cash Cash Cash	ce Soil Cracks (B6) age Patterns (B10) eason Water Table (C2) sh Burrows (C8) ation Visible on Aerial Imagery (C9) ed or Stressed Plants (D1)
DROLOGY tland Hydrology Indicators: mary Indicators (minimum of of Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4)		Water-Stained L Aquatic Fauna (True Aquatic Pla Hydrogen Sulfid Oxidized Rhizos Presence of Rea Recent Iron Rec	B13) e Odor (C1) pheres on Livi duced Iron (C4 fuction in Tilled)	Surface Draina Dry-Su Crayfi C3) Satura Sturte) Geom	ee Soil Cracks (B6) age Patterns (B10) eason Water Table (C2) sh Burrows (C8) ation Visible on Aerial Imagery (C9) ed or Stressed Plants (D1) orphic Position (D2)
DROLOGY tland Hydrology Indicators: mary Indicators (minimum of of Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5)	one is required	Water-Stained L Aquatic Fauna (True Aquatic Pla Hydrogen Sulfid Oxidized Rhizos Presence of Rec Recent Iron Rec Thin Muck Surfa	B13) e Odor (C1) pheres on Livi duced Iron (C4 fuction in Tilled ace (C7))	Surface Draina Dry-Su Crayfi C3) Satura Sturte) Geom	ce Soil Cracks (B6) age Patterns (B10) eason Water Table (C2) sh Burrows (C8) ation Visible on Aerial Imagery (C9) ed or Stressed Plants (D1)
DROLOGY tland Hydrology Indicators: mary Indicators (minimum of of Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial	one is required	Water-Stained L Aquatic Fauna (True Aquatic Pla Hydrogen Sulfid Oxidized Rhizos Recent Iron Rec Thin Muck Surfa Gauge or Well I	B13) ants (B14) e Odor (C1) pheres on Livi duced Iron (C4 fuction in Tilled ace (C7) Data (D9))	Surface Draina Dry-Su Crayfi C3) Satura Sturte) Geom	ee Soil Cracks (B6) age Patterns (B10) eason Water Table (C2) sh Burrows (C8) ation Visible on Aerial Imagery (C9) ed or Stressed Plants (D1) orphic Position (D2)
DROLOGY etland Hydrology Indicators: mary Indicators (minimum of of Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Sparsely Vegetated Concav	one is required	Water-Stained L Aquatic Fauna (True Aquatic Pla Hydrogen Sulfid Oxidized Rhizos Recent Iron Rec Thin Muck Surfa Gauge or Well I	B13) ants (B14) e Odor (C1) pheres on Livi duced Iron (C4 fuction in Tilled ace (C7) Data (D9))	Surface Draina Dry-Su Crayfi C3) Satura Sturte) Geom	ee Soil Cracks (B6) age Patterns (B10) eason Water Table (C2) sh Burrows (C8) ation Visible on Aerial Imagery (C9) ed or Stressed Plants (D1) orphic Position (D2)
DROLOGY etland Hydrology Indicators: mary Indicators (minimum of o Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Sparsely Vegetated Concav	one is required Imagery (B7) re Surface (B8	Water-Stained L Aquatic Fauna (True Aquatic Pla Hydrogen Sulfid Oxidized Rhizos Presence of Rei Recent Iron Rec Thin Muck Surfa Gauge or Well I Other (Explain in	B13) ants (B14) e Odor (C1) pheres on Livi duced Iron (C4 fuction in Tilled ace (C7) Data (D9) n Remarks)) Soils (C6)	Surface Draina Dry-Su Crayfi C3) Satura Sturte) Geom	ee Soil Cracks (B6) age Patterns (B10) eason Water Table (C2) sh Burrows (C8) ation Visible on Aerial Imagery (C9) ed or Stressed Plants (D1) orphic Position (D2)
DROLOGY etland Hydrology Indicators: mary Indicators (minimum of of Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Sparsely Vegetated Concavel I observations: Inface Water Present?	Imagery (B7) e Surface (B8	Water-Stained L Aquatic Fauna (Aquatic Fauna (Hydrogen Sulfid Oxidized Rhizos Presence of Red Recent Iron Red Thin Muck Surfa Gauge or Well I O Other (Explain in	B13) ants (B14) e Odor (C1) pheres on Livi duced Iron (C4 luction in Tilled ace (C7) Data (D9) n Remarks)) Soils (C6) 	Surface Draina Dry-Su Crayfi C3) Satura Sturte) Geom	ee Soil Cracks (B6) age Patterns (B10) eason Water Table (C2) sh Burrows (C8) ation Visible on Aerial Imagery (C9) ed or Stressed Plants (D1) orphic Position (D2)
DROLOGY etland Hydrology Indicators: mary Indicators (minimum of of Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Sparsely Vegetated Concavel eld Observations: Inface Water Present?	Imagery (B7) re Surface (B8 res No res No	Water-Stained L Aquatic Fauna (True Aquatic Flama (Hydrogen Sulfid Oxidized Rhizos Presence of Rec Recent Iron Rec Thin Muck Surfa Gauge or Well I Other (Explain in Depth (inches)) Depth (inches)	B13) ants (B14) e Odor (C1) pheres on Livi duced Iron (C4 fuction in Tilled ace (C7) Data (D9) n Remarks)) Soils (C6) 	Surfac Draina Dry-Se Crayfi C3) Satura Stunte) Geom FAC-N	ee Soil Cracks (B6) age Patterns (B10) eason Water Table (C2) sh Burrows (C8) ation Visible on Aerial Imagery (C9) ed or Stressed Plants (D1) orphic Position (D2) Neutral Test (D5)
High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Sparsely Vegetated Concav eld Observations: Inface Water Present?	Imagery (B7) Te Surface (B8 Yes No Yes No Yes No	Water-Stained L Aquatic Fauna (True Aquatic Pla Hydrogen Sulfid Oxidized Rhizos Presence of Rea Recent Iron Rea Gauge or Well I Other (Explain in Depth (inches)	B13) ants (B14) e Odor (C1) pheres on Livi duced Iron (C4 fuction in Tilled ace (C7) Data (D9) n Remarks)) Soils (C6) Wetla	Surfac Draina Dry-S Crayfi C3) Satura Stunte } Geom FAC-N	ee Soil Cracks (B6) age Patterns (B10) eason Water Table (C2) sh Burrows (C8) ation Visible on Aerial Imagery (C9) ed or Stressed Plants (D1) orphic Position (D2)

WETLAND DETE	RMINAT	ION DAT	A FORM	- Midwest Region Wet (an
oject/Site: Port of Catoosa_		City/County	. Ro	215-21 5 Sampling Date: 12/9/1
oplicant/Owner:				State: Sampling Point:
vestigator(s): Bleir Baleur, Eliss He	,+ <u>z</u>	Section, To	wnship, Ra	inge:
- ,				(concave, convex, none):
ope (%): Lat:				
bil Map Unit Name:				NWI classification:
e climatic / hydrologic conditions on the site typical for this	s time of yea	ar? Yes	∑No_	(If no, explain in Remarks.)
e Vegetation, Soil, or Hydrologys	ignificantly	disturbed?	Are "	"Normal Circumstances" present? Yes _ \swarrow No
e Vegetation, Soil, or Hydrology r	naturally pro	blematic?		eeded, explain any answers in Remarks.)
UMMARY OF FINDINGS – Attach site map	showing	samplin	g point l	ocations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes <u>Y</u> N Hydric Soil Present? Yes <u>N</u>	°		e Sampled	
Wetland Hydrology Present? Yes V		with	in a Wetlar	nd? Yes No
Remarks:				
				· · ·
· · · · · · · · · · · · · · · · · · ·				
EGETATION - Use scientific names of plants.		-		·
free Stratum (Plot size:)	Absolute % Cover	Dominant Species?		Dominance Test worksheet:
Plating out enteres	30		FAC	Number of Dominant Species (A)
			AU+	Total Number of Dominant
2. Jalix higher 3. Haney Louist gleditsis trigg	. <u>5</u>		FAC	Species Across All Strata: (B)
ł	<u>4705</u>		·	Percent of Dominant Species
5		- 7.44 0.4		That Are OBL, FACW, or FAC: 100/0 (A/B)
Sapling/Shrub Stratum (Plot size:)		= Total Co	ver	Prevalence Index worksheet:
1		. <u> </u>	<u> </u>	Total % Cover of:Multiply by:
		<u> </u>	<u> </u>	OBL species \underbrace{O}_{1} x 1 = \underbrace{O}_{1}
3				FACW species $50 \times 2 = 100$
4				FAC species $75 \times 3 = 225$ FACU species $x 4 = 0$
5		= Total Co		UPL species $\mathbf{D} \times 5 = \mathbf{O}$
Herb Stratum (Plot size:)		- 10101 00		Column Totals: 125 (A) 325 (B)
1. Xanthian straporium		<u> </u>	<u>FAC</u>	Prevalence index = $B/A = 2.1b$
2. Polygonin pensylvanistation	- 40	<u> </u>	EACUL	Prevalence index = B/A = , N Hydrephytic Vegetation Indicators:
3		· <u>· · · · · · · · · · · · · · · · · · </u>		Dominance Test is >50%
4 5			·	V Prevalence Index is ≤3.0 ¹
6				Morphological Adaptations ¹ (Provide supporting
				data in Remarks or on a separate sheet)
7				Problematic Hydrophytic Vegetation ¹ (Explain)
7 8			. <u> </u>	¹ Indicators of hydric soil and wetland hydrology must
8 9				
8				be present, unless disturbed or problematic.
8 9				be present, unless disturbed or problematic.
8 9 10		= Total Co		Hydrophytic
89 9 10 Woody Vine Stratum (Plot size:)	- <u> </u>	= Total Co		

6 3

SOIL

0 m

Sampling Point: Wetland (

Depth	cription: (Describe Matrix		Redo	<u>ix Features</u>	s			
(inches)	Color (moist)	%	Color (moist)			Loc ²	<u>Texture</u>	Remarks
0-16	104R3/3	80	54R.4/4	90		$\underline{\mathcal{M}}$	54417- -C164	
	· · · · · · · · · · · · · · · · · · ·							
			· · · · · · · · · · · · · · · · · · ·					
		. <u> </u>			<u> </u>		<u> </u>	
			· .				· · · · · · · · · · · · · · · · · · ·	
			·	· ——	<u> </u>			
	<u> </u>	, <u>.</u>						<u> </u>
	oncentration, D=Dep Indicators:	letion, RM	I≍Reduced Matrix, CS	S≍Covered	or Coate	d Sand G		ation: PL=Pore Lining, M=Matrix. for Problematic Hydric Soils ³ :
-			Sendu		Hu (01)			-
Histosol	pipedon (A2)			Gleyed Mat Redox (S5)				Prairie Redox (A16) Inganese Masses (F12)
	istic (A3)			d Matrix (Si				Explain in Remarks)
	en Sulfide (A4)			Mucky Min	•			
	d Layers (A5)			Gleyed Ma				
2 cm Mi	uck (A10)		🖌 Deplete	d Matrix (F	3)			
	d Below Dark Surfac	e (A11)		Dark Surfac	• •			
	ark Surface (A12)			d Dark Sur				of hydrophytic vegetation and
	Mucky Mineral (S1)	-	Redox I	Depression	ns (F8)			hydrology must be present,
	ucky Peat or Peat (S						unless	disturbed or problematic.
	Layer (if observed)	-						
	n							
Depth (in	iches):						Hydric Soil I	Present? Yes No _X_
							•	
Remarks:				•			·	
Remarks: YDROLC Wetland Hy)GY /drology Indicators							
YDROLC Wetland Hy Primary Indi	DGY /drology Indicators: cators (minimum of c		uired; check all that ap					y Indicators (minimum of two required)
Primary India	DGY /drology Indicators: cators (minimum of c Water (A1)		<u> </u>	ined Leave			Surfa	ace Soil Cracks (B6)
Primary Indi Primary Indi High Wa	DGY rdrology Indicators: cators (minimum of d Water (A1) ater Table (A2)		<u> </u>	ined Leave auna (B13)			Surfa Drair	ace Soil Cracks (B6) hage Patterns (B10)
Primary Indi Surface High Wa	DGY rdrology Indicators: cators (minimum of c Water (A1) ater Table (A2) ion (A3)		Water-Sta Aquatic Fa True Aqua	ined Leave auna (B13) atic Plants ((B14)		Surfa Drair Dry-S	ace Soil Cracks (B6) hage Patterns (B10) Season Water Table (C2)
Primary Indi Primary Indi Surface High W. Saturati Water M	DGY rdrology Indicators: cators (minimum of o Water (A1) ater Table (A2) ion (A3) Marks (B1)		_V_Water-Sta Aquatic Fa True Aqua Hydrogen	ined Leave auna (B13) atic Plants (Sulfide Od	(B14) lor (C1)		Surfa Drair Dry-S Cray	ace Soil Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8)
Primarks: YDROLC Wetland Hy Primary Indi Surface High Wa Saturati Water Mater	DGY rdrology Indicators: cators (minimum of of Water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2)		<u>V</u> Water-Sta Aquatic Fa True Aqua Hydrogen Cxidized F	ined Leave auna (B13) atic Plants (Sulfide Od Rhizospher	(B14) lor (C1) res on Livi	-	Cray (C3)	ace Soil Cracks (B6) nage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C9)
Primary Indi Saturati Water N Saturati Saturati Saturati Drift De	DGY /drology Indicators: cators (minimum of c Water (A1) ater Table (A2) ion (A3) Marks (B1) mt Deposits (B2) posits (B3)		Water-Sta Aquatic Fa True Aqua Hydrogen Oxidized F Presence	ined Leave auna (B13) atic Plants (Sulfide Od Rhizospher of Reduced	(B14) lor (C1) res on Livi d Iron (C4)	C3) Cash	ace Soil Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C9) ted or Stressed Plants (D1)
Primary Indi Primary Indi Surface High Water N Saturati Saturati Drift De Algal M	DGY rdrology Indicators: cators (minimum of c Water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2) sposits (B3) at or Crust (B4)		Water-Sta Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro	ined Leave auna (B13) atic Plants (Sulfide Od Rhizospher of Reduced on Reductio	(B14) lor (C1) les on Livi d Iron (C4 on in Tilleo)	(C3) Sturfa Drair Dry-S Cray (C3) Satur Sturfa S) Geor	ace Soil Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C9) ted or Stressed Plants (D1) norphic Position (D2)
Primary Indi Primary Indi Surface High Wa Saturati Saturati Drift De Algal M Iron De	DGY rdrology Indicators: cators (minimum of c Water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2) iposits (B3) at or Crust (B4) posits (B5)	one is requ	Water-Sta Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck	ined Leave auna (B13) tic Plants (Sulfide Od Rhizospher of Reduced on Reductio Sufface (C	(B14) lor (C1) res on Livi d Iron (C4 on in Tilleo C7))	(C3) Sturfa Drair Dry-S Cray (C3) Satur Sturfa S) Geor	ace Soil Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C9) ted or Stressed Plants (D1)
Primary Indi Primary Indi Surface High Wi Saturati Sedime Drift De Algal M Iron De Inundat	DGY rdrology Indicators: <u>cators (minimum of c</u> Water (A1) ater Table (A2) ion (A3) Marks (B1) mt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aerial	one is requ	Water-Sta Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck 37) Gauge or	ined Leave auna (B13) atic Plants (Sulfide Od Rhizospher of Reduced on Reductio	(B14) lor (C1) res on Livi d Iron (C4 on in Tilleo C7) (D9))	(C3) Sturfa Drair Dry-S Cray (C3) Satur Sturfa S) Geor	ace Soil Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C9) ted or Stressed Plants (D1) norphic Position (D2)
Primarks: YDROLC Vetland Hy Primary Indi Surface High Wa Saturati Water N Sedime Drift De Algal M Iron De Inundat Sparsel	DGY rdrology Indicators: cators (minimum of of Water (A1) ater Table (A2) ion (A3) Marks (B1) mt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aerial by Vegetated Concav	one is requ	Water-Sta Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck 37) Gauge or	ined Leave auna (B13) atic Plants (Sulfide Od Rhizosphen of Reduced on Reduction c Surface (C Well Data ((B14) lor (C1) res on Livi d Iron (C4 on in Tilleo C7) (D9))	(C3) Sturfa Drair Dry-S Cray (C3) Satur Sturfa S) Geor	ace Soil Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C9) ted or Stressed Plants (D1) norphic Position (D2)
Primary Indi Primary Indi Surface High W Saturati Saturati Saturati Saturati Drift De Algal M Iron De Iron De Sparsel Field Obser	DGY rdrology Indicators: cators (minimum of of Water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aerial ly Vegetated Concav rvations:	one is requ Imagery (l e Surface	Water-Sta Aquatic Fa True Aquat True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck Thin Muck G7) Gauge or (B8) Other (Exp	ined Leave auna (B13) atic Plants (Sulfide Od Rhizosphen of Reduced on Reduction c Surface (C Well Data (plain in Rer	(B14) lor (C1) es on Livi d Iron (C4 on in Tilled C7) (D9) marks)	.) I Soils (C	(C3) Sturfa Drair Dry-S Cray (C3) Satur Sturfa S) Geor	ace Soil Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C9) ted or Stressed Plants (D1) norphic Position (D2)
Primarks: YDROLC Vetland Hy Primary Indi Surface High Wi Saturati Water N Saturati Saturati Algal M Iron De Algal M Iron De Sparsel Field Obset Surface Wa	DGY rdrology Indicators: cators (minimum of of Water (A1) ater Table (A2) ion (A3) Marks (B1) mt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aerial ly Vegetated Concav rvations: ter Present?	one is requ Imagery (l e Surface 'es	Water-Sta Aquatic Fa Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck Thin Muck S7) Gauge or (B8) Other (Exp	ined Leave auna (B13) atic Plants (Sulfide Od Rhizosphen of Reduced on Reductio c Surface (C Well Data (plain in Rer ches):	(B14) lor (C1) res on Livi d Iron (C4 on in Tilled C7) (D9) marks)) d Soils (Co	(C3) Sturfa Drair Dry-S Cray (C3) Satur Sturfa S) Geor	ace Soil Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C9) ted or Stressed Plants (D1) norphic Position (D2)
Remarks: YDROLC Wetland Hy Primary Indi Surface High Wi Saturati Water N Sedime Drift De Algal M Iron De Inundat Sparsel Field Obsei Surface Wa Water Table	DGY rdrology Indicators: cators (minimum of of Water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aerial by Vegetated Concav rvations: ter Present?	Imagery (l e Surface 'es	Water-Sta Aquatic Fa True Aquat Hydrogen Oxidized F Presence Recent Irc Thin Muck 77) Gauge or (B8) Other (Exp No Depth (in No Depth (in	ined Leave auna (B13) atic Plants (Sulfide Od Rhizosphen of Reduced on Reductio Surface (C Well Data (plain in Rer ches):	(B14) lor (C1) res on Livi d Iron (C4 on in Tilleo C7) (D9) marks)	-) d Soils (Co	(C3) Stund (C3) Saturn (C3) Saturn (C3) Saturn (C3) Geor (C3) FAC-	ace Soil Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C9) ted or Stressed Plants (D1) norphic Position (D2) Neutral Test (D5)
Remarks: YDROLC YDROLC Vetland Hy Primary Indi Surface High W Saturati Saturati Saturati Sedime Drift De Algal M Iron De Iron De Iron De Sparsel Field Obser Surface Wa Water Table Saturation F (includes ca	DGY rdrology Indicators: cators (minimum of of Water (A1) ater Table (A2) ion (A3) Marks (B1) Int Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aerial ly Vegetated Concav rvations: ter Present? Present? Present?	Imagery (e Surface 'es 'es	Water-Sta Aquatic Fa Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck Thin Muck Other (Exp No Depth (in No Depth (in	ined Leave auna (B13) atic Plants (Sulfide Od Rhizospher of Reduced on Reductio (Surface (C Well Data (oblain in Rer ches): ches):	(B14) lor (C1) d Iron (C4 on in Tilled C7) (D9) marks)	-) d Soils (Co	(C3) Stund (C3) Stund (C3) Stund (C3) Stund (C3) Geor (C3) FAC-	ace Soil Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C9) ted or Stressed Plants (D1) norphic Position (D2)
Remarks: IYDROLC Wetland Hy Primary Indi Surface High W Saturati Sedime Drift De Algal M Iron De Iron De Sparsel Field Obser Surface Wa Water Table Saturation F (includes ca	DGY rdrology Indicators: cators (minimum of of Water (A1) ater Table (A2) ion (A3) Marks (B1) Int Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aerial ly Vegetated Concav rvations: ter Present? Present? Present?	Imagery (e Surface 'es 'es	Water-Sta Aquatic Fa True Aquat Hydrogen Oxidized F Presence Recent Irc Thin Muck 77) Gauge or (B8) Other (Exp No Depth (in No Depth (in	ined Leave auna (B13) atic Plants (Sulfide Od Rhizospher of Reduced on Reductio (Surface (C Well Data (oblain in Rer ches): ches):	(B14) lor (C1) d Iron (C4 on in Tilled C7) (D9) marks)	-) d Soils (Co	(C3) Stund (C3) Stund (C3) Stund (C3) Stund (C3) Geor (C3) FAC-	ace Soil Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C9) ted or Stressed Plants (D1) norphic Position (D2) Neutral Test (D5)
Remarks: YDROLC Wetland Hy Primary Indi Surface High W: Saturati Water N Sedime Sedime Sedime Sedime Saturati Saturati Sparsel Field Obset Surface Wa Water Table Saturation F (includes ca Describe Re	DGY rdrology Indicators: cators (minimum of of Water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aerial ty Vegetated Concav rvations: ter Present? Present? Present? pillary fringe) acorded Data (stream	Imagery (e Surface /es /es	Water-Sta Aquatic Fa True Aquat Hydrogen Oxidized F Presence Recent Iro Thin Muck 77) Gauge or (B8) Other (Exp No Depth (in No Depth (in No Depth (in nonitoring well, aerial	ined Leave auna (B13) atic Plants (Sulfide Od Rhizosphen of Reduced on Reductio con Reductio curface (C Well Data (olain in Rer ches): ches): photos, pre	(B14) lor (C1) d Iron (C4 on in Tilled C7) (D9) marks)	-) d Soils (Co 	(C3) Stund (C3) Stund (C3) Stund (C3) Stund (C3) Geor (C3) FAC-	ace Soil Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C9) ted or Stressed Plants (D1) norphic Position (D2) Neutral Test (D5)
Remarks: YDROLC Wetland Hy Primary Indi Surface High W: Saturati Water N Sedime Sedime Sedime Sedime Saturati Saturati Sparsel Field Obset Surface Wa Water Table Saturation F (includes ca Describe Re	DGY rdrology Indicators: cators (minimum of of Water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aerial ty Vegetated Concav rvations: ter Present? Present? Present? pillary fringe) acorded Data (stream	Imagery (e Surface /es /es	Water-Sta Aquatic Fa Aquatic Fa True Aqua Hydrogen Oxidized F Presence Recent Iro Thin Muck Thin Muck Other (Exp No Depth (in No Depth (in	ined Leave auna (B13) atic Plants (Sulfide Od Rhizosphen of Reduced on Reductio con Reductio curface (C Well Data (olain in Rer ches): ches): photos, pre	(B14) lor (C1) d Iron (C4 on in Tilled C7) (D9) marks)	-) d Soils (Co 	(C3) Stund (C3) Stund (C3) Stund (C3) Stund (C3) Geor (C3) FAC-	ace Soil Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C9) ted or Stressed Plants (D1) norphic Position (D2) Neutral Test (D5)
Remarks: YDROLC Wetland Hy Primary Indi Surface High W Saturati Saturati Sedime Drift De Algal M Iron De Inundat Sparsel Field Obser Surface Wa Water Table Saturation F (includes ca	DGY rdrology Indicators: cators (minimum of of Water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aerial ty Vegetated Concav rvations: ter Present? Present? Present? pillary fringe) acorded Data (stream	Imagery (e Surface /es /es	Water-Sta Aquatic Fa True Aquat Hydrogen Oxidized F Presence Recent Iro Thin Muck 77) Gauge or (B8) Other (Exp No Depth (in No Depth (in No Depth (in nonitoring well, aerial	ined Leave auna (B13) atic Plants (Sulfide Od Rhizosphen of Reduced on Reductio con Reductio curface (C Well Data (olain in Rer ches): ches): photos, pre	(B14) lor (C1) d Iron (C4 on in Tilled C7) (D9) marks)	-) d Soils (Co 	(C3) Stund (C3) Stund (C3) Stund (C3) Stund (C3) Geor (C3) FAC-	ace Soil Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C9) ted or Stressed Plants (D1) norphic Position (D2) Neutral Test (D5)
Remarks: YDROLC Wetland Hy Primary Indi Surface High Wi Saturati Saturati Algal M Iron De Inundat Sparsel Field Obset Surface Wa Water Table Saturation F (includes ca Describe Re	DGY rdrology Indicators: cators (minimum of of Water (A1) ater Table (A2) ion (A3) Marks (B1) int Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aerial ty Vegetated Concav rvations: ter Present? Present? Present? pillary fringe) acorded Data (stream	Imagery (e Surface /es /es	Water-Sta Aquatic Fa True Aquat Hydrogen Oxidized F Presence Recent Iro Thin Muck 77) Gauge or (B8) Other (Exp No Depth (in No Depth (in No Depth (in nonitoring well, aerial	ined Leave auna (B13) atic Plants (Sulfide Od Rhizosphen of Reduced on Reductio con Reductio curface (C Well Data (olain in Rer ches): ches): photos, pre	(B14) lor (C1) d Iron (C4 on in Tilled C7) (D9) marks)	-) d Soils (Co 	(C3) Stund (C3) Stund (C3) Stund (C3) Stund (C3) Geor (C3) FAC-	ace Soil Cracks (B6) hage Patterns (B10) Season Water Table (C2) fish Burrows (C8) ration Visible on Aerial Imagery (C9) ted or Stressed Plants (D1) norphic Position (D2) Neutral Test (D5)

File: R 120708A Future: Site 1 brib 3

	CHARACT	ERIZATIO	N CARCELLA							-
			<u></u>	- Pelekkor -	, 4		17		deCentres parts of	
GPS ID: ି					Date:	12.19	/11			
· 영향(영화) 제품 전 영향(영화)	Sike T	t clo	3			<u> </u>			·	
	SW MD	BV HA	WD MJ	(20)	Investigat	ors: Bla	ir Bale		· · · · ·	
jounty.	BL LO	KF OK		<u> </u>						
				<u> </u>	· · · · ·		(-	
) Virolo Mož	erbody/St	 roam Turo		MERAL*		MITTENT		ENNIAL		
	ernouyrau								· · ·	
\nnrovim-	ate depth o	 of running		·	1	Stroom Ec	rme Broen	nt	i L	
vhhiovillie	ale debui d	n raming T	/N/A			Stream FC	Pool(s)		n de la seconda de la secon La seconda de la seconda de	
					<u> </u>	•		1-4	_	
\		L	1-	3/1	<u>}</u>			82.8		
чрргохіта	ate OHWM	,	- 2 -	5	ļ	·	Run(s)	404		
				<u> </u>	<u> </u>		Riffles(s)	14	-	
\nn	ا ملداندر مراجع	-			<u> </u>			K .	<u> </u>	
	ate width o			7.		Stream Bo	tom	l The second se	L	
op of ban	of bank to			20'	· ···	Suedii D	r	<50%	>50%	
oh oi nau I	n)	1			<u> </u>	l silt	None	~0076	-50%	,
\nnrovim	ato hoicht	 of banke'	(channel de	nth)*	:	ciay		· · ·	┟─────┨─	
Approxima 1	ate neight	<u>or panks j</u>		pui):	; ;	mud			V	
left	3'-15	<u>_/</u>	right	2/-1	~					
leit	3 -12	2		<u> </u>		sand				
			_ 		;	gravel cobbles				
чрргохіта	ate depth o		: 	-		boulders				
	μ λ	N/A		· <u> </u>	1	·				
				+		bedrock	· · · · ·		· .	
Dominant	Dianto Ad	 iacont to (Stream* (scie	 		Docorintic	n that has	t fits the strea	m bank*	
	er ru				,	left			right	
		01000		<u> </u>	{		vertica	/undercut	- ngrit	
Pecar	<u>n</u>	1		<u> </u>	ļļ		vertica		<u> </u>	
					l					
	-	<u> </u>		1			م با محمد ا			
		<u> </u>			g		steeply s	loped (>30%)		
								slope (<30%)		
<u>Blockb</u> Uitis	eny					X				
<u>Blockb</u> Uitis	eny						gradual/no	slope (<30%)		
<u>Blockb</u> Uitis	eny					Descriptic	gradual/no on that bes	slope (<30%) fits the strea	am channel	
<u>Blockb</u> Uitis	eny					X	gradual/no	slope (<30%) fits the strea		
Blockb Vitis	eny					Descriptic	gradual/no on that bes narrow, de	slope (<30%) t fits the strea ep	am channel wide, deep	
Blocks Uitis Herbaceou	us:					Descriptic	gradual/no on that bes	slope (<30%) t fits the strea ep	am channel wide, deep wide,	
B/ockb U:Ł:S Herbaceou Pick the c	us:	I dest de	scribes the			Descriptic	gradual/no on that bes narrow, de	slope (<30%) t fits the strea ep	am channel wide, deep	
B/ockb Uitis Herbaceou Pick the c	us:	at best de	escribes the sti			Descriptio	gradual/no on that bes narrow, de	slope (<30%) t fits the strea ep	am channel wide, deep wide,	
B/ockb U:Ł:S Herbaceou Pick the c	ategory th which veg	at best de	ades the sti		100%		gradual/no on that bes narrow, de	slope (<30%) t fits the strea ep	am channel wide, deep wide,	
B/ockb U:Ł:S Herbaceou Pick the c	us: ategory th	at best de	ades the st				gradual/no on that bes narrow, de	slope (<30%) t fits the strea ep	am channel wide, deep wide,	
B/ockb Uitis Herbaceou Pick the c	ategory th which veg	at best de	ades the sti		100%		gradual/no on that bes narrow, de	slope (<30%) t fits the strea ep	am channel wide, deep wide,	
B/ock Uitis Herbaceou Pick the c extent to v	ategory th which vege 0% 25%	etation sh	ades the sti 50% 75%	ream withir	100% other 90	8	gradual/no on that bes narrow, de narrow, sh	slope (<30%) t fits the strea ep allow	am channel wide, deep wide,	×
B/ock Uitis Herbaceou Pick the c extent to v	ategory th which vego 0% 25%	etation sh	ades the sti 50% 75%	ream withir	100% other 90		gradual/no on that bes narrow, de narrow, sh	slope (<30%) t fits the strea ep allow	am channel wide, deep wide, shallow	
B/ock Uitis Herbaceou Pick the c extent to v	ategory th which vego 0% 25%	etation sh	ades the sti	ream within	100% other 7 0	8	gradual/no on that bes narrow, de narrow, sh	slope (<30%) t fits the strea ep allow	am channel wide, deep wide, shallow	
Shrubs/Vii B/ocks Uitis Herbaceou Pick the c extent to v	ategory th which vego 0% 25%	etation sh	ades the sti 50% 75%	ream within	100% other 90	8	gradual/no on that bes narrow, de narrow, sh	slope (<30%) t fits the strea ep allow	am channel wide, deep wide, shallow	

File: R120708A Feature: Sife 16762 incided bank

		۳ ۶ ۳	ssler thee	awar they	<u></u>	· Carrel	ANNA SA	<u></u>	<u>``</u>		
	STREAM (CHARACTE	RIZATION	· .	1				*	ant in the	
-											
-	GPS ID:	dil	2 5:1	1 5	orth	Date:	DA PI	711		<u> </u>	
-		14.10	0			ייייי ב					
_	• •	0144 440] 		$\frac{1}{1}$	1		
	County:			WD MJ	(RO)	Investigat	ors:	Bleir Bu	kcr		
		BL LO	KF OK	LI PO	<u> </u>				- ·		
_(Circle Wat	erbodv/Str	eam Type:	EPHE	MERAL*	INTER	MITTENT) PERE	NNIAL	·	
٦				•				P			
	Annroxim	ate denth c	of running v	water*:		1	Stream Fo	rms Prese	nt	· · ·	
'ר			du	N/A		· · ·		Pool(s)			*
+		÷	CIVIS	IWA		/ 		1 001(0)			
	-		L	2.4				Dun(a)			·
	Approxim	ate OHWM		2		<u> </u>	· · · · · · · · · · · · · · · · · · ·	Run(s)	N		
_						ļ					
				l				Riffles(s)	<u>~</u>		
			of stream:	15'-	201	<u> </u>				ļ	
		of bank to					Stream Bo	ottom	. <u> </u>		-
	top of ban					l .		None	<50%	>50%	
ר			ľ	[1	silt				· · · · · · · · · · · · · · · · · · ·
	Annrovim	afo beight i	of banks (c	hannel de	oth)*:	L	clay			V	
7	Chbiovilli	ate neight				1	mud				
+	left			right		81	sand				
4	leπ	6'-'	<u>15 '.</u>	right	61-	0 '					
	_						gravel				
	Approxim	ate depth ç	pt-pool(s):	·····		ļ	cobbles		• 1		
		(N/A)				boulders				
				}			bedrock				· .
الم.ب ا	Dominant	Plants Adi	acent to Si	tream* (scie	ntific names)	-	Descriptio	n that best	t fits the strea	am bank*	
_	Trees:	•	1		· · ·	[left			right	
-+	A 11	······································		· · · · · · · · · · · · · · · · · · ·				vertical	/undercut		· · · · · · · · · · · · · · · · · · ·
┝			l <u>.</u>	· · · · · · · · · · · · · · · · · · ·							
		5		ļ		ļ			an ad (5 000/)		
╧	Cerna							steepiy s	oped (>30%)	·	
	Shrubs/Vi	nes:				<u> </u>	·				
	Smilax							gradual/no	slope (<30%)		
		NOCCOPS	1								
	Herbaceo	us:									
+	· · · · · · · · · · · · · · · · · · ·					-	Descriptio	n that heef	fits the strea	m channe	
				ļ				narrow, de		wide, deep	
_	<u>.</u>		ļ			d	•	narrow, de	-h	wide, deep	[
			ļ	<u> </u>							
			· ·	ł	ļ			narrow, sha	allow	wide,	
			at best des							shallow	
	extent to v	which vege	tation sha		<u>eam with</u> ii	n ROW:					
	·····	0%		50%]100%	-				
t		25%	1/	75%		other					
╉				1		1					
	Comment	L	1			.I		l	······		
_	•		1. A. A.	j. t	h	1				į i	· ·
4	homi face	man a la la	Marlura	pointera.	rut in C	fannel					
_		} -	1	·	<u> </u>	·					
	run	sinte	poid			Į	ļ		· · · · ·		
- 1		· · • • •	1 1 1	4	1	1 .	1	1	•	r i	

County: SW MD BV HA WD MJ 20 Investigators: Bit B kc tiz Hotz BL LO KF OK. LI PO PO Investigators: Bit B kc tiz Hotz Circle Waterbody/Stream Type: EPHEMERAL* INTERMITTENT PERENNIAL Approximate depth of running water)*: Stream Forms Present Pool(s) Approximate OHWM: A Run(s) Run(s) Approximate width of stream: [57 Stream Bottom (from top of bank to top of bank) Stream Bottom Stream Bottom Approximate height of banks (channel depth)*: clay (Li mud left right gravel gravel Approximate depth of pool(s): Cobbles boulders boulders Investigators Description that best fits the stream bank* Description that best fits the stream bank*											
STREAM CHARACTERIZATION GPS ID: Six IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	1	•		デー	1.RDN	7084	F	atura	Site 1 Kril	1 with	and char
County: SW MD EV HA WD MJ D Investigators: B Siz B Lo KF OK LI PO EL LO KF OK LI PO Circle Waterbody/Stream Type: EPHEMERAL* INTERMITTENT PERENNIAL Approximate depth of running water: Stream Forms Present Circle Waterbody/Stream Type: EPHEMERAL* Approximate depth of stream: Circle Waterbody/Stream Type: EPHEMERAL* Approximate oHWM: Approximate oHWM: Approximate height of stream: IST Stream Bottom top of bank to top of bank to top of bank to top of bank to EQUIDENT Stream Bottom Stream Bottom Approximate height of banks (channel depth)*: Ciay Left Y right J sand Approximate depth of proo((s): (N/A) boulders Description that best fits the stream bank* Trees: Description that best fits the stream bank* Circle Vertical/Undercut Circle Circle Circ	STREAM	CHARACTE	RIZATION				; e		211-22 1 0/10	, wide	-vite soul
BL LO KF OK LI PO Circle Waterbody/Stream Type: EPHEMERAL* INTERMITTENT PERENNIAL Approximate depth of running watery: Stream Forms Present Approximate depth of running watery: Stream Forms Present Approximate depth of running watery: Stream Forms Present Approximate width of stream: [57] Approximate width of stream: [57] Stream Bottom None Approximate height of banks (channel depth)*: clay Clay Approximate height of banks (channel depth)*: clay Approximate depth of pool(s):	GPS ID:	Şıfr	1 713	b 2 A	Porth	Date:	12/9	Zi			· · · · · · · · · · · · · · · · · · ·
Approximate depth of running water: Stream Forms Present Approximate OHWM: Pool(s) Approximate OHWM: Run(s) Approximate width of stream: 57 Stream Bottom Riffles(s) Approximate width of stream: 57 Stream Bottom None top of bank to Stream Bottom top of bank to None top of bank to Stream Bottom top of bank to None top of bank to Stream Bottom top of bank to None top of banks Stream Bottom Approximate height of banks (channel depth)*: Clay right gravel gravel Stream Bottom UN/A boulders Dominant Plants Adjacent to Stream* (scientific names) Description that best fits the stream bank* Trees: If gradual/no slope (<30%)	County:				20	Investigat	iors: B	sic B	kor t	iz H	12
Approximate depth of running water: Stream Forms Present Approximate OHWM: Pool(s) Approximate OHWM: Run(s) Approximate width of stream: 57 Stream Bottom Riffles(s) Approximate width of stream: 57 Stream Bottom None top of bank to Stream Bottom top of bank to None top of bank to Stream Bottom top of bank to None top of bank to Stream Bottom top of bank to None top of banks Stream Bottom Approximate height of banks (channel depth)*: Clay right gravel gravel Stream Bottom UN/A boulders Dominant Plants Adjacent to Stream* (scientific names) Description that best fits the stream bank* Trees: If gradual/no slope (<30%)	······································										
Approximate depth of running watel': Stream Forms Present Approximate depth of running watel': Pool(s) Approximate OHWM: A Approximate Width of stream: Stream Bortom Approximate width of stream: Stream Bottom Approximate height of banks (channel depth)*: Clay Approximate height of banks (channel depth)*: Clay Ieft right Gravel Approximate depth of prool(s): cobbles Ieft right Gravel Intervention Stream Bottom Ieft right Gravel Intervention Stream Bottom Intervention Stream Sontom Intervention Stream Sontom Intervention Stream Sont	Circle Wat	 terbody/Sta	 ream Type:	EPHEI	MERAL*	INTER	MITTENT) PERE	INNIAL		
clvy_Chila Pool(s) Approximate OHWM: Pool(s) Approximate OHWM: Pool(s) Aun(s) Pool(s)								[
Approximate OHWM: Approximate Width of stream: Image: Stream Bottom Approximate width of stream: Image: Stream Bottom Icon top of bank to Stream Bottom top of bank) Stream Bottom Approximate height of banks (channel depth)*: clay left Y width sand left Y WA sand Image: Stream Source gravel Approximate depth of pool(s): cobbles Image: Stream Source sand Image: Stream Source gravel Approximate depth of pool(s): cobbles Image: Stream Source bedrock Dominant Plants Adjacent to Stream* (scientific names) Description that best fits the stream bank* Trees: left right Image: Stream Source steeply soped (>30%) Strubs/Vines: steeply soped (>30%) Strubs/Vines: marrow, deep Image: Steeply soped (>30%) marrow, deep Image: Steeply soped (>30%) marrow, deep Image: Steeply soped (>30%) marrow, shallow Image: Steeply soped (>30%) marrow, shallow <td>Approxim</td> <td>ate depth o</td> <td></td> <td></td> <td></td> <td></td> <td>Stream Fo</td> <td></td> <td></td> <td>I</td> <td>[</td>	Approxim	ate depth o					Stream Fo			I	[
Approximate width of stream: [57] (from top of bank to top of bank) Stream Bottom Approximate height of banks (channel depth)*: clay (approximate height of banks (channel depth)*: clay (left right (INA) sand (INA) gravel (INA) boulders (INA) gradual/no slope (<30%)											·····
Approximate width of stream: [57] (from top of bank to top of bank) Stream Bottom Approximate height of banks (channel depth)*: clay left right left right left right Approximate height of banks (channel depth)*: clay left right left right gravel gravel Approximate depth of pool(s): cobbles Dominant Plants Adjacent to Stream* (scientific names) Description that best fits the stream bank* Trees: left right (LL vertical/undercut clay Strubs/Vines: steeply sloped (>30%) steeply sloped (>30%) Strubs/Vines: pradual/no slope (<30%)	Approxim	ate OHWM	i a'					Run(s)	· · · - ·		·
(from top of bank to top of bank) Stream Bottom Approximate height of banks (channel depth)*: Clay (left right mud left right mud Approximate depth of pool(s): cobbles cobbles (N/A) boulders cobbles Dominant Plants Adjacent to Stream* (scientific names) Description that best fits the stream bank* Trees: ifft right (List) steeply sloped (>30%) coscillation Shrubs/Vines: gradual/no slope (<30%)		·····						Riffles(s)	h		
top of bank) None <50%			of stream:	151			Stream Br) · · ·		l	Į
Approximate height of banks (channel depth)*: Silt Clay I/I left right I Mud I/I Approximate depth of pool(s): cobbles I/I I/I Approximate depth of pool(s): cobbles I/I I/I Image:	• •			<u></u>					<50%	>50%	•
Ieft mud Approximate depth of pool(s): gravel (N/A) boulders (N/A) boulders Dominant Plants Adjacent to Stream* (scientific names) Description that best fits the stream bank* Trees: left (N/A) bedrock Dominant Plants Adjacent to Stream* (scientific names) Description that best fits the stream bank* Trees: left (N/A) steeply sloped (>30%) Shrubs/Vines: ////////////////////////////////////	-		ĺ	<u> </u>	47.)#		· · · · · · · · · · · · · · · · · · ·			/	
left right yit sand yit Approximate depth of pool(s): cobbles cobbles cobbles IN/A boulders bedrock cobbles Dominant Plants Adjacent to Stream* (scientific names) Description that best fits the stream bank* Trees: left right CULK vertical/undercut ccrss Shrubs/Vines: steeply sloped (>30%) steeply sloped (>30%) Description that best fits the stream channel narrow, deep wide, deep narrow, deep wide, deep Pick the category that best describes the extent to which vegetation shades the stream within ROW: narrow, shallow wide, deep 0% 50% 100% cs cs cs	Approxim	ate height	of banks (channel de]	pth)*:]	*				ļ
Approximate depth of pool(s): cobbles (N/A) boulders Dominant Plants Adjacent to Stream* (scientific names) Description that best fits the stream bank* Trees: left (U/L S) vertical/undercut (U/L S) steeply sloped (>30%) Shrubs/Vines: gradual/no slope (<30%)	left			right	4T						
Image: N/A boulders Dominant Plants Adjacent to Stream* (scientific nemes) Description that best fits the stream bank* Trees: left right C vertical/undercut case C steeply sloped (>30%) steeply sloped (>30%) Shrubs/Vines: gradual/no slope (<30%)		ata dantha	 								
Dominant Plants Adjacent to Stream* (scientific names) Description that best fits the stream bank* Trees: left right Cullus vertical/undercut cullus Cullus steeply sloped (>30%) steeply sloped (>30%) Shrubs/Vines: gradual/no slope (<30%)	Approxim			[
Trees: left right Cube vertical/undercut complexity Cube steeply sloped (>30%) steeply sloped (>30%) Shrubs/Vines: gradual/no slope (<30%)	······					· · · · ·	bedrock				
Trees: left right Cube vertical/undercut complexity Cube steeply sloped (>30%) steeply sloped (>30%) Shrubs/Vines: gradual/no slope (<30%)	Dominant	Plante Ad	iacent to S	troam* (ecie	ntific names)		Descriptio	 on that hesi	 t fits the stre	am bank*	[
Cccss steeply sloped (>30%) Shrubs/Vines: gradual/no slope (<30%)	Trees:	Tiano Auj									
Shrubs/Vines:		}						vertical	/undercut		
Shrubs/Vines: gradual/no slope (<30%)	Carys							steenlys	loned (>30%)	· · · ·	
Officesda Area Description that best fits the stream channel Herbaceous: Description that best fits the stream channel narrow, deep wide, deep narrow, shallow wide, deep Pick the category that best describes the shallow 0% 50% 100% 25% 75% 55	Shrubs/Vi	nes:									· · · · · · · · · · · ·
Herbaceous: Description that best fits the stream channel narrow, deep wide, deep narrow, shallow wide, deep Pick the category that best describes the extent to which vegetation shades the stream within ROW: narrow, shallow 0% 50% 100% 25% 75% 55	Sunv	horaci	NLS					gradual/no	slope (<30%)		
Description that best fits the stream channel narrow, deep wide, deep narrow, deep wide, deep Pick the category that best describes the narrow, shallow extent to which vegetation shades the stream within ROW: shallow 0% 50% 100% 25% 75% 55	JOFico	balton							· · · · · · · · · · · · · · · · · · ·	·	
Image: Solution of the set of the s	nerbaceo						Descriptio	n that bes	t fits the strea	am channe	
Pick the category that best describes the extent to which vegetation shades the stream within ROW: Image: shallow in the shal											
Pick the category that best describes the extent to which vegetation shades the stream within ROW: Image: shallow in the shal				 		-, -,,.		norrow, oh	ollow	wido	
extent to which vegetation shades the stream within ROW: 0% 50% 100% 0% 50% 100% 100% 25% 75% 55 other	Pick the c	ategory th	∣ at best des	cribes the	t	l		nanow, sn	anow		
25% 75% 55 other	extent to	which vege	etation sha	des the str	eam within	ROW:					
		0%	· ·	50%	86				<u></u> n,,,		
		20 /0	!	15/0							
	Comment	S		ş	1	1	1	1			1
											,
								•		· · · · · · · · · · · · · · · · · · ·	
]				1				
									· .		
					•						

GPS ID:	407	1	site		Date:	12/9	211			
County:	SW MD	BV HA	WD MJ	RO] Investigat	ors:	Bleir	eker + El	the the	
	BL LO									
Circle Wa	terbody/Sti	ream Type	EPHE	MERAL*		MITTENT	PERE	NNIAL		
			· · · · ·						· ·	
Approxim	ate depth c 		water: N/A		-	Stream Fo	Prese Prese Pool(s)		1	[
						· · · · · · · · ·				
Approxim	ate OHWM	<u> {8</u> #	- 3'	 		•	Run(s)	N	· · ·	
	<u> </u>				 	I	Riffles(s)	h	<u>.</u>	[
	ate width o	of stream:	3'-	20'		04m			}	[
(from top top of ban	of bank to					Stream Bo	None	<50%	>50%	
		ľ		•		silt				
Approxim	ate height	of banks (d	channel de	pth)*:	+	clay			V	
Wes teft	0"-	10.	Cafielat	17"-	10'	mud sand				
VOE JOIL			Lough .			gravel				
Annrovim	ate depth c	f pool(s):				cobbles				
-phiovili		V	r		1 ··· · · · · · · · · · · · · · · · · ·	I				
		N/A				boulders bedrock	}			·
Dominant Trees:	Plants Adj	N/A) acent to S		entific names)		bedrock	on that best	t fits the stre	am bank* right	·
Dominant		N/A) acent to S		ntific names)		bedrock Descriptio	on that best	/undercut	right	
Dominant Trees: ₽≈са∽ ,	Plants Adj ههدي ج	N/A) acent to S		entific names)		bedrock Descriptio	on that best		right	
Dominant Trees: ₽≈са∽ ,	Plants Adj Rhcr. e nes:	N/A) acent to S	cherry,	entific names)		bedrock Descriptio	on that best vertical steeply s	/undercut	right	
Dominant Trees: ຂະແມ່ງ Shrubs/Vi ຂວາວວາງ	Plants Adj Rherr, e nes:	acent to S	cherry,	entific names)		bedrock Descriptio	on that best vertical steeply s	/undercut loped (>30%)	right	
Dominant Trees: ⊉ະເ⇔~ , Shrubs/Vi ₽ວ\≲ວ⊱.` Herbaceo	Plants Adj ههدي ج nes: سي , ايديد us:	acent to S	cherry,	ntific names)		bedrock Descriptio	on that best vertical steeply s gradual/no	/undercut loped (>30%)		
Dominant Trees: ຂອງເພິ່ງ Shrubs/Vi ຂອງເວຍນີ	Plants Adj ههدي ج nes: سي , ايديد us:	acent to S	cherry,	entific names)		bedrock Descriptio	on that best vertical steeply s gradual/no	/undercut loped (>30%) slope (<30%)		
Dominant Trees: ຂະເພດ , Shrubs/Vi ຂົດໂລດແມ່ Herbaceo	Plants Adj ههدي ج nes: سي , ايديد us:	acent to S	cherry,	entific names)		bedrock Descriptio	on that best vertical steeply s gradual/no on that best narrow, de	/undercut loped (>30%) slope (<30%) fits the strea	am channe wide, deep	
Dominant Trees: کترشہ , Shrubs/Vi برمزی سرح Herbaceo	Plants Adj Rhcr. e nes: uy, tru us: -d	N/A) acent to S 16, hcc 4-p++ (/	cribes the			bedrock Descriptio	on that best vertical steeply s gradual/no on that best	/undercut loped (>30%) slope (<30%) fits the strea	right	
Dominant Trees: کیدیک Shrubs/Vi Poisous Herbaceo	Plants Adj Rhorr, e nes: us: -d ategory that which veget	N/A) acent to S 16, hcc 4-p++ (/	cribes the		ROW:	bedrock Descriptio	on that best vertical steeply s gradual/no on that best narrow, de	/undercut loped (>30%) slope (<30%) fits the strea	am channe wide, deep	
Dominant Trees: ₽≍rŵ~, Shrubs/Vi ₽o\So\; Herbaceo Ƙ&z ਯਾਵ Pick the c	Plants Adj Rhcr. e nes: us: -d ategory tha which vege 0%	N/A) acent to S 16, hcc 4-p++ (/	cribes the des the str	eam withir	ROW:	bedrock Descriptio	on that best vertical steeply s gradual/no on that best narrow, de	/undercut loped (>30%) slope (<30%) fits the strea	am channe wide, deep	
Dominant Trees: کیدیک Shrubs/Vi یک Herbaceo ۲۵۵ ست Pick the c	Plants Adj Rhorr, e nes: us: -d ategory that which veget	N/A) acent to S 16, hcc 4-p++ (/	cribes the		ROW:	bedrock Descriptio	on that best vertical steeply s gradual/no on that best narrow, de	/undercut loped (>30%) slope (<30%) fits the strea	am channe wide, deep	
Dominant Trees: ມີສັດຄິດ Shrubs/Vi ມີດີເວດ ມີ Herbaceoo ມີດວງ ທາສ Pick the c extent to y	Plants Adj Rherr, e nes: us: 	N/A) acent to S 16, hcc 4-p++ (/	cribes the des the str	eam withir	ROW:	bedrock Descriptio	on that best vertical steeply s gradual/no on that best narrow, de	/undercut loped (>30%) slope (<30%) fits the strea	am channe wide, deep	
Dominant Trees: אדינאסיייייייייייייייייייייייייייייייייי	Plants Adj Plants Adj Res: us: 	N/A) acent to S 16, hcc 4-p++ (/	cribes the des the str 50%	eam within	ROW: 100% other	bedrock Descriptio	on that best vertical steeply s gradual/no n that best narrow, det narrow, sha	/undercut loped (>30%) slope (<30%) fits the strea ep allow	right am channe wide, deep wide, shallow	
Dominant Trees: ມີສັດຄິດ Shrubs/Vi ມີດີເວດ ມີ Herbaceoo ມີດວງ ທາສ Pick the c extent to y	Plants Adj Plants Adj Res: us: 	N/A) acent to S 16, hcc 4-p++ (/	cribes the des the str 50%	eam within	ROW:	bedrock Descriptio	on that best vertical steeply s gradual/no on that best narrow, de	/undercut loped (>30%) slope (<30%) fits the strea ep allow	am channe wide, deep	
Dominant Trees: Pres: Pres: Anison; Anison; Herbaceor Pick the c extent to y Comment	Plants Adj Plants Adj Res: us: 	N/A) acent to S 16, hcc 4-p++ (/	cribes the des the str 50%	eam within	ROW: 100% other	bedrock Descriptio	on that best vertical steeply s gradual/no n that best narrow, det narrow, sha	/undercut loped (>30%) slope (<30%) fits the strea ep allow	right am channe wide, deep wide, shallow	

r ~~ (;-	File KIZOTOBA Feature: point gennic I pond SE Com NE Corr
Sito HI	Pond Field Data Form
Location/Project: Tort of Cot	Date: 12-09-2011 Client: Port & Catoese Investigator: Blair Baker + Flisa Hotz
Pond Name: Squart Dor	Investigator: Blair Baker + Flisa Hotz
County: RoalNS UTMI	North (Lat): UTM West (Long):
	x. Distance to road: Approx. distance to project ROW:
Description (circle one): Permanent la Origin: Natural Man-made	ke/pondTemporary lake/pondMarsh/BogSwamp/forestOtherUnknownPerimeter GPS points taken:yesno
Estimated pond depth:, Approx.	Ft. Primary Substrate: Silt/Muck Sand/Gravel Cobble Bedrock Other
	getation: 0 1-25 25-50 50-75 >75 Within Forest? Yes No
Distance to Forest Edge: <u>5</u> Ft.	Surrounding landscape/Vegetation: <u>PlCan</u> , Oaks, SpS, Awni Can F. M. Sylamone
Dominant species observed:	

Site Sketch/Notes 1ri6 \ fribZ, GPS5ike 1:5quarc pond VE Corner GPS Site 1: Square pond SE Corner Square Pond 1rib3

File: KIZ Reature: Site	210 11A 1 wetland pit & upland
	ATA FORM – Great Plains Region
Project/Site: Partof (ataoss city/0	ounty: <u>ROGRY5</u> Sampling Date: <u>D</u> <u>1</u> <u>D</u> <u>1</u> State: <u>OK</u> Sampling Point: <u>pi+8</u> poind d on, Township, Range: <u>Stee</u> <u>y</u> <u>1</u> <u>Slope</u> (%):
Investigator(s): BritBaker Elissibilitz Section	on, Township, Range:
Landform (hillslope, terrace, etc.): Local	relief (concave, convex, none): Slope (%):
Subregion (LRR): Lat:	Long: Datum:
Soil Map Unit Name:	NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Y	es No (If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology significantly distur	bed? Are "Normal Circumstances" present? Yes No
Are Vegetation, Soil, or Hydrology naturally problems	atic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map showing san	pling point locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes No X Hydric Soil Present? Yes No X Wetland Hydrology Present? Yes No X	Is the Sampled Area within a Wetland? Yes No
Remarks:	

VEGETATION – Use scientific names of plants.

· · · · · · · · · · · · · · · · · · ·	Absolute	Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:)	% Cover	Species? Status	Number of Dominant Species
1. Calga illinoersis	<u> </u>		That Are OBL, FACW, or FAC
1. Carga illinor 515 2. Machura poinsfra	<u> </u>	· · · · · · · · · · · · · · · · · · ·	(excluding FAC-): (A)
_ /			Total Number of Dominant
4		·	Species Across All Strata: (B)
Sapling/Shrub Stratum (Plot size:)	<u></u>	= Total Cover	Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)
1			Prevalence Index worksheet:
2			
3			Total % Cover of: Multiply by:
4			OBL species x1 =
5			FACW species x 2 =
		= Total Cover	FAC species x 3 =
Herb Stratum (Plot size:)	<u></u>	-	FACU species x 4 =
1. Taglered giant	<u> </u>	,	UPL species x 5 =
2			Column Totals: (A) (B)
3		·	Prevalence index = B/A =
4			Hydrophytic Vegetation Indicators:
5			1 - Rapid Test for Hydrophytic Vegetation
6			2 - Dominance Test is >50%
7			3 - Prevalence Index is $\leq 3.0^{1}$
8		· ·	4 - Morphological Adaptations ¹ (Provide supporting
9			data in Remarks or on a separate sheet)
10			Problematic Hydrophytic Vegetation ¹ (Explain)
Woody Vine Stratum (Plot size:)		_ = Total Cover	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1 2			Hydrophytic
% Bare Ground in Herb Stratum		= Total Cover	Vegetation Present? Yes No
			· · · · · · · · · · · · · · · · · · ·
Remarks: Mpland pit	-		<i>.</i> .

US Army Corps of Engineers

Great Plains - Version 2.0

SOIL

Sampling Point: _____

Profile Description: (Describe to the depth Depth Matrix	Redox Features		· · · · · · · · · · · · · · · · · · ·
(inches) Color (moist) %	Color (moist) % Type ¹ L	oc ² <u>Texture</u>	Remarks
2-16in 104R3/1			
		· ·	_
· · · ·			· · · · · · · · · · · · · · · · · · ·
	· · · · · · · · · · · · · · · · · · ·	<u> </u>	· · ·
		·	· · · · · · · · · · · · · · · · · · ·
¹ Type: C=Concentration, D=Depletion, RM=F			tion: PL=Pore Lining, M=Matrix.
Hydric Soil Indicators: (Applicable to all L			or Problematic Hydric Soils ³ :
Histosol (A1)	Sandy Gleyed Matrix (S4)		uck (A9) (LRR I, J)
Histic Epipedon (A2)	Sandy Redox (S5) Stripped Matrix (S6)		rairie Redox (A16) (LRR F, G, H) Irface (S7) (LRR G)
Black Histic (A3) Hydrogen Sulfide (A4)	Loamy Mucky Mineral (F1)		ains Depressions (F16)
Stratified Layers (A5) (LRR F)	Loamy Gleyed Matrix (F2)		R H outside of MLRA 72 & 73)
1 cm Muck (A9) (LRR F, G, H)	Depleted Matrix (F3)	•	d Vertic (F18)
Depleted Below Dark Surface (A11)	Redox Dark Surface (F6)	Red Par	rent Material (TF2)
Thick Dark Surface (A12)	Depleted Dark Surface (F7)	Very Sh	allow Dark Surface (TF12)
Sandy Mucky Mineral (S1)	Redox Depressions (F8)		Explain in Remarks)
2.5 cm Mucky Peat or Peat (S2) (LRR G			of hydrophytic vegetation and
5 cm Mucky Peat or Peat (S3) (LRR F)	(MLRA 72 & 73 of LRR H)		hydrology must be present,
			disturbed or problematic.
Restrictive Layer (if present):			, 1013
Type:			
Depth (inches):	· · · ·	Hydric Soil I	Present? Yes / No
Remarks:			
		•	
HYDROLOGY	-		
Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required	check all that apply)	Secondar	y Indicators (minimum of two required)
	Salt Crust (B11)		ce Soil Cracks (B6)
Surface Water (A1)	—		sely Vegetated Concave Surface (B8)
High Water Table (A2)	Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1)		age Patterns (B10)
Saturation (A3) Water Marks (B1)	Dry-Season Water Table (C2)		ized Rhizospheres on Living Roots (C3)
Valer Marks (B1) Sediment Deposits (B2)	Oxidized Rhizospheres on Living		nere tilled)
· · · ·	(where not tilled)		fish Burrows (C8)
Drift Deposits (B3) Algal Mat or Crust (B4)	Presence of Reduced Iron (C4)		ration Visible on Aerial Imagery (C9)
Iron Deposits (B5)	Thesence of Reduced from (C+) Thin Muck Surface (C7)	• • •	norphic Position (D2)
Inundation Visible on Aerial Imagery (B7			-Neutral Test (D5)
Water-Stained Leaves (B9)			Heave Hummocks (D7) (LRR F)
Field Observations:			
	No Depth (inches):	· .	
	No Depth (inches):		
		Wolland Lindust-	Present? Yes No 🔀
Saturation Present? Yes I (includes capillary fringe)	No Depth (inches):	wetiand hydrology	resentr tes NO
Describe Recorded Data (stream gauge, mo	nitoring well, aerial photos, previous inspe	ctions), if available:	
Remarks:		•	
	•		

WETLAND D	ETERMINATION	DATA FORM	 Midwest Region 	
roject/site: Port of Catocsa	Citv/	CountyRose	Sampling Date:	12/10/
$\frac{1}{2} \frac{1}{2} \frac{1}$			State: Sampling Point	withd
vestigator(s): Bland Baker Lisa	of Z Sect	ion. Township, Ra	inge:	pond 2
ndform (hillslope, terrace, etc.):				×
ope (%): <u>3</u> Lat:	Long		Datum:	
hil Map Unit Name: <u>Barge silt</u>				
e climatic / hydrologic conditions on the site typical f	N 1			-
e Vegetation, Soil, or Hydrology				<u>×_</u> No
e Vegetation, Soil, or Hydrology			eeded, explain any answers in Remarks.)	
JMMARY OF FINDINGS – Attach site n				eatures etc
	No	Is the Sampled	l Area	
· · · · · · · · · · · · · · · · · · ·	No	within a Wetla	nd? Yes 🗶 No	_
Netland Hydrology Present? Yes <u>***</u> Remarks:	NO			
vernarka.				
EGETATION – Use scientific names of pla	ants.			
		minant Indicator	Dominance Test worksheet:	
<u>Free Stratum</u> (Plot size:)	<u>% Cover</u> Sp	ecies? Status_	Number of Dominant Species	
Cursa Theoremais None			That Are OBL, FACW, or FAC:	(A)
3.			Total Number of Dominant Species Across All Strata:	(B)
 				(5)
			Percent of Dominant Species That Are OBL, FACW, or FAC:	(A/B)
	= To	otal Cover	Prevalence Index worksheet:	
Sapling/Shrub Stratum (Plot size:	-) 10 /	V FAC +		ply by:
2. Ulhus avertique	<u> </u>	N FAC	OBL species x 1 =	
3			FACW species x 2 =	
4			FAC species x 3 =	
5			FACU species x 4 =	ł
Herb Stratum (Plot size:)	= Te	otal Cover	UPL species x 5 =	
1. Polygon - pensylvenica	20	Y FACIN	Column Totals: (A)	(B)
2. million quas	30	Ý <u>–</u>	Prevalence Index = B/A =	
3 Mukiga jun cus		•	Hydrophytic Vegetation Indicators:	
l			Dominance Test is >50%	
5			 Prevalence Index is ≤3.0¹ Morphological Adaptations¹ (Provid 	
6			data in Remarks or on a separa	te sheet)
7			Problematic Hydrophytic Vegetation	n ¹ (Explain)
8 9				
9 10			¹ Indicators of hydric soil and wetland hy be present, unless disturbed or problem	
	= T			
Woody Vine Stratum (Plot size:		,	Hydrophytic	
			Vegetation	
2	= T		Present? Yes <u>X</u> No	

Midwest Region - Interim Version

SOIL

iten in

Sampling Point: Wetland

Frome Description, (Describe to the depth fit	eded to document the indicator or confirm	in the absence of indicators.)
Depth Matrix	Redox Features	Tation
	Color (moist) % Type ¹ Loc ²	Texture Remarks
0-160.1018312 80 2.2	SYRJ. 5/4 30 C M	acy loan
······································		
	· · · · · · · · · · · · · · · · · · ·	· [
· · · · · · · · · · · · · · · · · · ·		
¹ Type: C=Concentration, D=Depletion, RM=Red	luced Matrix, CS=Covered or Coated Sand G	Grains. ² Location: PL≑Pore Lining, M=Matrix.
Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :
Histosol (A1)	Sandy Gleyed Matrix (S4)	Coast Prairie Redox (A16)
Histic Epipedon (A2)	Sandy Redox (S5)	Iron-Manganese Masses (F12)
Black Histic (A3)	Stripped Matrix (S6)	Other (Explain in Remarks)
Hydrogen Sulfide (A4)	Loamy Mucky Mineral (F1)	
Stratified Layers (A5)	Loamy Gleyed Matrix (F2)	
2 cm Muck (A10) Depleted Below Dark Surface (A11)	Redox Dark Surface (F6)	
Thick Dark Surface (A12)	Depleted Dark Surface (F7)	³ Indicators of hydrophytic vegetation and
Sandy Mucky Mineral (S1)	Kedox Depressions (F8)	wetland hydrology must be present,
5 cm Mucky Peat or Peat (S3)		unless disturbed or problematic.
Restrictive Layer (if observed):	· · · · ·	
Type: hone		
Depth (inches):NA		Hydric Soil Present? Yes X No
Remarks:		
HYDROLOGY		
HYDROLOGY Wetland Hydrology Indicators:		
	check all that apply)	Secondary Indicators (minimum of two required)
Wetland Hydrology Indicators:	check all that apply)	<u>Secondary Indicators (minimum of two required)</u> Surface Soil Cracks (B6)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;		Surface Soil Cracks (B6) Drainage Patterns (B10)
Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required;</u> Surface Water (A1)	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14)	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2)
Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required:</u> Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1)	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1)	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roots	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) (C3) Saturation Visible on Aerial Imagery (C9)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roots Presence of Reduced Iron (C4)	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roots Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C4)	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5)	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roots Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7)	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7)	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roots Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9)	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roots Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7)	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roots Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks)	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roots Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks)	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roots Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): H	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2) FAC-Neutral Test (D5)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roots Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): <u>14</u> (1)	 Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) (C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roots Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): <u>14</u> , <u>n</u> Depth (inches): <u>14</u> , <u>n</u> Were	Surface Soil Cracks (B6) Trainage Patterns (B10) Try-Season Water Table (C2) Crayfish Burrows (C8) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Saturation (D2) FAC-Neutral Test (D5)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roots Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): <u>14</u> , <u>n</u> Depth (inches): <u>14</u> , <u>n</u> Were	Surface Soil Cracks (B6) Trainage Patterns (B10) Try-Season Water Table (C2) Crayfish Burrows (C8) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Saturation (D2) FAC-Neutral Test (D5)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roots Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): <u>14</u> , <u>n</u> Depth (inches): <u>14</u> , <u>n</u> Were	Surface Soil Cracks (B6) Trainage Patterns (B10) Try-Season Water Table (C2) Crayfish Burrows (C8) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Saturation (D2) FAC-Neutral Test (D5)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roots Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): <u>14</u> , <u>n</u> Depth (inches): <u>14</u> , <u>n</u> Were	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2) FAC-Neutral Test (D5)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roots Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): <u>14</u> , <u>n</u> Depth (inches): <u>14</u> , <u>n</u> Were	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2) FAC-Neutral Test (D5)
Wetland Hydrology Indicators: Primary Indicators (minimum of one is required;	Water-Stained Leaves (B9) Aquatic Fauna (B13) True Aquatic Plants (B14) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres on Living Roots Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soils (C Thin Muck Surface (C7) Gauge or Well Data (D9) Other (Explain in Remarks) Depth (inches): <u>14</u> , <u>n</u> Depth (inches): <u>14</u> , <u>n</u> Were	Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2) FAC-Neutral Test (D5)

.

WETLAND	DETERMINATION	DATA FORM	- Midwest Region
			manootrogion

.

Project/Site: Port of Catzosa		City/County:	Roher	τ	Sampling Date:	12/19/11
Applicant/Owner: Dawbern			<u> </u>	State:	Sampling Point:	
Investigator(s): B. Baker, E. Holt-	2.	Section, Town	ship, Range: _			
Landform (hillslope, terrace, etc.):						
Slope (%): Lat:						
Soil Map Unit Name:						0
Are climatic / hydrologic conditions on the site typical for th						
Are Vegetation, Soil, or Hydrology					s" present? Yes	har bla
						<u>~</u> NO
Are Vegetation, Soil, or Hydrology			•		wers in Remarks.)	
SUMMARY OF FINDINGS – Attach site map			Doint locat	ons, transed	cts, important i	eatures, etc.
Hydrophytic Vegetation Present? Yes X the hydric Soil Present? Yes 1			ampled Area		_	
Wetland Hydrology Present?			Wetland?	Yes	<u>× </u>	_
Remarks:						
						-
VEGETATION – Use scientific names of plants	<u>.</u>					
	Absolute	Dominant Ind	ticator Don	ninance Test w	orksheet:	
Tree Stratum (Plot size:)		Species? S	Notion	nber of Dominan	~	
1. Carya illinoisis	30		Tha	t Are OBL, FAC	W, or FAC:	(A)
2. Platanus occidentalis	20		EACT Tota	I Number of Do	minant c)
3. Celtis occidentalés	10_			cies Across All S) (B) ·
4			Perc	ent of Dominan	t Species 🔒 🏠	ନଏ
5			Tha	Are OBL, FAC	W, or FAC: 10	<u>U/o</u> (A/B)
Sapling/Shrub Stratum (Plot size:)		_ = Total Cover	Pre	valence index v	vorksheet:	
	16	f	AC _	Total % Cover of	of: Multip	ly by:
2. Celtis ocidentales			EAC OBL	species	<u>0</u> x1=	0
3. Rosa ep	5_		- FAC	W species	<u>∂</u> x2=	<u>Ò</u>
4			FAC	species	3 <u>5</u> ×3= <u>4</u>	<u>05</u>
5		<u> </u>	FAC	U species	0 ×4=	0
	<u></u>	= Total Cover	ÜPL	species	Q ×5=	0
Herb Stratum (Plot size:) 1. Ray weed anbrasa trifica	1.35	· 6	Coiu	umn Totals:	35_ (A) _4	DS(B)
	<u>(4.47)</u> 10	ـ ـــــــــــــــــــــــــــــــــــ	<u>no</u>	Prevalence Inc	fex = B/A = -3.6	\mathbf{c}
2. Ducker ogn Carey sp 3.			Hvd		ation Indicators:	
4	· · · · · ·				or Hydrophytic Vege	lation
5				2 - Dominance		
6			<u> </u>	/ 3 - Prevalence I		
7				4 - Morphologic	al Adaptations ¹ (Prov	ide supporting
8		., <u></u>			arks or on a separate	
9				Froblematic Hyd	drophytic Vegetation	(explain)
10				icators of hudde	soil and wetland hyd	
Woody Vine Stratum (Plot size:)		= Total Cover			listurbed or problema	
1. Smilax	(10	Ч	FAC			
2. tox rad				rophytic etation	X -	
	+_	= Total Cover			Yes <u>/</u> No	
Remarks: (Include photo numbers here or on a separate	sheet.)					
	-					

US Army Corps of Engineers

<i>c</i>	Matrix		Redox	Features			T . (
(inches)	Color (moist)		Color (moist)	%	Type ¹	Loc ²	Remarks	-
0-16	2.54 R 2.5	/170	2.57 R ZS/4	<u> </u>	<u> </u>	<u></u>	elaylocen	-
			·					-
	ncentration, D=Dep	letion, RM=Re	duced Matrix, MS	=Masked	Sand Gra	ains.	² Location: PL=Pore Lining, M=Matrix.	-
Hydric Soil I	ndicators:						Indicators for Problematic Hydric Soils ³ :	
Histosol			Sandy GI	•			Coast Prairie Redox (A16)	
	ipedon (A2)		Sandy Re				Dark Surface (S7)	
Black His			Stripped i				Iron-Manganese Masses (F12)	
	n Sulfide (A4) Layers (A5)		Loamy M Loamy G				Very Shallow Dark Surface (TF12) Other (Explain in Remarks)	
2 cm Mu			Depleted					
	Below Dark Surface	e (A11)	Redox Da	-	-			
	rk Surface (A12)		Depleted		• •		³ Indicators of hydrophytic vegetation and	
	ucky Mineral (S1)		Redox De				wetland hydrology must be present,	
5 cm Mu	cky Peat or Peat (S3	3)					unless disturbed or problematic.	
	over (if choonsed)							
								_ I
	ayer (II observed):		_					
Type: Depth (inc	ane						Hydric Soil Present? Yes No	
Type: Depth (inc Remarks:	hes):		_ m				Hydric Soil Present? Yes No	-
Type: Depth (inc Remarks:	hes):		-				Hydric Soil Present? Yes No	-
Type: Depth (inc Remarks: YDROLO(hes):		-				Hydric Soil Present? Yes No	-
Type: Depth (inc Remarks: YDROLO(Wetland Hyd	hes):		- - check all that app	iy)			Hydric Soil Present? Yes No	
Type: Depth (inc Remarks: YDROLOO Wetland Hyc Primary Indic	hes): GY Irology Indicators:		 					
Type: Depth (inc Remarks: YDROLO(Wetland Hyd Primary Indic Surface N	hes): GY Irology Indicators: ators (minimum of o			ed Leave			Secondary Indicators (minimum of two required) Surface Soil Cracks (B6) Drainage Patterns (B10)	
Type: Depth (inc Remarks: YDROLO(Wetland Hyc Primary Indic Surface N High Wa	hes): ators (minimum of o Water (A1)		Water-Stain	ed Leave ina (B13)	. ,		Secondary Indicators (minimum of two required) Surface Soil Cracks (B6)	
Type: Depth (inc Remarks: YDROLO(Wetland Hyc Primary Indic Surface N High Wa	Anes): hes): irology Indicators: ators (minimum of o Water (A1) ter Table (A2) n (A3)		Water-Stain Aquatic Fau	ed Leave ina (B13) c Plants ((B14)		Secondary Indicators (minimum of two required) Surface Soil Cracks (B6) Drainage Patterns (B10)	
Type: Depth (inc Remarks: YDROLOO Wetland Hyc Primary Indic Surface V High Wa Saturatio Water Ma	Anes): hes): irology Indicators: ators (minimum of o Water (A1) ter Table (A2) n (A3)		Water-Stain Aquatic Fau True Aquati Hydrogen S	ed Leave ina (B13) c Plants (ulfide Od	(B14) lor (C1)	ing Roots (Secondary Indicators (minimum of two required) Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2)	
Type: Depth (inc Remarks: YDROLO(Wetland Hyc Primary Indic Surface V High Wa Saturatic Water M Sedimen	And the second s		Water-Stain Aquatic Fau True Aquati Hydrogen S	ed Leave ina (B13) c Plants (ulfide Od iizospheri	(B14) for (C1) es on Livi		Secondary Indicators (minimum of two required) Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8)	
Type: Depth (inc Remarks: YDROLO(Wetland Hyc Primary Indic Surface V High Wa Saturatio Water M Sedimen Drift Dep	And the second s		Water-Stain Aquatic Fau True Aquati Hydrogen S Oxidized Rt Presence of Recent Iron	ed Leave Ina (B13) c Plants (ulfide Od iizosphern f Reduced Reductio	(B14) lor (C1) es on Livi d Iron (C4 on in Tilleo)	 <u>Secondary Indicators (minimum of two required</u>) Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1))
Type: Depth (inc Remarks: YDROLOO Wetland Hyc Primary Indic Surface V High Wa Saturatic Water M Saturatic Unift Dep Algal Ma Iron Dep	And the second state of th	ne is required:	Water-Stain Aquatic Fau True Aquati Hydrogen S Oxidized Rt Presence of Recent Iron Thin Muck S	ed Leave ina (B13) c Plants (ulfide Od izospheri f Reduced Reductio Surface (C	(B14) lor (C1) es on Livi d Iron (C4 on in Tilleo C7))	 <u>Secondary Indicators (minimum of two required</u>) Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) 	-)
Type: Depth (inc Remarks: YDROLOO Wetland Hyc Primary Indic Surface V High Wa Saturatio High Wa Saturatio Urift Dep Algal Ma fron Dep Inundatio	hes): hes): irology Indicators: ators (minimum of o Water (A1) ter Table (A2) n (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5) on Visible on Aerial I	ne is required: magery (B7)	Water-Stain Aquatic Fau True Aquati Hydrogen S Oxidized Rh Presence of Recent fron Thin Muck S Gauge or W	ed Leave ina (B13) c Plants (ulfide Od izosphen f Reduced Reductio Surface (C /ell Data ((B14) lor (C1) es on Livi d Iron (C4 on in Tilleo C7) (D9))	 <u>Secondary Indicators (minimum of two required</u>) Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2) 	-)
Type: Depth (inc Remarks: YDROLOO Wetland Hyc Primary Indic Surface V High Wa Saturatic Water M. Sedimen Drift Dep Algal Ma fron Dep Inundatic Sparsely	Anes): hes): irology Indicators: ators (minimum of o Water (A1) ter Table (A2) in (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5) on Visible on Aerial I Vegetated Concave	ne is required: magery (B7)	Water-Stain Aquatic Fau True Aquati Hydrogen S Oxidized Rh Presence of Recent fron Thin Muck S Gauge or W	ed Leave ina (B13) c Plants (ulfide Od izosphen f Reduced Reductio Surface (C /ell Data ((B14) lor (C1) es on Livi d Iron (C4 on in Tilleo C7) (D9))	 <u>Secondary Indicators (minimum of two required</u>) Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2) 	2
Type: Depth (inc Remarks: YDROLOO Wetland Hyc Primary Indic Surface V High Wa Saturatic Water M. Sedimen Drift Dep Algal Ma fron Dep Inundatic Sparsely	Anes): hes): irology Indicators: ators (minimum of o Water (A1) ter Table (A2) on (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5) on Visible on Aerial I Vegetated Concave rations:	ne is required: magery (B7) e Surface (B8)	Water-Stain Aquatic Fau True Aquati Hydrogen S Oxidized Rh Presence of Recent Iron Thin Muck S Gauge or W Other (Explain)	ed Leave ina (B13) c Plants (ulfide Od izosphen f Reduced Reductio Surface (C /ell Data (ain in Rer	(B14) lor (C1) es on Livi d Iron (C4 on in Tilleo (C7) (C9) marks)) d Soils (C6	 <u>Secondary Indicators (minimum of two required</u>) Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2) 	-)
Type: Depth (inc Remarks: YDROLOO Wetland Hyc Primary Indic Surface V High Wa Saturatic Water M Saturatic Unift Dep Algal Ma Iron Dep Inundatic Sparsely Field Observ	Anes): hes): irology Indicators: ators (minimum of o Water (A1) ter Table (A2) on (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5) on Visible on Aerial I Vegetated Concave rations: er Present? Y	magery (B7) e Surface (B8)	Water-Stain Aquatic Fau True Aquati Hydrogen S Oxidized Rh Presence of Recent fron Thin Muck S Gauge or W Other (Expla	ed Leave ina (B13) c Plants (ulfide Od izosphen f Reduceto Surface (C /ell Data (ain in Rer	(B14) for (C1) es on Livi d Iron (C4 on in Tilleo (C7) (D9) marks)) d Soils (C6	 <u>Secondary Indicators (minimum of two required</u>) Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2))
Type: Depth (inc Remarks: YDROLOO Wetland Hyc Primary Indic Common Indic Surface V High Wa Saturatio Water M Sedimen Drift Dep Algal Ma Inundatio Sparsely Field Obsern Surface Water	Anter All Anter All	magery (B7) e Surface (B8) es No	Water-Stain Aquatic Fau True Aquati Hydrogen S Oxidized Rt Presence of Recent Iron Thin Muck S Gauge or W Other (Explain Depth (incl Depth (incl	ed Leave ina (B13) c Plants (ulfide Od izosphen f Reduced Reductio Surface (C /ell Data (ain in Rer nes):	(B14) for (C1) es on Livi d Iron (C4 on in Tillec C7) (D9) marks)	d Soils (C6	Secondary Indicators (minimum of two required) Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2) FAC-Neutral Test (D5))
Type: Depth (inc Remarks: YDROLOO Wetland Hyc Primary Indic Contract of High Wa Saturatio Water Mi Sedimen Drift Dep Algal Ma Inundatio Sparsely Field Obsert Surface Water Saturation Pa (includes cap	Anter	magery (B7) e Surface (B8) es No es No	Water-Stain Aquatic Fau True Aquati Hydrogen S Oxidized Rt Presence of Recent Iron Thin Muck S Gauge or W Other (Expla	ed Leave ina (B13) c Plants (ulfide Od izosphen f Reduced Reductio Surface (C /ell Data (ain in Rer nes): nes):	(B14) for (C1) es on Livi d Iron (C4 on in Tillec C7) (D9) marks)	d Soils (C6	Secondary Indicators (minimum of two required) Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2) FAC-Neutral Test (D5) and Hydrology Present? Yes No No	-
Depth (inc Remarks: IYDROLO(Wetland Hyc Primary Indic Surface V High Wa Saturatio Water M Sedimen Drift Dep Algal Ma Drift Dep Inundatic Sparsely Field Obsern Surface Wate Water Table Saturation Pa (includes cap	Anes): hes): irology Indicators: ators (minimum of o Water (A1) ter Table (A2) in (A3) arks (B1) t Deposits (B2) osits (B3) t or Crust (B4) osits (B5) on Visible on Aerial I Vegetated Concave rations: er Present? Y esent? Y esent? Y	magery (B7) e Surface (B8) es No es No	Water-Stain Aquatic Fau True Aquati Hydrogen S Oxidized Rt Presence of Recent Iron Thin Muck S Gauge or W Other (Expla	ed Leave ina (B13) c Plants (ulfide Od izosphen f Reduced Reductio Surface (C /ell Data (ain in Rer nes): nes):	(B14) for (C1) es on Livi d Iron (C4 on in Tillec C7) (D9) marks)	d Soils (C6	Secondary Indicators (minimum of two required) Surface Soil Cracks (B6) Drainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) C3) Saturation Visible on Aerial Imagery (C9) Stunted or Stressed Plants (D1) Geomorphic Position (D2) FAC-Neutral Test (D5) and Hydrology Present? Yes <u>No</u> No	- - -

WEILAR	ID DETERMINAT	ION DATA	FORM - Mi	dwest Region	1
roject/Site: Port of Catex	59	City/County: _	Rogers	Co	Sampling Date: 12/10/11
pplicant/Owner: <u>Fort of ato</u>	059			State: <u>OK</u>	_ Sampling Point: Wet (and
vestigator(s): <u>Blair Baker</u>	Elisa Holtz	Section, Town	ship, Range:	Sec. 4 T	20 N, RISE
indform (hillslope, terrace, etc.): <u>Pond</u>					
ope (%): <u> </u>					
bil Map Unit Name: Barge Silt	y clay 10	am		NWI classi	fication: <u>PEM</u>
re climatic / hydrologic conditions on the site ty	pical for this time of ye	ar?Yes	No	(If no, explain in	Remarks.)
re Vegetation, Soil, or Hydrolog	y significantly	disturbed?	Are "Norma	I Circumstances'	' present? Yes 🔀 No
re Vegetation, Soil, or Hydrolog	y naturally pro	oblematic?	(If needed,	explain any answ	vers in Remarks.)
UMMARY OF FINDINGS - Attach s	ite map showing	sampling	point locati	ons, transect	s, important features, etc
Hydric Soil Present? Yes	XNo XNo XNo		Sampled Area a Wetland?	Yes _>	KNo
Fridge wetland an	•	nd 2			
EGETATION – Use scientific names		Dominant In	diantas I Dam		
Tree Stratum (Plot size:) 1	<u>% Cover</u>	<u>Species?</u>	Status Num	inance Test wor ber of Dominant Are OBL, FACW	Species 3
23				Number of Dom	~ ~
4 5			Perc	ent of Dominant	Species
Jo		= Total Cover		Are OBL, FACW	, or FAC: (A/B)
Sapling/Shrub Stratum (Plot size:)	•	Prev	alence Index wo	orksheet:
1. Ulmus americana	5_			Total % Cover of:	
2. Carya illinoinensis		. <u> </u>		species	
a.				W species species	$\frac{10}{5}$ x ² = <u>40</u>
4 5				Uspecies	$x_{4=}^{x_{3=}}$
	· · · · ·	= Total Cover		species	$7 \times 5 = 0$
Herb Stratum (Plot size:)		. F			
1. Polygonum pensyla	anian 20	. <u>^^</u> 1	THE W		
2. <u>schedonorus</u> pho	<u>uix 30</u>	yes F			x = B/A = <u>2</u> 1
3. juncus s p	20	<u>~~</u>		ophytic Vegetat	Hydrophytic Vegetation
4. <u></u>				2 - Dominance Te	
5				3 - Prevalence In	
6 7				4 - Morphological	Adaptations' (Provide supporting
8.				data in Remar	ks or on a separate sheet)
9				Problematic Hydr	ophytic Vegetation ¹ (Explain)
10		= Total Cover			oil and wetland hydrology must turbed or problematic.
Woody Vine Stratum (Plot size:)	-	ne hi	unicaa Ula	
1. None	··· ·			ophytic	
2		= Total Cover	Drag	ent? Y	es_X No
Remarks: (include photo numbers here or on a	separate sheet.)		I		· · · · · · · · · · · · · · · · · · ·
		4.	(Steam	
constructed dam			(Jun	

^с Гъ

, •...

117

Midwest Region - Version 2.0

. Sampling Point: Wotland 1 SOIL Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.) Depth Matrix Redox Features Color (moist) % Color (moist) Type¹ Loc² Texture ____ (inches) Remarks % 10YR 3/2 2.54R 2.5/4 <u>20</u> C 80 0-16 M <u>clay</u> ²Location: PL=Pore Lining, M=Matrix. ¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. Hydric Soil Indicators: Indicators for Problematic Hydric Soils³: ____ Coast Prairie Redox (A16) ____ Histosol (A1) Sandy Gleyed Matrix (S4) ____ Histic Epipedon (A2) ___ Dark Surface (S7) ____ Sandy Redox (S5) Black Histic (A3) Stripped Matrix (S6) ____ Iron-Manganese Masses (F12) ____ Hydrogen Sulfide (A4) Loamy Mucky Mineral (F1) ___ Very Shallow Dark Surface (TF12) Loamy Gleyed Matrix (F2) ___ Stratified Layers (A5) ___ Other (Explain in Remarks) ___ 2 cm Muck (A10) C Depleted Matrix (F3) Depleted Below Dark Surface (A11) ____ Redox Dark Surface (F6) Thick Dark Surface (A12) Depleted Dark Surface (F7) ³Indicators of hydrophytic vegetation and Kedox Depressions (F8) Sandy Mucky Mineral (S1) wetland hydrology must be present, 5 cm Mucky Peat or Peat (S3) unless disturbed or problematic. Restrictive Layer (if observed): none Type: _ Yes 🗶 Hydric Soil Present? No NA Depth (inches): Remarks:

HYDROLOGY

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one is required: check all that apply)	Secondary Indicators (minimum of two required)
Surface Water (A1) Water-Stained Leaves (B9)	Surface Soil Cracks (B6)
High Water Table (A2) Aquatic Fauna (B13)	Drainage Patterns (B10)
Saturation (A3) True Aquatic Plants (B14)	Dry-Season Water Table (C2)
Water Marks (B1) Hydrogen Sulfide Odor (C1)	Crayfish Burrows (C8)
Sediment Deposits (B2) Oxidized Rhizospheres on Living	Roots (C3) Saturation Visible on Aerial Imagery (C9)
Drift Deposits (B3) Presence of Reduced Iron (C4)	Stunted or Stressed Plants (D1)
Algal Mat or Crust (B4) Recent from Reduction in Tilled Sc	bils (C6) Geomorphic Position (D2)
fron Deposits (B5) Thin Muck Surface (C7)	FAC-Neutral Test (D5)
Inundation Visible on Aerial Imagery (B7) Gauge or Well Data (D9)	
Sparsely Vegetated Concave Surface (B8) Other (Explain in Remarks)	·
Field Observations:	
Surface Water Present? Yes No <u>K</u> . Depth (inches):	
Water Table Present? Yes <u>V</u> No Depth (inches): <u>b-14 in</u>	
Saturation Present? Yes <u>Y</u> No Depth (inches): <u>0 - (6 in</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>0</u> No
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspec	tions), if available:
Remarks:	

The RIZOTOSA RIZIOLLA
File: RIZO709A RIZIOIIA File: Rizo709A RIZIOIIA Features Area Gen. Site I Pondz Line Gren. Site I Pondz Welland Pond Field Data Form
Location/Project: Port of Caloosa Date: 12-110/11 Client: DRILberry Pond Name: Pond 2 Investigator: Blair Baker, Elisa Hutz
County: Katis UTM North (Lat): UTM West (Long):
Compass Dir. to road: Approx. Distance to road: Approx. distance to project ROW:
Description (circle one): Permanent lake pond Temporary lake/pond Marsh/Bog Swamp/forest Other
Origin: Natural Man-made Unknown Perimeter GPS points taken: ves no
Estimated pond depth: ApproxFt. Primary Substrate: Silt/Muck Sand/Gravel Cobble Bedrock Other
% of Pond Margin with Emergent Vegetation: 0 (-25) 25-50 50-75 >75 Within Forest? Yes No
Distance to Forest Edge:Ft. Surrounding landscape/Vegetation: Forest Edge:
Dominant species observed: prcan, Ancr. elm. Quercus \$ps.

Hur 266	Trib Pond audient	
	· · · · · · · · · · · · · · · · · · ·	N1

			ON Bank	- I.	114.1	11/1/	in ford a star I I	<u>oto nemine diblet</u> I	FFORE L. LAND	Magangan di Kasta I
GPS ID:	5,70/11	<u>764 -</u>	<u> </u>	ature.	Site tr Date:					· · ·
GPS ID:	Trit 4									
County:		BV H	<u>≥ /</u> A WD Mø	PD	_ Investigat	tors:	51-17	L F	\mathbf{b} 2 1	1.1-
County.			K LI PO					ekcr, E	+1, 2 , $+1$	
Circle Wat	erbody/Sti	eam Ty	pe: EPHE	MERAL*	INTER	MITTENT	PERE	NNIAL	trib	-(
	· · · · · · · · · · ·									
Approxima			ng water*:	· *		Stream Fo	rms Prese			
		1-12	/(_N/A				 Pool(s) 	<u> </u>		
								-	1	
Approxima	ITE OHWM	: 	3'-'	7.			Run(s)	-5	_	
				1		<u> </u>	Riffles(s)	6		
Approxima	te width c) of streau	n: <u>5'</u>	301		1	101103(3)	<u> </u>	.	
(from top of			·····			Stream Bo	ottom			
top of ban		- 3	- : - : : : : : : : : : : : : : : : : :	-			None	<50%	>50%	
•.•						silt				
Approxima	ate height	of bank	s (channel d	epth)*:	- X-	clay		•		
	· - ·					mud				
left	2'-	301	righ	nt <u> </u>	BOI	sand				
		l A 1 an sibirt				gravel				
Approxim	ate depth o		s):			cobbles				
		N/A				boulders bedrock				,
						Sicile				
Dominant	Plants Ad	acent t	o Stream* (so	cientific names	s)	Descriptio	on that best	t fits the stre	am bank*	
Trees:				j i	·	left	ļ		right	
GLIV	- `>					V	vertical	/undercut	U	
(any y								•		
Ulni							steeply s	loped (>30%)		
Shrubs/Vi	nés:							-		
Swall	hor						gradual/no	slope (<30%)	
7 F										
Herbaceo	ls:								enera productiones	
	-					Descriptio	· · · · · · · · · · · · · · · · · · ·	t fits the stre		
		1					narrow, de	ер	wide, deep	
	_	1		1			norrous of		wide,	
Pick the c	ategony th	at beet	describes th			L	narrow, sha	allOW	shallow	\checkmark
			shades the s		in ROW:				JICHOW	
	0%		50%		100%					
	25%	L	75%	-	other				· · · · ·	
	· · · · ·	1								
Comment	Station of the second					*				
1			n hal	1 inte	_l	1	1		· · · · · · · · · · · · · · · · · · ·	

Project/Site: Part #f Cataosa City/County: Rogers Sampling Date: 12/12/11 Applicant/Owner: Part #f Cataosa DeuXorman, State: Dr. Sampling Date: 12/12/11 Applicant/Owner: Part #f Cataosa DeuXorman, State: Dr. Sampling Date: 12/12/11 Investigator(s): DeuXorman, Sampling Date: 12/12/11 Sampling Date: 12/12/11 Sampling Date: 12/12/11 Applicant/Owner: DeuXorman, Construction, Sampling Date: 12/12/11 Sampling Date: 12/12/11 Sampling Date: 12/12/11 Andorm (Hildgon, terrace, etc.) Datum:	WETLAND DETE	RMINATIO	ON DATA FOR	M – Midwest Region
newstigator(s): E Dotte: T. Coskey Section, Township, Range: andform (hillslope, terrace, etc.): batter: Local relief (concave, convex, none); sippe (%): 3.20 Lot: Datum: we of institute in the site typical for this time of year? Yes No		c	ity/County: <u>Re</u>	Sampling Date: 12/12/11
andtorm (hillstope, terrace, etc.): betters (etc.): betters (concave, convex, none): tope (%): 3.20 Local relief (concave, convex, none):				
cope (%) 3?2 Lat:				
ail Map Unit Name:	_			
e climatic / hydrologic conditions on the site typical for this time of year? Yes No (if no, explain in Remarks.) e VegetationSoil, or Hydrologyalignificantly disturbed? Are "Normal Circumstances" present? Yes No to regetationSoil, or Hydrologynaturally problematic? (if needed, explain any answers in Remarks.) UMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc Hydrophytic Vegetation Present? Yes No is the Sampled Area within a Wetland? Yes No Wetland Hydrology Present? Yes No is the Sampled Area within a Wetland? Yes No Regetation Status: No EGETATION - Use scientific names of plants. EGETATION - Use scientific names o	ope (%): <u>376</u> Lat: <u></u>	L		
• Vegetation				
re Vegetation	e climatic / hydrologic conditions on the site typical for thi	s time of yea	r? Yes 💆 No	(If no, explain in Remarks.)
UMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc. tydrophytic Vegetation Present? Yes No Is the Sampled Area tydrophytic Vegetation Present? Yes No Is the Sampled Area within a Wetland? Yes No No Statum (Plot size:	e Vegetation, Soil, or Hydrologys	significantly d	isturbed? Are	e "Normal Circumstances" present? Yes 🎾 No
Hydrophytic Vegetation Present? Yes No Is the Sampled Area Wetland Hydrology Present? Yes No within a Wetland? Yes No Remarks: Yes No within a Wetland? Yes No	re Vegetation, Soil, or Hydrology r	naturally prob	lematic? (If	needed, explain any answers in Remarks.)
Hydric Soli Present? Yes No Is the Sampled Area within a Wetland? Yes No EGETATION - Use scientific names of plants. Intersection of the size:) % Cover Status No No No No It Celtis occurate within a Wetland? Yes No No No No It Celtis occurate within a Wetland? Yes No No No It Celtis occurate within a Wetland? Yes No No No It Celtis occurate within a Wetland? Yes No No No It Celtis occurate within a Wetland? Yes No No No It Science Science Science Science Intersection Science Intersection It Science Science Science Intersection Intersection No It Mailing/Shrub Stratum (Plot size:) Intersection Intersection Intersection No It Mailing/Shrub Stratum (Plot size	UMMARY OF FINDINGS – Attach site map	showing s	sampling point	locations, transects, important features, etc.
Tree Stratum (Plot size:) Absolute Secies? Dominant Indicator Species? Dominant Species 1. Celtis octionations 40 x 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44 44	Hydric Soil Present? Yes <u>/ N</u> Wetland Hydrology Present? Yes <u>/ N</u>	io		ed Area land? Yes <u>×</u> No
Iree Stratum (Plot size:) % Cover Species? Status I. Celfis cardeutalis 20 % Cover FAC 2. Carry a i llinoit sis 20 % FAC 3. Llinoit sis 20 % FAC 5	EGETATION – Use scientific names of plants			
1. Celfis occidentalis Yo X FAC 2. Caky a illinoi usis 20 V FAC 3. ulmus curricona 5 FAC 4. 5 FAC 5. FAC FAC 6. FAC FAC 7. FAC FAC 8. FAC FAC 9. FAC FAC	free Stratum (Plot size;)			
2 Caby a (Il) is is is is 20 9 FAC 3 u(mus) (mus) (- Number of Dominant Species
a. $u(mus)$ $u(mus)$ $u(mus)$ $(u(mus))$ (B) a. (B) b. (B) Babling/Shrub Stratum (Plot size:) $(A = D)$ Babling/Shrub Stratum (Plot size:) $(A = T)$ Babling/				
4.		5	FAC	
5.				
Sapling/Shrub Stratum (Plot size:) = Total Cover Prevalence Index worksheet: I.	-			
1. 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		<u> </u>	Total Cover	
22 OBL species $x 1 = 0$ 33 FACW species $x 2 = 0$ 44 FACW species $x 3 = 7220$ 55 FACU species $x 4 = 420$ UPL species $x 4 = 420$ UPL species $x 5 =$ Column Totals: 7224 22 Stratum 23 Stratum 24 Stratum 25 Stratum 26 Stratum 27 Stratum 28 Stratum 29 Stratum 20 Stratum 21 Stratum 22 Stratum 23 Stratum 24 Stratum 25 Stratum 26 Stratum 27 Stratum 28 Stratum 29 Stratum 20 Stratum 21 Stratum 22 Stratum 23 Stratum 24 Hydrophytic Vegetation 25 Stratum <td></td> <td></td> <td></td> <td></td>				
3.				
A.				
5. $=$ Total Cover Herb Stratum (Plot size:) $=$ Total Cover 6. $=$ Total Cover 7. $=$ Total Cover 6. $=$ Total Cover 7. $=$ Total Cover 8. $=$ Total Cover 9. $=$ Total Cover 6. $=$ Total Cover				
= Total Cover $= Total Cover$ $UPL species$ $x 5 = Column Totals: UPL species$ $x 5 = Column Totalspecies$ $x 5 = Colu$	······································	- <u></u> ·		
ierb Stratum (Plot size:) 5 FACU Column Totals: 72.1 (A) 21.5 (B) Prevalence Index = B/A =3.00 B. 1 - Rapid Test for Hydrophytic Vegetation B. 1 - Rapid Test for Hydrophytic Vegetation S. 2 - Dominance Test is >50% Y - Current of the prevalence Index is \$3.0° 4 - Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation 1 (Explain) Indicators of hydric soil and wetland hydrology must be present unless disturbed or problemation	*		Total Cover	UPL species x5 =
Prevalence Index = B/A = Image: State				Column Totals: 72 (A) 2 (B)
B. Hydrophytic Vegetation Indicators: I. 1 - Rapid Test for Hydrophytic Vegetation S. 2 - Dominance Test is >50% Y. 3 - Prevalence Index is ≤3.0' A - Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet) B. Problematic Hydrophytic Vegetation' (Explain) IO. Indicators of hydric soil and wetland hydrology must be present unless disturbed or problematic	Gynadon dectalon	<u> </u>	<u> </u>	4
1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.01 4 - Morphological Adaptations1 (Provide supporting data in Remarks or on a separate sheet) 9 - Problematic Hydrophytic Vegetation1 (Explain) 10 - Total Cover			•	
5. 2 - Dominance Test is >50% 5. 3 - Prevalence Index is ≤3.0° 6. 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) 6. Problematic Hydrophytic Vegetation¹ (Explain) 10. = Total Cover				- 1
3.			·	
4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)				-1/7.
B.				- 1
9 Problematic Hydrophylic Vegetation' (Explain) 10 = Total Cover = Total Cover				
10 = Total Cover ¹ Indicators of hydric soil and wetland hydrology must				Problematic Hydrophytic Vegetation ¹ (Explain)
= Total Cover Indicators of hydric soil and wetland hydrology must				-
1. top red FAC Hydrophytic		2	FAC	+ Hydrophytic
2 1 1 1 1 1 1 1 1 1 1	2. With's m	2		Vegetation
= Total Cover Present? Yes X No			Total Cover	Present? Yes X No
Remarks: (Include photo numbers here or on a separate sheet.)	Remarks: (Include photo numbers here or on a separate			

art st.

6

Profile Description: (Desc	ribe to the depti	h needed to docum	nent the ir	ndicator o	r confirm	the absence of indica	tors.)
Depth <u>Mat</u> (inches) Color (mois		Color (moist)	x Features %	Type ¹	Loc ²	Texture	Domoska
							Remarks
2-16 10YR 3	1	5 YR 4/1.		<u> </u>	PL	_sitty alon /	an-
·			·				· · · · · · ·
<u> </u>			·			<u> </u>	
				.			
			·			. <u> </u>	
	·	-					
Type: C=Concentration, D=	Depletion, RM=I	Reduced Matrix, MS	S=Masked	Sand Grai	ns.		e Lining, M=Matrix.
Hydric Soil Indicators:							ematic Hydric Soils ³ :
Histosol (A1)			Bleyed Mat			Coast Prairie Re	
Histic Epipedon (A2) Black Histic (A3)			Redox (S5) I Matrix (Si			Dark Surface (S	
Hydrogen Sulfide (A4)			Mucky Mine	•		Iron-Manganese	rk Surface (TF12)
Stratified Layers (A5)			Gleyed Mai			Other (Explain i	
2 cm Muck (A10)		Depleted					(((((((((((((((((((
Depleted Below Dark Si	urface (A11)		Dark Surfac				
Thick Dark Surface (A12	?)	Depleted	d Dark Sur	face (F7)			phytic vegetation and
Sandy Mucky Mineral (8		Redox D	Depression	is (F8)			y must be present,
5 cm Mucky Peat or Pea						unless disturbed	or problematic.
Restrictive Layer (if observ							•
Type:	,					Hydric Soil Present	Yes 💋 No
Depth (inches):	1					Hydric Soil Present	9 Yes <u>X</u> No
Depth (Inches):	,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, , ,, , ,, , ,, , ,, , ,, , ,, , ,, , , , , , , , , , , , , , , , , , , ,					Hydric Soil Present	Yes <u>2</u> No
Depth (Inches): Remarks: YDROLOGY						Hydric Soil Present	Yes <u>></u> No
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicat	, ors:						
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (minimum	, ors:					<u>Secondary Indica</u>	ors (minimum of two required
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (minimun Surface Water (A1)	, ors:		ned Leave			<u>Secondary Indical</u> Surface Soil (ors (minimum of two required Cracks (B6)
Depth (Inches): Remarks: YDROLOGY Vetland Hydrology Indicat Primary Indicators (minimum Surface Water (A1) High Water Table (A2)	, ors:	Water-Stain Aquatic Fa	ned Leave Juna (B13)			<u>Secondary Indical</u> Surface Soil (Drainage Pat	ors (minimum of two required Cracks (B6) erns (B10)
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (minimun Surface Water (A1) High Water Table (A2) Saturation (A3)	, ors:	Water-Stain Aquatic Fa True Aquat	ned Leave Juna (B13) tic Plants ((B14)		<u>Secondary Indical</u> Surface Soil (Drainage Pat Dry-Season V	ors (minimum of two required Cracks (B6) erns (B10) Vater Table (C2)
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (minimum Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1)	ors:	Water-Stain Aquatic Fa True Aquat Hydrogen S	ned Leave Juna (B13) tic Plants (Sulfide Od	(B14) kor (C1)		<u>Secondary Indical</u> Surface Soil (Drainage Pat Dry-Season V Crayfish Burn	ors (minimum of two required Cracks (B6) erns (B10) Vater Table (C2) ows (C8)
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (minimum Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2)	ors:	Water-Stain Aquatic Fa True Aquat Hydrogen S Oxidized R	ned Leave luna (B13) tic Plants (Sulfide Od Rhizosphere	(B14) lor (C1) res on Livin		<u>Secondary Indical</u> Surface Soil Drainage Pat Dry-Season V Crayfish Burn C3) Saturation Via	ors (minimum of two required Cracks (B6) erns (B10) Vater Table (C2) ows (C8) iible on Aerial Imagery (C9)
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (minimum Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1)	ors:	Water-Stain Aquatic Fa True Aquat Hydrogen 3 Oxidized R Presence c	ned Leave luna (B13) tic Plants (Sulfide Od Rhizospher of Reduced	(B14) lor (C1) res on Livin d Iron (C4)		<u>Secondary Indica</u> Surface Soil (Drainage Pat Dry-Season V Crayfish Burn C3) Saturation Via Stunted or St	ors (minimum of two required Cracks (B6) erns (B10) Vater Table (C2) ows (C8) ible on Aerial Imagery (C9) essed Plants (D1)
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (minimum Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3)	ors:	Water-Stain Aquatic Fa True Aquat Hydrogen S Oxidized R	ned Leave luna (B13) tic Plants (Sulfide Od Rhizosphere of Reduced n Reductio	(B14) lor (C1) res on Livin d Iron (C4) on in Tilled		<u>Secondary Indical</u> Surface Soil (Drainage Pat Dry-Season M Crayfish Burn C3)Saturation Vis Stunted or St Geomorphic I	ors (minimum of two required Cracks (B6) erns (B10) Vater Table (C2) ows (C8) lible on Aerial Imagery (C9) ressed Plants (D1) Position (D2)
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (minimun Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4)	ors: a of one is require	Water-Stain Aquatic Fa Aquatic Fa True Aquat Hydrogen 3 Oxidized R Presence 0 Recent Iron Thin Muck	ned Leave luna (B13) tic Plants (Sulfide Od Rhizospherio of Reduced n Reductio Surface (C	(B14) kor (C1) res on Livin d Iron (C4) on in Tilled C7)		<u>Secondary Indica</u> Surface Soil (Drainage Pat Dry-Season V Crayfish Burn C3) Saturation Via Stunted or St	ors (minimum of two required Cracks (B6) erns (B10) Vater Table (C2) ows (C8) lible on Aerial Imagery (C9) ressed Plants (D1) Position (D2)
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (minimun Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5)	ors: a of one is require a of one is require a of one is require	Water-Stain Aquatic Fa True Aquat Hydrogen S Oxidized R Presence C Recent Iron Thin Muck Gauge or M	ned Leave luna (B13) tic Plants (Sulfide Od Rhizosphere of Reduced n Reductio Surface (C Well Data ((B14) (or (C1) res an Livin d Iron (C4) on in Tilled (C7) (D9)		<u>Secondary Indical</u> Surface Soil (Drainage Pat Dry-Season M Crayfish Burn C3)Saturation Vis Stunted or St Geomorphic I	ors (minimum of two required Cracks (B6) erns (B10) Vater Table (C2) ows (C8) lible on Aerial Imagery (C9) ressed Plants (D1) Position (D2)
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (minimum Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Ad	ors: of one is require rial Imagery (B7) acave Surface (B	Water-Stain Aquatic Fa Aquatic Fa Hydrogen S Oxidized R Presence C Recent Iron Thin Muck Gauge or V 8) Other (Exp	ned Leave luna (B13) tic Plants (Sulfide Od Rhizosphere of Reduced n Reductio Surface (C Well Data (Islain in Rer	(B14) lor (C1) es on Livin d Iron (C4) on in Tilled C7) (D9) marks)		<u>Secondary Indical</u> Surface Soil (Drainage Pat Dry-Season M Crayfish Burn C3)Saturation Vis Stunted or St Geomorphic I	ors (minimum of two required Cracks (B6) erns (B10) Vater Table (C2) ows (C8) lible on Aerial Imagery (C9) ressed Plants (D1) Position (D2)
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicate Primary Indicators (minimum Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Ad Sparsely Vegetated Com	ors: of one is require rial Imagery (B7) acave Surface (B	Water-Stain Aquatic Fa Aquatic Fa True Aquat Hydrogen S Oxidized R Presence c Recent Iron Thin Muck Gauge or M	ned Leave luna (B13) tic Plants (Sulfide Od Rhizosphere of Reduced n Reductio Surface (C Well Data (Islain in Rer	(B14) lor (C1) es on Livin d Iron (C4) on in Tilled C7) (D9) marks)		<u>Secondary Indical</u> Surface Soil (Drainage Pat Dry-Season M Crayfish Burn C3)Saturation Vis Stunted or St Geomorphic I	ors (minimum of two required Cracks (B6) erns (B10) Vater Table (C2) ows (C8) lible on Aerial Imagery (C9) ressed Plants (D1) Position (D2)
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (minimum Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Ad Sparsely Vegetated Coo Field Observations:	ors: tof one is require of ane is require trial Imagery (B7 acave Surface (B Yes <u>Y</u> N	Water-Stain Aquatic Fa Aquatic Fa True Aquat Hydrogen 8 Oxidized R Presence 0 Recent Iron Thin Muck Gauge or V 8) Other (Exp Other (Exp Depth (inc	ned Leave Juna (B13) tic Plants (Sulfide Od Rhizosphere of Reduced n Reductio Surface (C Well Data (Jain in Rer ches): <u>()</u> ches): <u>()</u>	(B14) kor (C1) res on Livin d Iron (C4) on in Tilled C7) (D9) marks)	Soils (C6)	<u>Secondary Indical</u> Surface Soil (Drainage Pat Dry-Season M Crayfish Burn C3)Saturation Vis Stunted or St Geomorphic I	ors (minimum of two required Cracks (B6) erns (B10) Vater Table (C2) ows (C8) lible on Aerial Imagery (C9) ressed Plants (D1) Position (D2)
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (minimum Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Ad Sparsely Vegetated Cor Field Observations: Surface Water Present? Water Table Present? Saturation Present?	ors: tof one is require of ane is require trial Imagery (B7 acave Surface (B Yes <u>Y</u> N	Water-Stain Aquatic Fa Aquatic Fa True Aquat Hydrogen 8 Oxidized R Presence 0 Recent Iron Thin Muck Gauge or V 8) Other (Exp	ned Leave Juna (B13) tic Plants (Sulfide Od Rhizosphere of Reduced n Reductio Surface (C Well Data (Jain in Rer ches): <u>()</u> ches): <u>()</u>	(B14) kor (C1) res on Livin d Iron (C4) on in Tilled C7) (D9) marks)	Soils (C6)	<u>Secondary Indical</u> Surface Soil (Drainage Pat Dry-Season M Crayfish Burn C3)Saturation Vis Stunted or St Geomorphic I	ors (minimum of two required Cracks (B6) erns (B10) Vater Table (C2) ows (C8) iible on Aerial Imagery (C9) ressed Plants (D1) Position (D2) Fest (D5)
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (minimun Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Ad Sparsely Vegetated Coo Field Observations: Surface Water Present? Water Table Present?	erial Imagery (B7) acave Surface (B Yes Yes N Yes N	Water-Stain Aquatic Fa Aquatic Fa True Aquat Hydrogen S Oxidized R Presence C Recent Iron Thin Muck Gauge or M 8) Other (Exp 10 Depth (inc 10 D	ned Leave una (B13) tic Plants (Sulfide Od Rhizosphere of Reduced n Reductio Surface (C Well Data (olain in Rer ches): <u>O</u> ches): <u>O</u> ches): <u>C</u>	(B14) kor (C1) res on Livin d Iron (C4) on in Tilled C7) (D9) marks) 	Soils (C6)	<u>Secondary Indical</u> Surface Soil (Drainage Pat Dry-Season V Crayfish Burn C3) Saturation Vis Stunted or St Geomorphic I FAC-Neutral	ors (minimum of two required Cracks (B6) erns (B10) Vater Table (C2) ows (C8) iible on Aerial Imagery (C9) ressed Plants (D1) Position (D2) Fest (D5)
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (minimum Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Ad Sparsely Vegetated Coor Field Observations: Surface Water Present? Water Table Present? Saturation Present? Saturation Present?	erial Imagery (B7) acave Surface (B Yes Yes N Yes N	Water-Stain Aquatic Fa Aquatic Fa True Aquat Hydrogen S Oxidized R Presence C Recent Iron Thin Muck Gauge or M 8) Other (Exp 10 Depth (inc 10 D	ned Leave una (B13) tic Plants (Sulfide Od Rhizosphere of Reduced n Reductio Surface (C Well Data (olain in Rer ches): <u>O</u> ches): <u>O</u> ches): <u>C</u>	(B14) kor (C1) res on Livin d Iron (C4) on in Tilled C7) (D9) marks) 	Soils (C6)	<u>Secondary Indical</u> Surface Soil (Drainage Pat Dry-Season V Crayfish Burn C3) Saturation Vis Stunted or St Geomorphic I FAC-Neutral	ors (minimum of two required Cracks (B6) erns (B10) Vater Table (C2) ows (C8) iible on Aerial Imagery (C9) ressed Plants (D1) Position (D2) Fest (D5)
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (minimum Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Ad Sparsely Vegetated Coor Field Observations: Surface Water Present? Water Table Present? Water Table Present? Saturation Present? Saturation Present? Saturation Present? Saturation Present? Saturation Present?	ors: of one is require of one is require reave Surface (B Yes N Yes N Yes N ream gauge, mor	Water-Stain Aquatic Fa Aquatic Fa True Aquat Hydrogen S Oxidized R Presence C Recent Iron Thin Muck Gauge or V 8) Other (Exp lo Depth (inc lo Depth (inc htoring well, aerial p	ned Leave una (B13) tic Plants (Sulfide Od thizosphere of Reduced n Reductio Surface (C Well Data (olain in Rer ches): ches): ches): ches): ches): ches): ches): ches):	(B14) kor (C1) res on Livin d Iron (C4) on in Tilled (C7) (D9) marks)	Soils (C6)	<u>Secondary Indical</u> Surface Soil (Drainage Pat Dry-Season V Crayfish Burn C3) Saturation Vis Stunted or St Geomorphic I FAC-Neutral	ors (minimum of two required Cracks (B6) erns (B10) Vater Table (C2) ows (C8) iible on Aerial Imagery (C9) ressed Plants (D1) Position (D2) Fest (D5)
Depth (Inches): Remarks: YDROLOGY Wetland Hydrology Indicat Primary Indicators (minimum Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Ad Sparsely Vegetated Coor Field Observations: Surface Water Present? Water Table Present? Water Table Present? Saturation Present? Saturation Present? Saturation Present? Saturation Present? Saturation Present?	ors: of one is require of one is require reave Surface (B Yes N Yes N Yes N ream gauge, mor	Water-Stain Aquatic Fa Aquatic Fa True Aquat Hydrogen S Oxidized R Presence C Recent Iron Thin Muck Gauge or M 8) Other (Exp 10 Depth (inc 10 D	ned Leave una (B13) tic Plants (Sulfide Od thizosphere of Reduced n Reductio Surface (C Well Data (olain in Rer ches): ches): ches): ches): ches): ches): ches): ches):	(B14) kor (C1) res on Livin d Iron (C4) on in Tilled (C7) (D9) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks) marks)	Soils (C6)	<u>Secondary Indical</u> Surface Soil (Drainage Pat Dry-Season V Crayfish Burn C3) Saturation Vis Stunted or St Geomorphic I FAC-Neutral	ors (minimum of two required Cracks (B6) erns (B10) Vater Table (C2) ows (C8) iible on Aerial Imagery (C9) ressed Plants (D1) Position (D2) Fest (D5)

1 19 - 19 - 19

Project/Site: Port of Catoosa City/	County: <u>Rogers Co.</u> Sampling Date: <u>12/12/11</u> State: <u>0/</u> Sampling Point: <u>Upfland</u>
Applicant/Owner: Part of Cotaosa	State:O/C_ Sampling Point: Wet auch
Investigator(s): Elisa Holt, Jason Coskey Section	on, Township, Range: Sec 4 T20N RISE
Landform (hilislope, terrace, etc.):	Local relief (concave, convex, none): Concore
Slope (%): Lat: Long	: Datum:
Soil Map Unit Name:	NWI classification: PFO
Are climatic / hydrologic conditions on the site typical for this time of year?	
Are Vegetation, Soil, or Hydrology significantly distu	rbed? Are "Normal Circumstances" present? Yes 🔽 No
Are Vegetation, Soil, or Hydrology naturally problem	atic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map showing sar	npling point locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes <u>Y</u> No	
Hydric Soil Present? Yes <u>X</u> No	Is the Sampled Area
Wetland Hydrology Present? Yes Y No	within a Wetland? Yes <u>X</u> No

VEGETATION – Use scientific names of plants.

a . t

4

Remarks:

.

			Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:)	% Cover	<u>Species?</u>		Number of Dominant Species
1. Ulnus americana	20	<u> </u>	FAC	That Are OBL, FACW, or FAC: (A)
2. celtis occidentalis	20	<u> </u>	FAC	Total Number of Dominant
3. unus alata	(0	N	EACU	Species Across All Strata: 3 (B)
4				
5				Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)
	50	= Total Co	ver	Mat Ale OBL, FACW, of FAC. 100 (AVB)
Sapling/Shrub Stratum (Plot size:)	<u> </u>	- 1000100		Prevalence Index worksheet:
1. Unus Americana	10	Ý	FAC	Total % Cover of:Multiply by:
2				OBL species O x1= O
3				FACW species x 2 =
4				FAC species 55 = 4 x3=
		C	•	FACU species X4 = 120
5		= Total Co	••••••••••••••••••••••••••••••••••••••	UPL species x5=
Herb Stratum (Plot size:)	<u> </u>	= Total Co	ver	Column Totals (5 (A) 285 (B)
1. Cyna dan dactalon	20	N	Exu	
			terest.	Prevalence Index = B/A = <u>3. 400.3</u> 5
			·	Hydrophytic Vegetation Indicators:
3				1 - Rapid Test for Hydrophytic Vegetation
4				\sum 2 - Dominance Test is >50%
5				3 - Prevalence Index is ≤3.0 ¹
6				
7				4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
8			. 	Problematic Hydrophytic Vegetation ¹ (Explain)
9			••••••••••••••••••••••••••••••••••••••	
10				Bendle and a Rhould a set and see of a set of the set o
	<u>_2o</u> ,	= Total Co	ver	³ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic,
Woody Vine Stratum (Plot size:)		••		
1. <u>tor</u>	5	_ <u>N</u> ,	FAC	Hydrophytic
2. Vitis Sp		<u>N</u>		Vegetation
1	<u> </u>	= Total Co	ver	Present? Yes No
Remarks: (Include photo numbers here or on a separate	sheet.)			

US Army Corps of Engineers

OIL									Sampling	Point: Wet
	Juliana (Passaila - 4		th mandad to de		ndlar to			af laster		
	ription: (Describe t	o the dep				or contim	n the absence	e of indica	ators.)	
Depth (inches)	Matrix Color (moist)	%	Color (moist)	ox Features %	Tvpe ¹	Loc ²	Texture		Rema	arks
Q	10, YR3/1	80	25403/6	20	<u></u>	M	clay	Inan	110110	
	-006 1100/1		4371076				cray		-	
					<u> </u>					
<u> </u>								<u></u>	<u> </u>	
										
	•····						•			
							21		re Lining, M	
Hydric Soil I	procentration, D=Deple indicators:	ellon, KM-	-Reduced mains, m	o-maskeu	Sand Gra	uns,				dric Soils ³ :
Histosol			Sandy	Gleyed Ma	irix (S4)				edox (A16)	
	bipedon (A2)			Redox (S5)	• •			Surface (S		
Black Hi	stic (A3)		Strippe	d Matrix (S	6)		Iron-N	langanesi	e Masses (F	-12)
	n Sulfide (A4)			Mucky Min			— ·		ark Surface	• •
	Layers (A5)			Gleyed Ma			Other	(Explain i	n Remarks)	}
2 cm Mu Depleted	ck (A10) I Below Dark Surface	(614)		ed Matrix (F Dark Surfa	•					
	rk Surface (A12)	()		ed Dark Suna			³ Indicator	s of hydro	phytic vege	tation and
	lucky Mineral (S1)			Depression					gy must be	
	cky Peat or Peat (S3)					unies	s disturbed	d or problem	natic.
Restrictive I	ayer (if observed):						1			
						-				
Туре:	pon	L				-	Hudria Cai	Dracant	s val	
··	2.hes):	L				-	Hydric Sol	l Present'	? Yes 🗸	/ No
··	-	£				-	Hydric Sol	l Present	? Yes <u>\</u>	/No
Depth (inc	-	£				-	Hydric Sol	l Present	? Yes <u>\</u>	No
Depth (inc	-	£				-	Hydric Soi	l Present	? Yes <u>\</u>	No
Depth (inc	-	<u> </u>				-	Hydric Soi	l Present	? Yes <u>\</u>	No
Depth (inc	-	<u> </u>				-	Hydric Soi	l Present	? Yes <u>\</u>	No
Depth (ind Remarks:	ches):	£	 	-		-	Hydric Soi	l Present	? Yes <u> </u>	No
Depth (inc Remarks: YDROLO	ches):	£_				-	Hydric Sol	l Present	? Yes <u></u>	No
Depth (inc Remarks: YDROLO Wetland Hyc	Shes):		red: check all that a	DDIV)		-				No
Depth (inc Remarks: YDROLO Netland Hyd Primary Indic	GY GY drology Indicators: ators (minimum of or			oply) hined Leave		-	<u>Second</u>	ary Indica	tors (minimi Cracks (B6)	um of two regui
Depth (inc Remarks: YDROLO Wetland Hyo Primary Indic Surface	GY GY drology Indicators: ators (minimum of or		Water-Sta			-	<u>Second</u>	ary Indica	tors (minim	um of two regui
Depth (inc Remarks: YDROLO Wetland Hyo Primary Indic Surface High Wa Saturatio	GY drology Indicators: cators (minimum of or Water (A1) uter Table (A2) on (A3)		Water-Sta Aquatic F True Aqua	ained Leave auna (B13) atic Plants) (B14)	-	Second Su Dra Dra	ary Indica face Soil (ilnage Pat -Season \	tors (minim Cracks (B6) terns (B10) Nater Table	um of two requi
Depth (inc Remarks: YDROLO Wetland Hyo Primary Indic Surface High Wa Saturatio Water M	GY drology Indicators: cators (minimum of or Water (A1) tter Table (A2) on (A3) arks (B1)		Water-Sta Aquatic F True Aqua Hydrogen	ained Leave auna (B13) atic Plants Sulfide Oc) (B14) lor (C1)	-	<u>Second</u> Su Dra Drj Cra	ary Indica face Soil (Inage Pat -Season \ Inyfish Burr	lors (minimu Cracks (B6) terns (B10) Water Table ows (C8)	um of two requi
Depth (inc Remarks: YDROLO Wetland Hyo Primary Indic Saturation Saturation Water M Sedimer	GY drology Indicators: cators (minimum of or Water (A1) tter Table (A2) on (A3) larks (B1) nt Deposits (B2)		Water-Sta Aquatic F True Aqua Hydrogen ∠ Oxidized	ained Leave auna (B13) atic Plants Sulfide Oc Rhizospher) (B14) for (C1) res on Livi		Second Sul Dra Dra (C3)	ary Indica face Soil (ilnage Pat -Season V iyfish Burr uration Vi	tors (minimi Cracks (B6) terns (B10) Water Table ows (C8) sible on Aer	um of two requin) e (C2) rial Imagery (C9
Depth (inc Remarks: YDROLO Wetland Hyd Primary Indic Saturation Sa	GY drology Indicators: cators (minimum of or Water (A1) ter Table (A2) on (A3) larks (B1) ht Deposits (B2) posits (B3)		Water-Sta Aquatic F True Aqua Hydrogen Oxidized Presence	ained Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce) (B14) lor (C1) res on Livi d iron (C4)	<u>Second</u> Dra Dra Dra Cra (C3) ∑Sa' ∑Sa' ∑Stu	ary Indica face Soil (Inage Pat -Season \ Nyfish Burr Juration Vi Inted or St	tors (minimu Cracks (B6) terns (B10) Nater Table ows (C8) sible on Aer ressed Plar	um of two requir) (C2) rial Imagery (C9 nts (D1)
Depth (inc Remarks: YDROLO Wetland Hyo Primary Indic Surface High Wa Saturatio Water M Saturatio Drift Dep Algal Ma	GY drology Indicators: cators (minimum of or Water (A1) tter Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4)		Water-Sta Aquatic F True Aqua Hydrogen Oxidized Presence Recent In	ained Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce on Reductio) (B14) lor (C1) res on Livi d iron (C4 on in Tilleo)	(C3) Second	ary Indica face Soil (inage Pat -Season \ ingish Burr iuration Vi iuration Vi inted or St omorphic	tors (minimu Cracks (B6) terns (B10) Water Table ows (C8) sible on Aer ressed Plar Position (D2	um of two requir) (C2) rial Imagery (C9 nts (D1)
Primary Indic Primary Indic Surface High Wa Saturatio Water M Saturatio Algal Ma Iron Dep	GY drology Indicators: cators (minimum of or Water (A1) tter Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5)	ne îs requi	Water-Sta	ained Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce on Reductik k Surface (i) (B14) lor (C1) res on Livi d iron (C4 on in Tilleo C7))	(C3) Second	ary Indica face Soil (Inage Pat -Season \ Nyfish Burr Juration Vi Inted or St	tors (minimu Cracks (B6) terns (B10) Water Table ows (C8) sible on Aer ressed Plar Position (D2	um of two requir) (C2) rial Imagery (C9 nts (D1)
Primary Indic Primary Indic Primary Indic Saturatic Saturatic Saturatic Algal Ma Iron Dep Inundatic	GY drology Indicators: cators (minimum of or Water (A1) tter Table (A2) on (A3) larks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial Ir	ne îs requi	Water-Sta Aquatic F True Aqua Hydrogen Oxidized Presence Recent fru Thin Mucl 7) Gauge or	ained Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce on Reduction k Surface (Well Data) (B14) lor (C1) res on Livi d Iron (C4 on in Tilleo C7) (D9))	(C3) Second	ary Indica face Soil (inage Pat -Season \ ingish Burr iuration Vi iuration Vi inted or St omorphic	tors (minimu Cracks (B6) terns (B10) Water Table ows (C8) sible on Aer ressed Plar Position (D2	um of two requir) (C2) rial Imagery (C9 nts (D1)
Pepth (inc Remarks: YDROLO Wetland Hyo Primary Indic Saturatio Saturatio Saturatio Saturatio Algal Ma Iron Dep Inundali Sparsely	GY drology Indicators: cators (minimum of or Water (A1) ter Table (A2) on (A3) larks (B1) ht Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial In y Vegetated Concave	ne îs requi	Water-Sta Aquatic F True Aqua Hydrogen Oxidized Presence Recent fru Thin Mucl 7) Gauge or	ained Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce on Reductik k Surface (i) (B14) lor (C1) res on Livi d Iron (C4 on in Tilleo C7) (D9))	(C3) Second	ary Indica face Soil (inage Pat -Season \ ingish Burr iuration Vi iuration Vi inted or St omorphic	tors (minimu Cracks (B6) terns (B10) Water Table ows (C8) sible on Aer ressed Plar Position (D2	um of two requir) (C2) rial Imagery (C9 nts (D1)
Depth (inc Remarks: YDROLO Wetland Hyo Primary Indic Surface High Wa Saturatic Water M Sedimer Drift Dep Algal Ma Iron Dep Inundati Sparsely Field Obser	GY drology Indicators: cators (minimum of or Water (A1) ater Table (A2) on (A3) arks (B1) nt Deposits (B2) cosits (B3) at or Crust (B4) cosits (B5) on Visible on Aerial Ir y Vegetated Concave vations:	ne is requi nagery (B Surface (Water-Sta Aquatic F True Aqua Hydrogen Oxidized Presence Recent fru Thin Muc 7) Gauge or B8) Other (Ex	ained Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce on Reductik k Surface (i Well Data plain in Re) (B14) lor (C1) res on Livi d Iron (C4 on in Tilleo C7) (D9))	(C3) Second	ary Indica face Soil (inage Pat -Season \ ingish Burr iuration Vi iuration Vi inted or St omorphic	tors (minimu Cracks (B6) terns (B10) Water Table ows (C8) sible on Aer ressed Plar Position (D2	um of two requir) (C2) rial Imagery (C9 nts (D1)
Depth (inc Remarks: YDROLO Wetland Hyo Primary Indic Saturatio Sat	GY drology Indicators: cators (minimum of or Water (A1) ater Table (A2) on (A3) arks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial In y Vegetated Concave vations: er Present? Ye	nagery (B Surface (Water-Sta Aquatic F True Aqua Hydrogen Oxidized Presence Recent fru Recent fru Gauge or B8) Other (Ex No Depth (ir	ained Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce on Reduction k Surface (Well Data plain in Re) (B14) lor (C1) res on Livi d Iron (C4 on in Tilleo C7) (D9))	(C3) Second	ary Indica face Soil (inage Pat -Season \ ingish Burr iuration Vi iuration Vi inted or St omorphic	tors (minimu Cracks (B6) terns (B10) Water Table ows (C8) sible on Aer ressed Plar Position (D2	um of two requir) (C2) rial Imagery (C9 nts (D1)
Depth (inc Remarks: IYDROLO Wetland Hyd Primary Indic Surface High Wa Saturatic Saturatic Water M Sedimer Drift Dep Algal Ma Iron Dep Inundati	GY drology Indicators: ators (minimum of or Water (A1) ther Table (A2) on (A3) larks (B1) ht Deposits (B2) posits (B3) at or Crust (B4) posits (B5) on Visible on Aerial In vegetated Concave vations: er Present? Ye	ne is requi magery (B Surface (es	Water-Sta Aquatic F True Aqua Hydrogen Oxidized Presence Recent fru Recent fru Gauge or B8) Other (Ex No Depth (ir	ained Leave auna (B13) atic Plants Sulfide Oc Rhizospher of Reduce on Reductio k Surface (f Well Data plain in Re nches): nches):) (B14) lor (C1) res on Livi d Iron (C4 on in Tilleo C7) (D9)) I Soils (Co	(C3) Second	ary Indica face Soil of inage Pat ange Pat suration Vision turation br>turation tura	tors (minimi Cracks (B6) terns (B10) Nater Table ows (C8) sible on Aer ressed Plar Position (D2 Test (D5)	um of two requir) (C2) rial Imagery (C9 nts (D1)

.

Remarks:

 \mathbf{G}

ß

.

buttrassed trees

US Army Corps of Engineers

			Roca	Sampling Date: 12/2/2
oject/Site: Port & Catore	(Sity/County	<u>rage</u>	State K Compling Date: 12/12/1
vestigator(s): <u>Flish Hotza Jason</u>	n. k.			StateOK Sampling Point:9
vestigator(s): 12/15/07/07/07/06.5em	<u>Coster</u> :	Section, To	wnship, Ran	ge:
andform (hillslope, terrace, etc.):		Local relief	(concave, c	onvex, none): <u>Con Conce</u> Slope (%): <u>57</u>
ubregion (LRR):				
• • •			• _	NWI classification:
e climatic / hydrologic conditions on the site typical for this		,		
e Vegetation, Soil, or Hydrologys				Normal Circumstances" present? Yes No
e Vegetation, Soil, or Hydrology r	naturally prol	blematic?	(If nee	eded, explain any answers in Remarks.)
UMMARY OF FINDINGS – Attach site map	showing	samplin	g point lo	ocations, transects, important features, etc
Hydrophytic Vegetation Present? Yes N	lo			•
Hydrophytic Vegetation Present? Yes N Hydric Soil Present? Yes N			e Sampled	V
Wetland Hydrology Present? Yes N	-	with	in a Wetlan	d? Yes 🗾 No
Remarks: Butressed thee Fosts	<u></u>			
DUTUBLE CILL TOM				
EGETATION – Use scientific names of plar				· · · · · · · · · · · · · · · · · · ·
EGETATION - Use scientific names of plan	Absolute	Dominant	t Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:)	% Cover	Species?	Status	Number of Dominant Species
1. Ulnus Americana	30	<u> </u>	. Frc	That Are OBL, FACW, or FAC
2. Cettis Occidentalio	30		FAC_	(excluding FAC-):
3. Winged Elm Ulnus alata	10	<i>,</i>	ERCUP	Total Number of Dominant 3
4 0				Species Across All Strata: (B)
		= Total Co	ver	Percent of Dominant Species
		•	FAC	
1. Ulhus Americana		•	FAC	
1. Ulhus Americana		•	FAC	That Are OBL, FACW, or FAC: (A/B) Prevalence Index worksheet: Total % Cover of: Multiply by:
1. Ulhus Americana		•	FAC	That Are OBL, FACW, or FAC:
1. Ulnus Americana 2		•	EAC.	That Are OBL, FACW, or FAC: V (A/B) Prevalence Index worksheet:
1. ULNUD Americana 2 3 4 5		•	<i>FAC</i>	That Are OBL, FACW, or FAC:
1. [J] Mio Asmen; cana 2. 3. 4. 5. Herb Stratum (Plot size:	0		FAC.	That Are OBL, FACW, or FAC:
1. [J] Mio Americana 2		= Total Cc	<i>FAC</i>	That Are OBL, FACW, or FAC: (A/B) Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species 0 $x 1 = 0$ FACW species 75 $x 3 = 25$ FAC species 30 $x 4 = 120$ UPL species $5 = 20$
1. [J] Mich Armen; convert 2		= Total Cc	FAC.	That Are OBL, FACW, or FAC: (A/B) Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species O $x 1 = O$ FACW species 75 $x 3 = 0.25$ FACU species 30 $x 4 = 120$ UPL species O $x 5 = 0$ Column Totals: 105 (A) $3+5$ (B)
1. [J] Mio Americana 2		= Total Cc	FAC.	That Are OBL, FACW, or FAC: (A/B) Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species O $x 1 = O$ FACW species 75 $x 3 = 225$ FACU species 30 $x 4 = 120$ UPL species O $x 5 = O$ Column Totals: 105 (A) $3+5$ (B)
1. [J] Mio Aimer; cana 2. 3. 4. 5. Herb Stratum (Plot size:) 1. Bumuda 2. 3. 4.		= Total Cc	FAC.	That Are OBL, FACW, or FAC: (A/B) Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species O x 1 = O FACW species 7.5 x 3 = 2.25 FACU species 30 x 4 = 120 UPL species 0 x 5 = 0 Column Totals: 105 (A) 345 (B) Prevalence Index = $B/A = 3,3$ Hydrophytic Vegetation Indicators:
1. [J] Mio Aimer; cana 2	 	= Total Co	FAC.	That Are OBL, FACW, or FAC: (A/B) Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species $(A = 0)$ FACW species $(A = 0)$ FAC species $(A = 0)$ FACU species $(A = 0)$ UPL species $(A = 0)$ Column Totals: $(A = 0)$ Prevalence Index = $B/A = 0$ (B) Prevalence Index = $B/A = 0$ (B) Prevalence Index = $B/A = 0$ (C) 1 - Rapid Test for Hydrophytic Vegetation
1. [J] Mio Aimer; cana 2. 3. 4. 5. Herb Stratum (Plot size:) 1. Bumuda 2. 3. 4. 5. 6.	 	= Total Co	FAC.	That Are OBL, FACW, or FAC: (A/B) Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species $(A = 0)$ FACW species $(A = 0)$ FACW species $(A = 0)$ FACU species $(A = 0)$ UPL species $(A = 0)$ UPL species $(A = 0)$ Column Totals: $(A = 0)$ Prevalence Index = B/A = $(3, 3)$ Hydrophytic Vegetation Indicators: (A = 0) Prevalence Index = B/A = $(3, 3)$ Hydrophytic Vegetation Indicators: (A = 0) (A = 0)
1. [J] Mio Americana 2. 3. 4. 5. Herb Stratum (Plot size:) 1. Bumuda 2. 3. 4. 5. 6. 7.		= Total Cc	FAC.	That Are OBL, FACW, or FAC: (A/B) Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species O x 1 = O FACW species 75 x 3 = 225 FAC species 30 x 4 = 120 UPL species 0 x 5 = O Column Totals: 105 (A) $3+5$ (B) Prevalence Index = B/A = $3,3$ Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index Is $\leq 3.0^1$
1. [J] Mio Americana 2. 3. 4. 5. Herb Stratum (Plot size:) 1. Burmuida 2. 3. 4. 5. 6. 7. 8.			FAC.	That Are OBL, FACW, or FAC: (A/B) Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species (A/B) FACW species (A/B) FACW species (A/B) FACU species
2		= Total Co	FAC.	That Are OBL, FACW, or FAC: (A/B) Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species 0 x 1 = 0 FACW species 175 x 3 = 325 FACU species 30 x 4 = 120 UPL species 0 x 5 = 0 Column Totals: 105 (A) $3+5$ (B) Prevalence Index = B/A = $3,3$ Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50%
1. [J] Mio Aimes; cana 2. 3. 4. 5. Herb Stratum (Plot size:) 1. Bumuda 2. 3. 4. 5. 6. 7. 8. 9. 10.		= Total Co	FAC.	That Are OBL, FACW, or FAC: (A/B) Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species 0 x 1 = 0 FACW species 0 x 2 = 0 FAC species 30 x 4 = 120 UPL species 0 x 5 = 0 Column Totals: 105 (A) $3+5$ (B) Prevalence Index = B/A = $3,3$ Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index Is $\leq 3.0^1$ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation ¹ (Explain)
1. [J] Mio Aimer; cana 2. 3. 4. 5. Herb Stratum (Plot size:) 1			FAC.	That Are OBL, FACW, or FAC: (A/B) Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species $A = 0$ FACW species 75 $x = 0$ FAC species 75 $x = 0$ FAC species 30 $x = 0$ FACU species 30 $x = 0$ UPL species 0 $x = 0$ Column Totals: 105 (A) $3+5$ (B) Prevalence Index = B/A = $3,3$ Hydrophytic Vegetation Indicators: 1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index Is $\leq 3.0^1$ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
1. [J] Muo Aimer; cama 2. 3. 4. 5. Herb Stratum (Plot size:) 1. Bumuda 2. 3. 4. 5. 6. 7. 8. 9. 10. Woody Vine Stratum (Plot size:) 1. for all f			FAC.	That Are OBL, FACW, or FAC: (A/B) Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species $A = A = A = A = A = A = A = A = A = A $
1. [J] Mio Aimes; cana 2. 3. 4. 5. Herb Stratum (Plot size:) 1. Bumuda 2. 3. 4. 5. 6. 7. 8. 9. 10.			FAC	That Are OBL, FACW, or FAC: (A/B) Prevalence Index worksheet:

-

Great Plains - Version 2.0

-

rofile Desci	ription: (Descrit	be to the de	pth neede	i to docur	nent the i	ndicator	or confir	Sampling Point:
Depth	Matrix				x Feature			······································
(inches)	Color (moint)	%	Color	(moist)	%	_Type ¹	_Loc ²	Texture Remarks
)-/6"	10YR 3/1	RO	2.54	K-2/6	20	C	М	Clay/Silt/Loam
·								
					• • • • • • • • • • • • • • • • • • • •	• ••		• • • • • • • • • • • • • • • • • • •
	·							
		·			•	·,		۲ <u>ــــــــــــــــــــــــــــــــــــ</u>
			,		• • • • • • •		· · · · · · · · ·	
			·			• • • • • • •		· · · · · · · · · · · · · · · · · · ·
Type: C=Co	oncentration, D=D	Depletion, RM	/I=Reduced	Matrix, CS	S=Covere	d or Coate	ed Sand G	
lydric Soll I	ndicators: (App	licable to a	ll LRRs, ur	less othe	rwise not	ed.)		Indicators for Problematic Hydric Soils ³ :
Histosol	(A1)		·	Sandy (Gleyed Ma	atrix (S4)		1 cm Muck (A9) (LRR I, J)
Histic Ep	vipedon (A2)		-	_ Sandy I	Redox (St	5)		Coast Prairie Redox (A16) (LRR F, G, H)
Black Hi			-		d Matrix (•		Dark Surface (S7) (LRR G)
	n Sulfide (A4)		-	-	-	neral (F1)		High Plains Depressions (F16)
	Layers (A5) (LR	•	-		Gleyed M			(LRR H outside of MLRA 72 & 73)
	ick (A9) (LRR F, (d Bolow Dark Sur		7	C Deplete	ed Matrix (Dark Surfi			Reduced Vertic (F18)
	d Below Dark Sur ark Surface (A12)		-			ace (F6) urface (F7	`	Red Parent Material (TF2) Very Shallow Dark Surface (TF12)
	lucky Mineral (S1		-		Depressio	•)	Other (Explain in Remarks)
	Aucky Peat or Pea		с. н) –	High Pl	-		-16)	³ Indicators of hydrophytic vegetation and
	icky Peat or Peat				-	73 of LRI	-	wetland hydrology must be present,
		····		(,	unless disturbed or problematic.
Restrictive I	Layer (if present):						
		x \ 0						
Type:	n	NA						\mathbf{V}
Type:		NA						Hydric Soil Present? Yes No
Type:	ches):							Hydric Soil Present? Yes No
Type: Depth (in	ches):							Hydric Soil Present? Yes No
Type: Depth (in	ches):							Hydric Soil Present? Yes No
Type: Depth (in Remarks:	•							Hydric Soil Present? Yes No
Type: Depth (in Remarks:	•		·					Hydric Soil Present? Yes No
Type: Depth (in Remarks: YDROLO	•	Jrs:	·					Hydric Soil Present? Yes No
Type: Depth (in Remarks: YDROLO Wetland Hy	GY		red; check a	all that app	Iv)			Hydric Soil Present? Yes No
Type: Depth (in: Remarks: YDROLO Wetland Hy Primary India	GY drology Indicato cators (minimum o		red; check a	all that app Salt Crust				
Type: Depth (in Remarks: YDROLO Wetland Hy Primary India Surface	GY drology Indicato cators (minimum o		red; check a		t (B11)	es (B13)		Secondary Indicators (minimum of two require
Type: Depth (in Remarks: YDROLO Wetland Hy Primary India Surface	GY drology Indicato cators (minimum Water (A1) ater Table (A2)		red; check a	Salt Crust	t (B11) overtebrat	• •		<u>Secondary Indicators (minimum of two require</u> Surface Soil Cracks (B6)
Type: Depth (in Remarks: YDROLO Wetland Hy Primary India Surface High Wa Saturati	GY drology Indicato cators (minimum Water (A1) ater Table (A2)		red; check a	Salt Crust Aquatic In	t (B11) overtebrat Sulfide C	dor (C1))	Secondary Indicators (minimum of two requires Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B6
Type: Depth (in: Remarks: YDROLO Wetland Hy Primary India Surface High Wa Saturati	GY drology Indicato cators (minimum Water (A1) ater Table (A2) on (A3)		red; check a	Salt Crust Aquatic In Hydrogen	t (B11) overtebrate Sulfide C on Water)dor (C1) Table (C2		Secondary Indicators (minimum of two requires Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8 Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (
Type: Depth (in: Remarks: YDROLO Wetland Hy Primary India Surface High Wa Saturati	GY drology Indicato cators (minimum of Water (A1) ater Table (A2) on (A3) farks (B1) nt Deposits (B2)		red; check a	Salt Crust Aquatic In Hydrogen Dry-Sease Oxidized	t (B11) overtebrate Sulfide C on Water)dor (C1) Table (C2 eres on Li		Secondary Indicators (minimum of two requires Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8 Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (
Type: Depth (in: Remarks: YDROLO Wetland Hy Primary Indie Surface High Wa Saturati Saturati Water M Sedime Drift Dep	GY drology Indicato cators (minimum of Water (A1) ater Table (A2) on (A3) farks (B1) nt Deposits (B2) posits (B3)			Salt Crust Aquatic In Hydrogen Dry-Sease Oxidized	t (B11) overtebrat overtebrat Sulfide C on Water Rhizospho not tilled)dor (C1) Table (C2 eres on Li)	ving Root	 <u>Secondary Indicators (minimum of two require</u> Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8 Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (1) s (C3) (where tilled)
Type: Depth (in: Remarks: YDROLO Wetland Hy Primary Indie Surface High Wa Saturati Saturati Water M Sedime Drift Dep	GY drology Indicato cators (minimum of Water (A1) ater Table (A2) on (A3) flarks (B1) nt Deposits (B2) posits (B3) at or Crust (B4)			Salt Crust Aquatic In Hydrogen Dry-Sease Oxidized (where	t (B11) overtebrate Sulfide C on Water Rhizosphe not tilled of Reduc	odor (C1) Table (C2 eres on Li) ed Iron (C	ving Root	Secondary Indicators (minimum of two requires Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B6) Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots ((where tilled) Crayfish Burrows (C8)
Type: Depth (in: Remarks: YDROLO Wetland Hy Primarv India Saturati Water M Saturati Water M Sedimei Drift De Algal Mi Iron Dej	GY drology Indicato cators (minimum of Water (A1) ater Table (A2) on (A3) flarks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5)	<u>of one requir</u>		Salt Crust Aquatic In Hydrogen Dry-Sease Oxidized (where Presence	t (B11) Ivertebrate Sulfide C on Water Rhizospho not tilled of Reduc k Surface	odor (C1) Table (C2 eres on Li) ed Iron (C (C7)	ving Root	Secondary Indicators (minimum of two requires Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B6) Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (where tilled) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9)
Type: Depth (in: Remarks: YDROLO Wetland Hy Primary India Saturati Saturati Saturati Unift Dej Algal Ma Iron Dej Inundati	GY drology Indicato cators (minimum Water (A1) ater Table (A2) on (A3) farks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aer	<u>of one requir</u> ial Imagery (Salt Crust Aquatic In Hydrogen Dry-Sease Oxidized (where Presence Thin Muc	t (B11) Ivertebrate Sulfide C on Water Rhizospho not tilled of Reduc k Surface	odor (C1) Table (C2 eres on Li) ed Iron (C (C7)	ving Root	Secondary Indicators (minimum of two requires Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8) Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (s (C3) (where tilled) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Geomorphic Position (D2) FAC-Neutral Test (D5)
Type: Depth (in: Remarks: YDROLO Wetland Hy Primary India Saturati Saturati Water M Sedimen Drift Dep Algal Mi Iron Dep Inundati Water-S	GY drology Indicato cators (minimum of Water (A1) ater Table (A2) on (A3) farks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aer Stalned Leaves (B	<u>of one requir</u> ial Imagery (Salt Crust Aquatic In Hydrogen Dry-Sease Oxidized (where Presence Thin Muc	t (B11) Ivertebrate Sulfide C on Water Rhizospho not tilled of Reduc k Surface	odor (C1) Table (C2 eres on Li) ed Iron (C (C7)	ving Root	 <u>Secondary Indicators (minimum of two require</u> Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8 Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (s (C3) (where tilled) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Geomorphic Position (D2)
Type: Depth (in: Remarks: YDROLO Wetland Hy Primary India Saturati Saturati Galanti Saturati Saturati Jorift Dej Algal Ma Iron Dej Inundati Water-S Field Obser	GY drology Indicato cators (minimum of Water (A1) ater Table (A2) on (A3) flarks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aer Stained Leaves (B vations:	of one requir ial Imagery (9)	(B7)	Salt Crust Aquatic Ir Hydrogen Dry-Sease Oxidized (where Presence Thin Muci Other (Ex	t (B11) overtebrate Sulfide C on Water Rhizosphe not tilled of Reduc k Surface plain in R	odor (C1) Table (C2 eres on Lir) ed Iron (C (C7) emarks)	ving Root	Secondary Indicators (minimum of two requires Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8) Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (s (C3) (where tilled) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Geomorphic Position (D2) FAC-Neutral Test (D5)
Type: Depth (in: Remarks: YDROLO Wetland Hy Primary Indie Surface High Wa Saturati Water N Sedime Drift De Algal Ma Iron De Inundati Water-S Field Obser Surface Wa	GY drology Indicato cators (minimum of Water (A1) ater Table (A2) on (A3) flarks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aer Stained Leaves (B vations: ter Present?	of one requir ial Imagery (9) Yes	(B7)	Salt Crust Aquatic In Hydrogen Dry-Sease Oxidized (where Presence Thin Much Other (Ex	t (B11) overtebratu Sulfide C on Water Rhizospho not tilled of Reduc k Surface plain in R	odor (C1) Table (C2 eres on Lir) ed Iron (C (C7) emarks)	ving Root (4)	Secondary Indicators (minimum of two requires Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8) Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (s (C3) (where tilled) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Geomorphic Position (D2) FAC-Neutral Test (D5)
Type: Depth (in: Remarks: YDROLO Wetland Hy Primarv India Surface High Wa Saturati Water M Sedimei Drift De Algal Mi Iron De Inundati Water-S Field Obser Surface Wal	GY drology Indicato cators (minimum of Water (A1) ater Table (A2) on (A3) farks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aer Stained Leaves (B vations: ter Present?	ial Imagery (9) Yes Yes	(B7)	Salt Crust Aquatic Ir Hydrogen Dry-Sease Oxidized (where Presence Thin Muc Other (Ex	t (B11) overtebrate Sulfide C on Water Rhizosphe of Reduc dof Reduc k Surface plain in R nches):	odor (C1) Table (C2 eres on Lir) ed Iron (C (C7) emarks)	ving Root: :4)	Secondary Indicators (minimum of two requires Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B6) Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (s (C3) (where tilled) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Geomorphic Position (D2) FAC-Neutral Test (D5) Frost-Heave Hummocks (D7) (LRR F)
Type: Depth (in: Remarks: YDROLO Wetland Hy Primary Indie Surface High Wa Saturatii Water N Saturatii Child Water N Gedime Drift De Algal Ma Iron De Inundati Water S Field Obser Surface Wal Water Table Saturation F	GY drology Indicato cators (minimum of Water (A1) ater Table (A2) on (A3) flarks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aer Stained Leaves (B rvations: ter Present? Present?	ial Imagery (9) Yes Yes	(B7)	Salt Crust Aquatic Ir Hydrogen Dry-Sease Oxidized (where Presence Thin Muc Other (Ex	t (B11) overtebrate Sulfide C on Water Rhizosphe of Reduc dof Reduc k Surface plain in R nches):	odor (C1) Table (C2 eres on Lir) ed Iron (C (C7) emarks)	ving Root: :4)	Secondary Indicators (minimum of two requires Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8) Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (s (C3) (where tilled) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Geomorphic Position (D2) FAC-Neutral Test (D5)
Type: Depth (in: Remarks: YDROLO Wetland Hy Primary Indie Saturati Saturati Water M Sedimes Drift De Algal M Unift De Innudati Water-S Field Obser Surface Water Saturation F (includes ca	GY drology Indicato cators (minimum of Water (A1) ater Table (A2) on (A3) farks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aer Stained Leaves (B vations: ter Present?	ial Imagery (9) Yes Yes	(B7)	Salt Crust Aquatic In Hydrogen Dry-Sease Oxidized I (where Presence Thin Much Other (Ex Depth (ir Depth (ir	t (B11) overtebratu Sulfide C on Water Rhizospho not tilled of Reduc k Surface plain in R nches): nches):	odor (C1) Table (C2 eres on Lir) ed Iron (C (C7) emarks)	ving Root: 4) We	Secondary Indicators (minimum of two requires Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B6) Crayfish Queres on Living Roots (where tilled) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Geomorphic Position (D2) FAC-Neutral Test (D5) Frost-Heave Hummocks (D7) (LRR F)
Type: Depth (in: Remarks: YDROLO Wetland Hy Primary Indie Saturati Saturati Water M Sedimes Drift De Algal M Unift De Innudati Water-S Field Obser Surface Water Saturation F (includes ca	GY drology Indicato cators (minimum of Water (A1) ater Table (A2) on (A3) farks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aer Stained Leaves (B vations: ter Present? Present? pillary fringe)	ial Imagery (9) Yes Yes	(B7)	Salt Crust Aquatic In Hydrogen Dry-Sease Oxidized I (where Presence Thin Much Other (Ex Depth (ir Depth (ir	t (B11) overtebratu Sulfide C on Water Rhizospho not tilled of Reduc k Surface plain in R nches): nches):	odor (C1) Table (C2 eres on Lir) ed Iron (C (C7) emarks)	ving Root: 4) We	Secondary Indicators (minimum of two requires Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B6) Crayfish Queres on Living Roots (where tilled) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Geomorphic Position (D2) FAC-Neutral Test (D5) Frost-Heave Hummocks (D7) (LRR F)
Type: Depth (in: Remarks: YDROLO Wetland Hy Primary India Surface High Wa Saturati Saturati Unift Dej Algal Ma Iron Dej Inundati Water-S Field Obser Surface Wal Water Table Saturation F (includes ca Describe Re	GY drology Indicato cators (minimum of Water (A1) ater Table (A2) on (A3) farks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aer Stalned Leaves (B vations: ter Present? Present? pillary fringe) acorded Data (streed)	ial Imagery (9) Yes Yes Yes	(B7)	Salt Crust Aquatic Ir Hydrogen Dry-Sease Oxidized (where Presence Thin Muci Other (Ex _ Depth (ir _ Depth (ir _ Depth (ir well, aerial	t (B11) overtebratu Sulfide C on Water Rhizospho not tilled of Reducc k Surface plain in R nches): nches): photos, p	odor (C1) Table (C2 eres on Lir) ed Iron (C (C7) emarks)	ving Root: 4) We	Secondary Indicators (minimum of two requires Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B6) Crayfish Queres on Living Roots (where tilled) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Geomorphic Position (D2) FAC-Neutral Test (D5) Frost-Heave Hummocks (D7) (LRR F)
Type: Depth (in: Remarks: YDROLO Wetland Hy Primary India Surface High Wa Saturati Saturati Unift Dej Algal Ma Iron Dej Inundati Water-S Field Obser Surface Wal Water Table Saturation F (includes ca Describe Re	GY drology Indicato cators (minimum of Water (A1) ater Table (A2) on (A3) farks (B1) nt Deposits (B2) posits (B3) at or Crust (B4) posits (B5) ion Visible on Aer Stained Leaves (B vations: ter Present? Present? pillary fringe)	ial Imagery (9) Yes Yes Yes	(B7)	Salt Crust Aquatic Ir Hydrogen Dry-Sease Oxidized (where Presence Thin Muci Other (Ex _ Depth (ir _ Depth (ir _ Depth (ir well, aerial	t (B11) overtebratu Sulfide C on Water Rhizospho not tilled of Reducc k Surface plain in R nches): nches): photos, p	odor (C1) Table (C2 eres on Lir) ed Iron (C (C7) emarks)	ving Root: 4) We	Secondary Indicators (minimum of two requires Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B6) Crayfish Queres on Living Roots (where tilled) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Geomorphic Position (D2) FAC-Neutral Test (D5) Frost-Heave Hummocks (D7) (LRR F)

* K * * sc

Sike Wooded Wetland P.	4/0 Wetlan
oject/site: Port of Catorso 5,4-1 city/county: Rege	UNS Sampling Date: 12-112-201
plicant/Owner:0	
vestigator(s): E/130 Hote + Jason Caoky Section, Township, Ra	
ndform (hillslope, terrace, etc.): Local relief (concave,	
bregion (LRR): Lat:	
il Map Unit Name:	•
e climatic / hydrologic conditions on the site typical for this time of year? Yes No _	
e Vegetation, Soil, or Hydrology significantly disturbed? Are	"Normal Circumstances" present? Yes No
e Vegetation, Soil, or Hydrology naturally problematic? (If ne	eeded, explain any answers in Remarks.)
UMMARY OF FINDINGS – Attach site map showing sampling point I	locations, transects, important features, etc.
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, _,
Hydrophytic Vegetation Present? Yes No Is the Sampled	d Area
Hydric Soil Present? Yes No within a Wetla	v 1
Netland Hydrology Present? Yes <u>X</u> No	
Remarks:	and antitude -
upland sampling paint - in	proved protuce
upland sampling point - i'm 10070 cynadon dactalon, Soil	= 10YR 3/3 0-1104
EGETATION – Use scientific names of plants.	
Absolute Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size:) <u>% Cover Species? Status</u>	Number of Dominant Species
1. Celtis occidentalis 40 X FAC	That Are OBL, FACW, or FAC
2. Cerna illinolinis 20 × FAC	(excluding FAC): (A)
3. Ulanus americana 5 ELC	Total Number of Dominant
4.	Species Across All Strata: (B)
= Total Cover	Percent of Dominant Species
Sapling/Shrub Stratum (Plot size:)	That Are OBL, FACW, or FAC:(60) (A/B)
1. none	Prevalence index worksheet:
2	Total % Cover of: Multiply by:
3	OBL species \heartsuit x1 = \heartsuit
4	FACW species $2 \times 2 = 2$
5	FAC species $67 \times 3 = 201$
= Total Cover	FACU species $5 \times 4 = 20$
Herb Stratum (Plot size: 1. <u>RormUCLA cynadon daitelon 5</u> FACH	
	Column Totals: $\boxed{12}$ (A) $\boxed{221}$ (B)
2	
3	Prevalence Index = B/A = <u>3.06-</u>
5	Hydrophytic Vegetation Indicators:
	- Rapid Test for Hydrophytic Vegetation
6	2 - Dominance Test is >50%
7	- 3 - Prevalence Index is ≤3.0 ¹
8	4 - Morphological Adaptations ¹ (Provide supporting
9	- data in Remarks or on a separate sheet)
10	 Problematic Hydrophytic Vegetation¹ (Explain)
Woody Vine Stratum (Plot size:)	¹ Indicators of hydric soil and wetland hydrology must
1. Tox Rad Q YAP	be present, unless disturbed or problematic.
2. Vitti st. 2	_ Hydrophytic
= Total Cover	Vegetation Present? Yes No
% Bare Ground in Herb Stratum	
% Bare Ground in Herb Stratum	<u></u>
% Bare Ground in Herb Stratum	2

	ded to document the indicator or confi	Sampling Point: <u>WeHa</u> rm the absence of indicators.)
Depth Matrix	Redox Features	- Texture Remarks
	1000000000000000000000000000000000000	
2-16m 10483/120905	F-VO IO & PL	Entry clay low
· · ·		
· · · · · · · · · · · · · · · · · · ·		
	······································	<u> </u>
· · · · · · ·		<u> </u>
	<u>.</u>	
		· .
¹ Type: C=Concentration, D=Depletion, RM=Redu	iced Matrix, CS=Covered or Coated Sand	Grains. ² Location: PL=Pore Lining, M=Matrix.
Hydric Soil Indicators: (Applicable to all LRRs		Indicators for Problematic Hydric Soils ³ :
Histosol (A1)	Sandy Gleyed Matrix (S4)	1 cm Muck (A9) (LRR I, J)
Histic Epipedon (A2)	Sandy Redox (S5)	Coast Prairie Redox (A16) (LRR F, G, H)
Black Histic (A3)	Stripped Matrix (S6)	Dark Surface (S7) (LRR G)
Hydrogen Sulfide (A4)	Loamy Mucky Mineral (F1)	High Plains Depressions (F16)
Stratified Layers (A5) (LRR F)	Loamy Gleyed Matrix (F2)	(LRR H outside of MLRA 72 & 73)
1 cm Muck (A9) (LRR F, G, H)	Depleted Matrix (F3) Redox Dark Surface (F6)	Reduced Vertic (F18) Red Parent Material (TF2)
Depleted Below Dark Surface (A11) Thick Dark Surface (A12)	Depleted Dark Surface (F7)	Very Shallow Dark Surface (TF12)
Sandy Mucky Mineral (S1)	Redox Depressions (F8)	Other (Explain in Remarks)
2.5 cm Mucky Peat or Peat (S2) (LRR G, H)		³ Indicators of hydrophytic vegetation and
5 cm Mucky Peat or Peat (S3) (LRR F)	(MLRA 72 & 73 of LRR H)	wetland hydrology must be present,
		unless disturbed or problematic.
Restrictive Layer (if present):		
Туре:		V ·
Depth (inches):		Hydric Soil Present? Yes <u> </u>
Remarks:		, ,, ,,
		· · · · · · · · · · · · · · · · · · ·
HYDROLOGY	·	·
Wetland Hydrology Indicators:		
Wetland Hydrology Indicators: Primary Indicators (minimum of one required: che	eck all that apply)	Secondary Indicators (minimum of two require
Primary indicators (minimum of one required: che	eck all that apply) Salt Crust (B11)	Secondary Indicators (minimum of two require Surface Soil Cracks (B6)
Primary Indicators (minimum of one required: che	Salt Crust (B11)	Surface Soil Cracks (B6)
Primary Indicators (minimum of one required; che Surface Water (A1) High Water Table (A2)	Salt Crust (B11) Aquatic Invertebrates (B13)	Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8
Primary Indicators (minimum of one required; che Surface Water (A1) High Water Table (A2) Saturation (A3)	Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1)	Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8 Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (
Primary Indicators (minimum of one required: che Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1)	Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2)	Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8 Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (
Primary Indicators (minimum of one required: che Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2)	 Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Oxidized Rhizospheres on Living Roce 	 Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8) Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (where tilled) Crayfish Burrows (C8)
Primary Indicators (minimum of one required: che Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3)	 Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Oxidized Rhizospheres on Living Roo (where not tilled) 	 Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8 Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (only content of the second /li>
Primary Indicators (minimum of one required: che Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4)	 Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Oxidized Rhizospheres on Living Roo (where not tilled) Presence of Reduced Iron (C4) 	 Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8) Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots ((where tilled) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9)
Primary Indicators (minimum of one required: che Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5)	 Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Oxidized Rhizospheres on Living Room (where not tilled) Presence of Reduced Iron (C4) Thin Muck Surface (C7) 	 Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B8) Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (10) Oxidized Rhizospheres on Living Roots (10) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Geomorphic Position (D2)
Primary Indicators (minimum of one required; che Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7) Water-Stained Leaves (B9) Field Observations:	 Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Oxidized Rhizospheres on Living Roo (where not tilled) Presence of Reduced Iron (C4) Thin Muck Surface (C7) Other (Explain in Remarks) 	 Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B6) Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (or where tilled) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Geomorphic Position (D2) FAC-Neutral Test (D5)
Primary Indicators (minimum of one required; che Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7) Water-Stained Leaves (B9) Field Observations:	 Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Oxidized Rhizospheres on Living Rood (where not tilled) Presence of Reduced Iron (C4) Thin Muck Surface (C7) Other (Explain in Remarks) 	 Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B6) Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (or where tilled) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Geomorphic Position (D2) FAC-Neutral Test (D5)
Primary Indicators (minimum of one required; che Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7) Water-Stained Leaves (B9) Field Observations:	 Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Oxidized Rhizospheres on Living Roc (where not tilled) Presence of Reduced Iron (C4) Thin Muck Surface (C7) Other (Explain in Remarks) 	 Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B6) Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (or where tilled) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Geomorphic Position (D2) FAC-Neutral Test (D5)
Primary Indicators (minimum of one required; che Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7) Water-Stained Leaves (B9) Field Observations: Surface Water Present? Yes Water Table Present? Yes Yes No Saturation Present? Yes No No	 Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Oxidized Rhizospheres on Living Roce (where not tilled) Presence of Reduced Iron (C4) Thin Muck Surface (C7) Other (Explain in Remarks) 	 Surface Soil Cracks (B6) Sparsely Vegetated Concave Surface (B6) Drainage Patterns (B10) Oxidized Rhizospheres on Living Roots (or where tilled) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9) Geomorphic Position (D2) FAC-Neutral Test (D5)
Primary Indicators (minimum of one required; che Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7) Water-Stained Leaves (B9) Field Observations: Surface Water Present? Yes No Water Table Present? Yes No Saturation Present? Yes No Saturation Present? Yes No	 Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Oxidized Rhizospheres on Living Rood (where not tilled) Presence of Reduced Iron (C4) Thin Muck Surface (C7) Other (Explain in Remarks) 	Surface Soil Cracks (B6)Sparsely Vegetated Concave Surface (B8Drainage Patterns (B10)Oxidized Rhizospheres on Living Roots (Oxidized Rhizospheres (Oxidized Rhizospheres on Living Roots (Oxidized Rhizos
Primary Indicators (minimum of one required; che Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) Sediment Deposits (B2) Drift Deposits (B3) Algal Mat or Crust (B4) Iron Deposits (B5) Inundation Visible on Aerial Imagery (B7) Water-Stained Leaves (B9) Field Observations: Surface Water Present? Yes Water Table Present? Yes Yes No Saturation Present? Yes No No	 Salt Crust (B11) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Dry-Season Water Table (C2) Oxidized Rhizospheres on Living Rood (where not tilled) Presence of Reduced Iron (C4) Thin Muck Surface (C7) Other (Explain in Remarks) 	Surface Soil Cracks (B6)Sparsely Vegetated Concave Surface (B8Drainage Patterns (B10)Oxidized Rhizospheres on Living Roots (Oxidized Rhizospheres (Oxidized Rhizospheres on Living Roots (Oxidized Rhizos

⁶ \$344	-16×
--------------------	------

Pond Field Data Form R/2/209A

Location/Project: Port & Cataosa Date: 12-12-11 Client: Durbery Kentry: Pond Name: <u>Sike Wook Watland Pond 3</u> Investigator: <u>Elise Hatz + Sason Tooky</u> County: <u>Rogers</u> UTM North (Lat): UTM West (Long): Compass Dir. to road: Approx. Distance to road: Approx. distance to project ROW:
Description (circle one): Permanent lake/pond Temporary lake/pond Marsh/Bog Swamp/forest Other
Origin: Natural Man-made Unknown Perimeter GPS points taken: yes no
Estimated pond depth: Approx. 2 Ft. Primary Substrate: Silt/Muck Sand/Gravel Cobble Bedrock Other
% of Pond Margin with Emergent Vegetation: 0 1-25 25-50 50-75 >75 Within Forest? Yes No Distance to Forest Edge: 30_Ft. Surrounding landscape/Vegetation:
Distance to Forest Edge: <u>D</u> Ft. Surrounding landscape/vegetation:
Dominant species observed: <u>Sedges</u> Querces Villes
Site Sketch/Notes
Very X X X X
Tree (1# VXV) X

Boundary

.

	-		

APPENDIX B

CULTURAL RESOURCES

Christopher A. Cojeen Principal Investigator Cojeen Archaeological Services, LLC

Archaeology Research History

Report on the Archeological Site Assessment of the Tulsa Port of Catoosa 130-Acre Portion of the Barge Fleeting Area Project Rogers County, Oklahoma

With Appendix B, Soil Morphology and Stratigraphy By Scott Fine

Land Administration: US Army Corps of Engineers, Tulsa District

Client: Dewberry Representative: Andrea Burk, (973) 739-9400 Location: Portions of Sections 8, 16 and 17 T20N, R15E (approximately 130 acres) USGS Catoosa, OKLA quadrangle, 7.5-minute series 1963 (photo revised 1980)

File Search: Amy Cojeen, November 24, 2011 Survey: Christopher Cojeen, Amy Cojeen, David Boling, Barker Fariss, Aaron Judkins and Daniel Farrow, November 30 and December 1, 2011 Report: Christopher Cojeen and Amy Cojeen, March 5, 2012 (Revised May 22, 2012)

P.O. Box 1186 | Norman, Oklahoma 73070 | (405) 360-9996 FAX: (405) 366-7020

Abstract:

On November 30 and December 1, 2011, Cojeen Archaeological Services, LLC (CAS) conducted an archeological assessment of approximately 130 acres (project area), on US Army Corps of Engineers (USACE) and Tulsa Port of Catoosa (TPC) lands located in portions of Sections 8, 16 and 17 T20N, R15E, Rogers County, Oklahoma. This study was performed at the request of Dewberry Engineers, Inc. (Dewberry). A land exchange between the USACE and TPC has been proposed as part of the Barge Fleeting Area Project. The areas of the proposed action were divided into six study areas for the purposes of this report.

The purpose of this survey is to identify the surface expression of any cultural resources present in the project area, and possible disturbances to such resources caused by the proposed Barge Fleeting Area project. Survey methodology included pedestrian meandering transects of no more than 50 feet (15m) spacing augmented by shovel tests in lower visibility settings in an attempt to locate cultural resources. A total of approximately 130 acres of land area was studied for this report.

CAS previously conducted a preliminary archeological site assessment of a 30-acre portion of the proposed Barge Fleeting Area Project located in the E/2 of the E/2 of the NE/4 of Section 17 T20N, R15E (Cojeen and Cojeen 2010). This 30-acre area is owned by the TPC and is part of the proposed land exchange areas. One archeological site, 34RO343, was recorded in the 30-acre study area. This site is the remains of a 20th century homestead consisting of five features and associated artifacts. The site was recorded as an inventory site, not eligible for inclusion on the National Register of Historic Places (NRHP).

According to files at the Oklahoma Archeological Survey (OAS) no previously recorded sites are located within the 130-acre project area. One new archeological site was located in the project area. Site 34RO347 is the remains of a concrete block outbuilding noted in Study Area 3. Based on the poor condition of the outbuilding and lack of integrity of the artifacts, this site does not appear to be eligible under Criterion C or D of the NRHP. An initial records check of the NE/NE of Section 17 T20N, R15E revealed no association with significant events or persons, therefore this site does not appear to be eligible under Criterion A or B of the NRHP. No further archeological concern for 34RO347 is recommended.

Scott Fine, Oklahoma State University PhD candidate under Brian Carter, examined two soil cores. Both showed weak soil structure, accumulating from an alluvial setting. Because of the weak soil structures and alluvial nature of deposition (thin deposits), confidence in plant remains for C-14 dating was low and was not utilized as a field method.

No significant cultural resources were observed in the project area during the course of these investigations. The proposed Barge Fleeting Area Project as currently planned will have no effect on significant cultural resources.

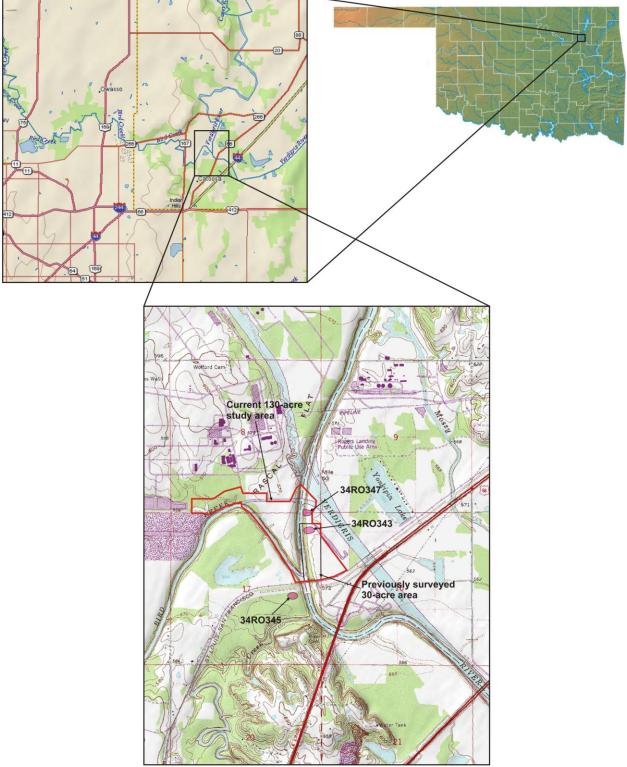
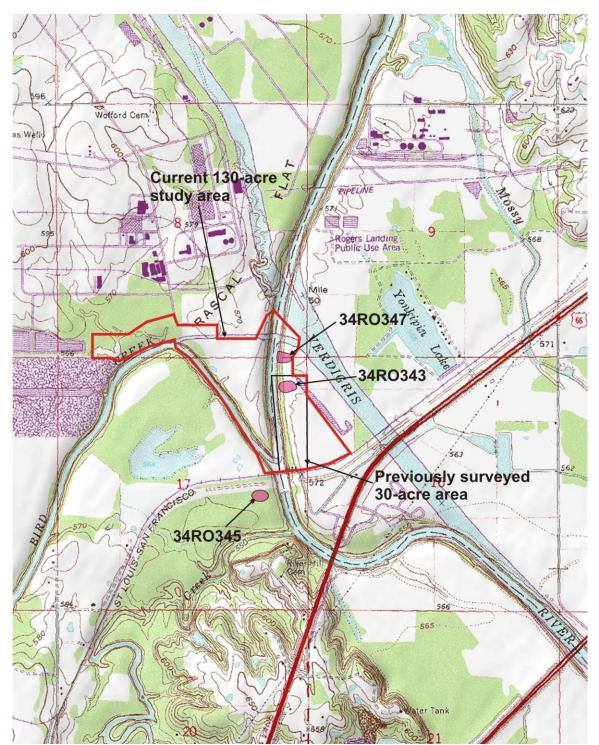


Figure 1. Project vicinity (study area outlined in red).



CAS Archeological Report, Tulsa Port of Catoosa Barge Fleeting Area Project, page 4

Figure 2. Topographic map of the proposed Barge Fleeting Area Project (outlined in red) and known archeological sites within the study areas and a ¼ of a mile from the project boundary. USGS Catoosa, OKLA quadrangle, 7.5-minute series 1963 (photo revised 1980).



Figure 3. Proposed Barge Fleeting Area Project (red diagonal lines), provided by client.

Description of Project:

The TPC proposes to build a new barge fleeting area within the former Verdigris River channel (Figure 3). As part of this project, a land sale by the USACE to the TPC has been proposed (Figure 4). The island and northern peninsula portions owned by the USACE will be sold to the TPC.

The Barge Fleeting Project Scope is as follows (as provided by the TPC):

The channel will be 300 feet in width measured at the bottom of the channel and will have 3:1 side slopes. The depth of the channel will be 14 feet. The channel will be approximately 2,200 feet long. The proposed dimensions of the fleeting area will allow berthing of 60 standard hopper barges.

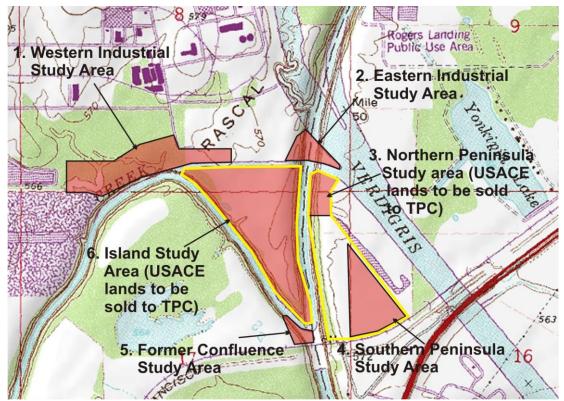


Figure 4. Topographic map showing the six archeological study areas and proposed land exchange areas (highlighted in yellow) of the Barge Fleeting Area Project.

Location and Setting:

The Tulsa Port of Catoosa, Barge Fleeting Area Project is located in southwest Rogers County, Oklahoma (Figure 1). The study area is located approximately 2 miles north of Catoosa, Oklahoma adjacent to State Highway 66 in the S/2 of the S/2 of Section 8, the W/2 of the NW/4 of Section 16 and the NE/4 of Section 17 T20N, R15E (Figure 2). The Barge Fleeting Area Project was divided into six study areas for the purposes of this report (Figure 4). A total of 130 acres of land area was surveyed for this report.

Study Area 1: Western Industrial Study Area (approximately 27 acres)

This study area is located adjacent to the north of the Bird Creek channel and the Bird Creek cutoff within the TPC industrial complex and encompasses approximately 27 acres. Aerial photographs from 1942 to 1964 show the majority of the area as heavily wooded with a portion of the northeast extent cleared of timber. Currently Study Area 1 is cleared of timber with the exception of areas immediately adjacent to the Bird Creek cut-off. The western and eastern extents are currently utilized as a dumping ground with debris piles of asphalt, concrete, dimensional lumber, metal and soils (Photo 1). At the time of survey medium to tall height grasses covered the central portion of this study area with some standing water on the surface. Wooded areas adjacent to Bird Creek were covered in short grasses and leaf litter showing 0-30% visibility. Soils in shovel tests revealed 0-40cmbs of brown silty loam over darker brown silty loam to 50cmbs. Drainages observed in this area contained debris related to the industrial complex including large concrete slab fragments, metal drainage pipe and rebar. Elevation in Study Area 1 ranges from 560-570 feet above mean sea level (AMSL).



Photo 1. Facing west to debris piles in the western extent of Study Area 1.

Study Area 2: Eastern Industrial Study Area (approximately 6 acres)

This study area is also located within the TPC industrial area on a point of land comprised of soils dredged from construction of the original TPC Terminal channel. The original Verdigris River channel once trended roughly north/south through this area. The river was diverted to the east and the channel was filled in with soils. The Bird Creek cut-off forms the southern boundary of this study area. Aerial photographs show the Verdigris River channel with wooded areas on either side of the channel. Currently the area is in medium to tall height grasses showing 0-20% visibility with hardwoods lining the waterway. Elevation in Study Area 2 ranges from 530-565 feet AMSL.



Photo 2. Facing northeast to Bird Creek cut-off and southern boundary of Study Area 2.

Study Area 3: Northern Peninsula Study Area (approximately 8 acres) This study area is located on the northern portion of a peninsula formed by the former Verdigris River channel to the west, the Bird Creek cut-off to the north, and the diverted Verdigris River channel to the east. Aerial photographs show that prior to construction of the TPC, Study Area 3 was mostly open pasture overlooking the original Verdigris River channel to the west. Areas adjacent the river were heavily wooded. Currently Study Area 3 consists of moderately wooded rocky terraces with leaf litter and sparse understory showing 0-30% visibility. Two-track roads and areas of erosion showed higher visibility (up to 60%). Gently sloping terraces adjacent to the former Bird Creek and Verdigris River channels have been reinforced with dredged soils. Flotsam and modern debris such as plastic and glass bottles and styrofoam were noted along the terraces. Shovel tests revealed mottled brown silty loam with red brown clay. Pea-size gravels were noted throughout the shovel tests. The majority of the study area consists of soils dredged from the TPC Terminal channel. Elevation in Study Area 3 ranges from 525-565 feet AMSL.



Photo 3. Facing south to two-track road along the western extent of Study Area 3.

Study Area 4: Southern Peninsula Study Area (approximately 18 acres) This study area is a triangular shaped portion bounded to the east by a large earthen levee formed from dredged soils, the Burlington Northern Santa Fe (BNSF) railroad grade to the south and the 30-acre area previously studied to the west. Aerial photographs show the study area as open pasture with scattered hardwoods. At the time of survey the area was in level, open hay pasture with medium to tall height grasses showing 0-20% visibility. The eastern boundary adjacent to the levee is moderately wooded. Shovel tests revealed compact brown silty loam 0-30cmbs, reddish brown silty loam 30-55cmbs over medium brown clay 55-70cmbs. Elevation in the Study Area 4 ranges from 565-570 feet AMSL.



Photo 4. Facing northeast to Study Area 4.

Study Area 5: Former Confluence Study Area (approximately 2 acres) This study area is located on the west bank of the former Bird Creek channel and its confluence with the former Verdigris River channel. The confluence is now filled in with dredged sediments creating an oxbow. The BNSF railroad grade represents the southern boundary of this study area. Currently the study area consists of wooded gently to moderately sloping terraces reinforced with dredge sediments showing 40% visibility overall. Flotsam and modern debris were noted along the terraces. No intact soils were noted in this study area. Shovel tests revealed mottled compact gray brown silty loam with gray clay to 50cmbs. Elevation in Study Area 5 ranges from 530-575 feet AMSL.



Photo 5. Study Area 5 facing northeast from BNSF railroad grade to the former confluence of the Verdigris River and Bird Creek channels.

Study Area 6: Island Study Area (approximately 54 acres)

This study area is a triangular-shaped island formed by the former Bird Creek channel to the west, the Bird Creek cut-off to the north and the former Verdigris River channel to the east. This island area is owned by the USACE and is part of the proposed land sale to the TPC (Figure 4). Prior to the closing of the confluence of the two water ways and construction of the Bird Creek cut-off, aerial photographs show the area as a peninsula that was both heavily wooded and open pasture. The former Verdigris River and Bird Creek channel areas were lined by heavily wooded areas with mostly post oak and blackjack oak with a moderate scrub understory. Surface visibility along the creek channels ranged from 0-30% with leaf litter and mixed grasses covering the surface. Areas offering higher visibility (up to 60%) including areas of erosion, game trails and the river bank were noted. Currently the area is heavily wooded with some open areas at the northern extent. Gently sloping terraces adjacent to the former Bird Creek and Verdigris River channels have been reinforced with dredged sediments. Flotsam and modern debris such as plastic and glass bottles and styrofoam were noted along the terraces. The majority of the northern extent of this study area is comprised of dredged soils. Shovel tests in the southern portions showed compact brown silty loam 0-30cmbs, gray brown silty loam 30-55cmbs. Sparse pea-size gravels were noted throughout the shovel tests. Elevation in Study Area 6 ranges from 525-540 feet AMSL.



Photo 6. Facing west to a terrace reinforced with dredge sediments adjacent the former Verdigris River along the eastern boundary of Study Area 6.

The project is located within Claremore Cuesta Plains Geomorphic province (within the Prairie Plains Physiographic Region [Bruner 1976]), an area generally described as "resistant Pennsylvanian sandstones and limestones dipping gently westward, forming cuestas between broad shale plains" (Curtis Jr., Ham and Johnson 2008). The study area is considered within the Tallgrass Prairie Vegetation type (Hoagland 2008), characterized by "prominent grass species buffalograss, gramas (blue, black, hairy, and sideoats), and silver bluestem".

At present, the project area has a temperate, subhumid climate, typical of the north-central part of Oklahoma. Seasonal changes vary in intensity, but the changes between seasons are gradual. Summer is usually the wettest season. Average annual precipitation varies from 36 cm to 40 cm.

Vegetation in the project area is associated with the Tallgrass Prairie Plains (Hoagland 2008). The Tallgrass Prairie Preserve managed by the Nature Conservancy has documented the native plant and animal communities in this region (Coppedge et. al 1999, Palmer et. al 2003, Palmer 2007). The dominant plants on the uplands are Indiangrass, big and little bluestem, sideoats grama, blue grama, and hairy grama. Recent invasive species such as the Eastern Red Cedar (*Juniperous virginiana*) are scattered over the prairie, creating a savanna-like vegetation community. Small groves of low broadleaf deciduous trees and shrubs occur along major drainages and valley bottoms as riparian woodlands and crosstimbers on some north-facing slopes. The dominant species in these groves are oaks (*Quecus stellata* and *Quercus marilandica*), hackberry (*Celtis occidentalis*), cottonwood, plum (*Prunus* sp.), and coralberry (*Symphoricarpos orbicultus*).

Research Biases:

The purpose of this investigation was to locate any cultural resources within the defined impact area of the project, and to provide sufficient detail for the protection and management of such resources. Interpretation of any cultural resources found followed standard methodology practices. By strict definition, cultural resources are any evidence of human use or occupation without any age limitations, but for this project, the term was restricted to cultural remains that were at least 45 years in age.

Land management and modification activities including land clearing for use as pasture, plowing, contour terracing, roads, fences, and overhead utility corridors have all impacted the study areas. All six study areas exhibited disturbances related to the construction of the TPC and the McClellan-Kerr Arkansas River Navigation System. Study Areas 1, 2 and 5 and the northern portion of Study Areas 3 and 6 are comprised of dredge sediments. Modern trash dumping activity and flotsam was observed in all six study areas particularly along the wooded terraces adjacent the former Verdigris River and Bird Creek channels. Numerous large debris piles of concrete, asphalt, rock, wood and metal were observed in the Study Area 1. Deer stands and debris related to hunting activity was also observed. These items and modifications were discounted as cultural resources for the purposes of this report.

Paleontological Resources:

No vertebrate paleontological resources or significant invertebrate resources were observed during the course of this archeological investigation.

Previous Archeological Studies In or Near the Project Area:

Richard Drass (1985) discussed the archeological resources within the Bird Creek Basin including the study areas. One of the conclusions drawn from his studies was the presence of extensive alluviation of river and stream valleys in the area. The deep alluvium may have buried many Archaic time period occupations. With this in mind, Drass concludes only extensive subsurface explorations into bottom lands will add to the knowledge of Archaic site distributions and densities in these settings of alluvial deposition. For example, both the Oolagah and Copan reservoirs have deeply buried Archaic camps exposed by creek bank erosion.

Plains Woodland period sites are more abundant in the north-central Oklahoma region, with representative artifacts including Scallorn and Reed points. The abundance of Woodland period sites may be a reflection of greater population density during this period; or, Drass notes (1985) that it again may be the alluvium covering Archaic (and former) sites that alter our perception of the settlement activity adjacent to these waterways.

One consideration of the Bird Creek study was to examine the impact of Tulsa metroplex development on Bird Creek archeological resources. Much of Bird Creek has not been affected by urban growth, as development has favored the tributaries and avoided the flood-prone bottom lands. Drass indicates (as of 1984) that modern quarry and transportation development have reached a limit, and expects few additional concerns for impact to Bird Creek sites, with the exception to developments of railroads and port facilities (Drass 1985).

Drass states that future work should concentrate on impacts to potential buried habitation materials; summarizing that unless deep excavations occur with construction, little impact will occur to archeological sites (Drass 1985).

As Drass' comments relate to the current project in consideration, this port project does offer an opportunity to examine potential effects on deeper buried deposits, if they indeed exist and if they can be identified. However, the (potential) sites need to be extensive enough (containing enough cultural materials) to be found by soil coring or other deeper sampling methods.

Another large format study touching on the boundaries of the TPC project area was the Tulsa North Triangle, an archeological study of northern Tulsa and western Rogers counties, Oklahoma (Dickerson et. al 1991). The TPC itself was excluded from the study area. As in Drass' Bird Creek study, the concern for potential sites buried in the deep alluvial settings adjacent waterways was also expressed (Dickerson et. al 1991:107).

Efforts at identifying buried soils on USACE projects in the general region have previously been conducted, with limited results. In particular, the Candy Creek study in Osage County, Oklahoma (Tucker et. al 2008) identified two named buried pedostratigraphic units, both within a time period known for human occupation of the general area (determined through C-14 samples within soil core samples). Still, the Candy Creek study identified alluvium to a depth of 25 to 40 feet and, according to C-14 dates, from the early to late Pleistocene through the late Holocene in chronological age, lending to the possibility for buried human activity areas. No identifiable artifacts were recovered in the limited number of cores placed over a relatively large area. The authors note a concern that the coring sample was too small to locate artifacts, and they describe an artifact search in this method as a 'needle in a haystack' search; also, ephemeral prehistoric land use within time periods represented by the buried soils may contribute to a lack of ability to identify cultural materials.

Although well summarized, written and researched by geomorphologist Brian Carter, there remains a lack of consensus regarding investigating deeply buried soils for archeological materials. The report acknowledges that cost factors would inhibit a greater sampling capacity by increased coring, and the sparse and ephemeral nature of early occupations do not lend well to this method of detection, even when buried soils are known to exist.

Geophysical methods to compliment coring are suggested, such as ground penetrating radar (Tucker 2008:55), however if sites are deeply buried and sparse in nature one would question if this method would successfully identify physical cultural remains.

In personal communication with Leland Bement, who also utilized coring under the direction of Brian Carter at the Cooper site (a buried Folsom bone bed), Leland Bement suggests once deeper soils are identified, removal of soils (such as with a backhoe) and spreading the matrix out in search of larger artifacts or concentrations of artifacts represents a realistic research method.

Thus, relating the above discussions to the TPC, soil cores were examined by a geomorphologist (Appendix B) to identify possible buried soil. If identified, the buried soils may be "spread out" during monitoring of the disturbance activities.

Soils Within the 130-Acre Project Area:

According to the United States Department of Agriculture, Natural Resources Conservation Service, soils in the project area are floodplain alluvial deposits associated with the Verdigris River and the Bird Creek basins (Figure 5). Four major soil units occur in the study areas including Barge silty clay loam (BarG), 0 to 30 percent slopes (Port industrial areas and northern portion of the island study area), Verdigris silt loam (Vd), 0 to 1 percent slopes, occasionally flooded (southern portion of the island study area), Verdigris silty clay loam (Vf), 0 to 2 percent slopes (former Bird Creek and Verdigris River channel) and Verdigris clay loam (Ve), 0 to 1 percent slopes, occasionally flooded (southern portion of peninsula study area). These soils are similar in composition, with slight variations in slope varying the properties and qualities. Barge silty clay loam represents silty dredge soil. These soils are described as linear, well-drained soils occupying floodplains and floodplain steps parented from silty alluvium (Natural Resources Conservation Service, 2009).

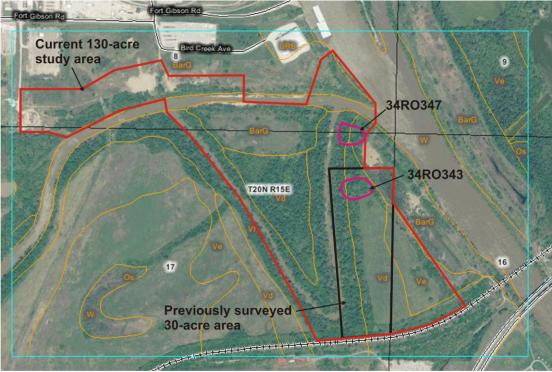


Figure 5. Mapped soil units of the proposed Barge Fleeting Area Project.

File Search:

CAS visited the OAS in Norman, Oklahoma, to examine maps and files pertaining to the study area in an effort to identify previously recorded cultural resources within the proposed project location. OAS files indicate that no previously recorded archeological site are located within the six study areas of this project. Two archeological sites are located within a ¹/₄ of the project area:

34RO343

C E/2 NE/NE Section 17 T20N, R15E

This site is the remains of a mid-20th century homestead recorded by CAS on November 8, 2010. Features observed at the site include a concrete block house foundation (Feature 1), a poured cement cellar (Feature 2), two 12-inch (30 cm) cement circular casings (Feature 3), a possible water well represented by a metal pipe set in concrete (Feature 4), and two rectangular poured concrete stem wall foundations (Feature 5). The five features and associated artifacts were observed on the surface in a moderately wooded setting over a 360-foot by 215-foot (110x65 m) area with leaf litter and sparse understory showing 40-50% visibility. The 1942, 1958 and 1964 aerial photographs show three discernible standing structures. The farmstead is extant on the 1972 aerial photograph.

Site 34RO343 was recorded as not eligible under Criterion C or D of the NRHP based on the lack of integrity of the artifacts and the poor condition of the features. The site was also recorded as not eligible under Criterion A or B based on an initial records check of the NE/NE of Section 17 T20N, R15E and no further concern for 34RO343 was recommended. This site is located adjacent to Study Area 3 in the previously surveyed 30-acre area. No additional features or artifacts of 34RO343 were located in the current 130-acre project area.

34RO345

SE/NW/SW of Section 17 T20N, R15E

This site is an unassigned prehistoric camp recorded by Algonquin Consultants, Inc. on March 1, 2011 during a cultural resource survey of the 9-acre Spunky Creek Dredging Project. The materials were observed in shovel tests south of a railroad grade in an open field used to store heavy equipment. Artifacts collected from the site include small pieces of fired clay, four bifaces, three unifaces, two pieces of fire-cracked rock and six hundred and ninety one pieces of debitage. The recorder notes possibility for intact site stratigraphy is high. NRHP status of this site was not assessed. This site is located 350 feet south of Study Area 5. No artifacts were observed in Study Area 5 on the surface or in shovel tests.

On December 2, 2010 an initial records search was performed at the Rogers County Courthouse in Claremore, Oklahoma. The earliest entries in the index book for T20N, R15E revealed NE/NE of Section 17:

- Bearl Deweese et ux granted an Amortization Mortgage to the Land Bank Commissioners on October 1, 1936

-L. O. Gravitt and Newton M. Foster granted an Affidavit to the Public on October 13, 1939. -State of Oklahoma Corporation Commission granted a Certificate of non-Deed to the Public (Conservancy District #30) on March 29, 1962

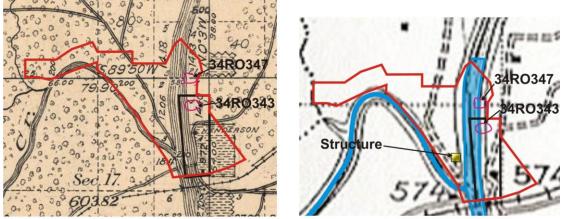
-Public Service Company of Oklahoma granted a Quit Claim Deed to the United States of America on September 24, 1969.

According to the most recent listings, no properties listed on the NRHP are within the specific project area. No properties considered eligible for the NRHP but not yet nominated (Oklahoma SHPO Determinations of Eligibility listings, October 2011) are noted in the specific study areas.

Early and mid-20th century maps as well as mid to late-20th century and current aerial photographs were examined for structures, trails and roads in the study areas. General Land Office (GLO) plat maps of the study areas (Bureau of Land Management 2008) were examined including the Original Survey dated April 9, 1898 (survey completed July 3, 1896). The map shows the study areas as both plowed field and wooded with roads trending through Study Areas 1, 4, 5 and 6. No structures area plotted within the study areas (Figure 6a).

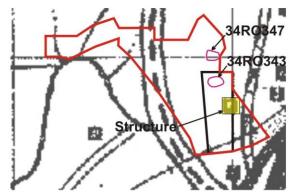
The USGS Claremore, OKLA quadrangle, 30-minute series, 1916 map (surveyed 1913-1914) was also examined (Figure 6b). This map shows one structure adjacent to a road trending through Study Area 6. No remains of this structure were noted on the surface or in shovel tests.

The 1936 Oklahoma State Highway Department's General Highway and Transportation Map of Rogers County was also examined (Figure 6c). One structure, indicated with a 'dwelling- other than farm' symbol, is plotted between the previously studied 30-acre area and the current 130-acre study area. No remains of this structure were noted on the surface or in shovel tests.



a. 1898 GLO Original Survey plat map.

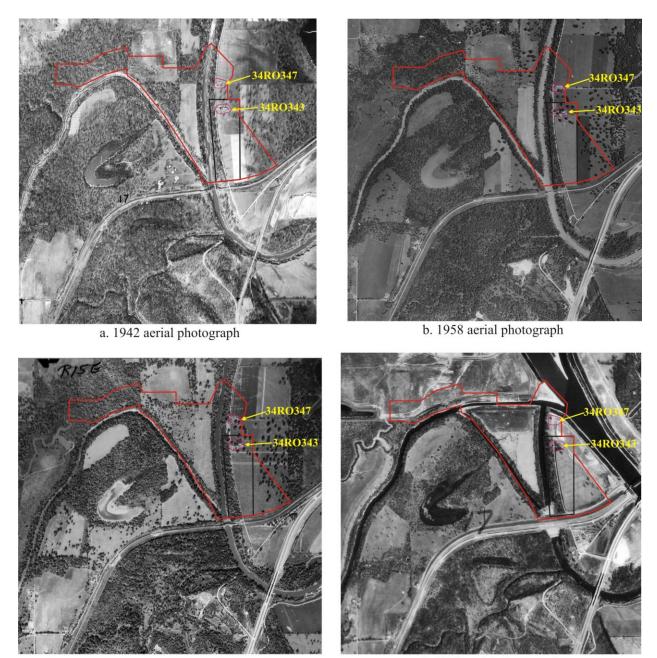
b. 1916 USGS Claremore, OKLA quadrangle, 30-minute series.



c. 1936 Rogers County General Highway and Transportation Map.

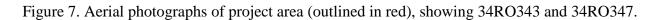
Figure 6. Early and mid-20th century maps of the proposed Barge Fleeting Area Project (red outline).

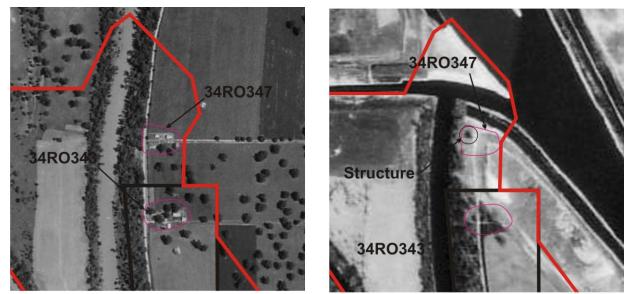
Aerial photographs at the Oklahoma Geological Survey (Norman, Oklahoma) were also examined. The 1942, 1958, 1964 and 1972 aerial images show the study areas as both open pasture and wooded areas particularly adjacent the waterways (Figure 7a-d). Two structures are visible on the 1942 aerial in the area of 34RO347. An additional third structure is shown on the 1958 and 1964 aerial photographs. The 1972 aerial photograph shows the study areas post construction of the TPC navigation system. This aerial also shows the area of site 34RO347 as cleared of vegetation with a two-track road trending from what appears to be a structure (Figure 8). The resolution of the photograph does not give sufficient detail to determine if the structure is still intact.



c. 1964 aerial photograph

d. 1972 aerial photograph





a. 1958 aerial photograph

b. 1972 aerial photograph

Figure 8. Aerial photographs showing site areas 34RO343 and 34RO347.

Archeological Investigations:

On November 30 and December 1, 2011, CAS conducted an archeological site assessment of an approximate 130-acre area, on TPC and USACE lands located in portions of Sections 8, 16 and 17 T20N, R15E, Rogers County, Oklahoma.

Pedestrian transects of no more than 50 feet (15m) spacing augmented by hand dug shovel tests in low visibility settings were utilized as field methodology. Matrix was screened through ¹/₄-inch screen mesh, excavated to between 30 and 70 cm. No deep testing methods were utilized during this preliminary reconnaissance (see shovel test log, Appendix A). All UTM coordinates were recorded in datum NAD27 CONUS, Zone 14S using WAAS-enabled, Delorme PN-60 handheld GPS devices, offering optimal accuracy of < 3m.

One new archeological site was recorded during the course of these investigations.

34RO347

SE/SE/SE of Section 8 and the NE/NE/NE Section 17 T20N, R15E Site area: 360 feet by 215 feet (90x70 m) UTM E0254760 N4011644

This site is the remains of a 10-foot by 7-foot by 5-foot concrete block outbuilding of unknown function. The roof and upper portions of the walls are missing leaving a rectangular stem wall approximately 5 feet tall (Photo 7). Two railroad ties intersect the center of the outbuilding and protrude from the east side. Approximately 10 feet west of the feature is a 6-inch metal pipe with a hook on top that appears to have held a pulley. Bull dozer push piles of cleared timber and

dirt are evident surrounding the structure and adjacent to the two-track road trending generally north-south through the site area. Sheet metal, steel cable and concrete fragments were noted in push piles north, south and west of the outbuilding. Modern debris including glass and aluminum food containers, aluminum beer and soda cans and plastic bottles were also observed on the surface and in the push piles surrounding the structure.

Aerial photographs from 1942, 1958 and 1964 show two to three structures in the approximate location of site 34RO347. The 1972 aerial photograph shows the terrace where the site area was once located transformed to a peninsula with the construction of the Bird Creek cut-off, cleared of all vegetation with dredge soil dumped on the surface. A single structure, what appears to be the concrete block outbuilding, is visible in the site area on the 1972 aerial photograph. However the resolution of the photograph is not sufficient to determine if the structure is intact.

This mid to late 20th century outbuilding has been heavily impacted by the construction of the McClellan-Kerr Arkansas River Navigation System. This site would not appear eligible for inclusion on the NRHP under Criterion C or D based on the poor condition of the feature and lack of integrity of the sparse artifacts. This site also appears not eligible under Criterion A or B based on an initial records check of the NE/NE of Section 17 T20N, R15E and no further archeological concern for 34RO347 is recommended.



Photo 7. Facing southeast to northwest corner of outbuilding remains at 34RO347.



Photo 8. Facing east to outbuilding remains at 34RO347.



Photo 9. Facing southeast to interior of outbuilding remains at 34RO347.

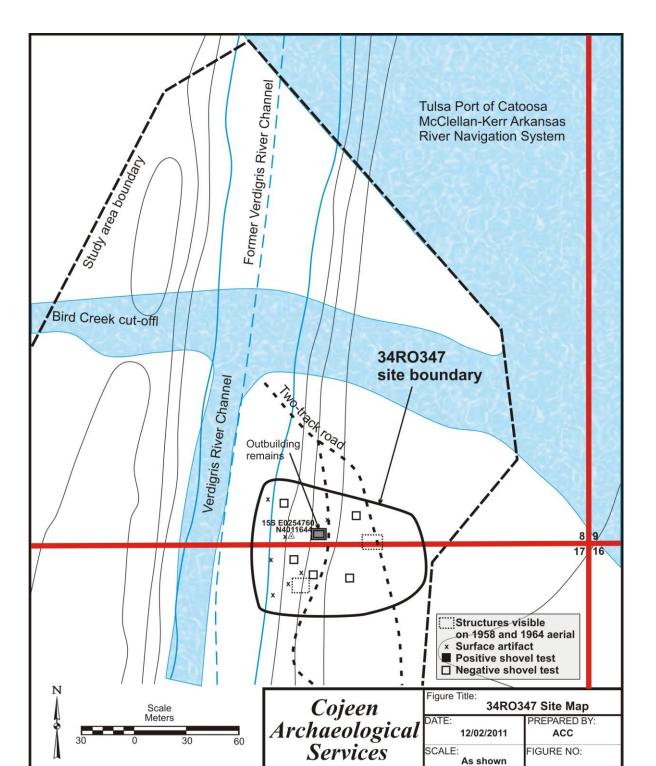


Figure 9. Site map of 34RO347.

Catoosa Soil Core Review/Summary:

Investigations of two soil cores placed in relatively intact portions of the survey area yielded soils consistent with alluvial floodplain sedimentation. Core B-5 yielded shallow sediments with weak soil structure that accumulated in an alluvial setting, underlain by gleyed soils indicating poorly drained soils with a high water table and swamp-like conditions. Core B-6 showed alluvial soils with planar bedding and fine sediments with occasional flooding events depositing coarse sand. This is underlain by sequences of limited soil development punctuated by alluvial flooding events typical of a backwater floodplain setting. Interspersed in the cores were well-preserved plant remains indicating periods of seasonal stability or flood deposits. No artifacts or evidence of human occupation was observed in the cores.

Scott Fine, Oklahoma State University PhD candidate under Brian Carter, examined two soil cores. Both showed weak soil structure, accumulating from an alluvial setting. Because of the weak soil structures and alluvial nature of deposition (thin deposits) confidence in plant remains for C-14 dating was low and was not utilized as a field method.

Recommendations:

One new archeological site was recorded during the course of these investigations. Site 34RO347 is considered not eligible for inclusion on the NRHP under Criterion C and D based on the poor condition of the feature and lack of integrity of the sparse artifacts. This site also does not appear to be eligible under Criterion A or B based on an initial records check of the NE/NE of Section 17 T20N, R15E and no further archeological concern for 34RO343 was recommended.

No significant cultural resources were observed in the six study areas during the course of these investigations. The TPC proposed Barge Fleeting Area Project as currently planned will have no effect on significant cultural resources.

the ly ear

Christopher Cojeen Principal Investigator

copies:

Environmental Analysis and Compliance Branch U.S. Army Corps of Engineers, Tulsa District 1645 South 101st East Avenue Tulsa, Oklahoma 74128 attention: Michelle C. Horn

References:

Bement, Leland C.

1999 Bison Hunting at Cooper Site: Where Lightning Bolts Drew Thundering Herds. University of Oklahoma Press; Norman.

Bruner, W.E.

1976 *Physiographic Regions of Oklahoma*. Map reproduced by the Oklahoma Highway Department, Planning Division; Oklahoma City.

Bureau of Land Management

2008 http://www.glorecords.blm.gov/SurveySearch/Default.asp

Cojeen, Christopher and Amy Cojeen

2010 Report on the Preliminary Archeological Site Assessment of the Tulsa Port of Catoosa, East Bank Portion of the Barge Fleeting Area Project, Rogers County, Oklahoma. Contract survey report on file at the US Army Corps of Engineers, Tulsa District, Tulsa, Oklahoma.

Coppedge, Bryan R., Samuel D. Fuhlendorf, David M. Engle, Brian J. Carter, and James H. Shaw

1999 Grassland Soil Depressions: Relict Bison Wallows or Inherent Landscape Heterogeneity? American Midland Naturalist. Vol. 142, pp. 382-392

Curtis, Neville M. Jr., William E. Ham and Kenneth S. Johnson

2008 Geomorphic Provinces of Oklahoma. In Earth Sciences and Mineral Resources of Oklahoma. Oklahoma Geological Survey Educational Publication No. 9. Oklahoma Geological Survey; Norman.

Dickerson, Kent E., Kenneth L. Shingleton, Jr., Kerstin Miller and Donald O. Henry
 1991 Tulsa/North Triangle: An Archeological Survey of Northern Tulsa and
 Western Rogers Counties, Oklahoma. Contributions in Archeology No.
 18, Department of Anthropology; University of Tulsa; Tulsa.

Drass, Richard R.

1985 Archeological Resources in the Bird Creek Basin Rogers, Tulsa and Osage Counties, Oklahoma. Archeological Resource Survey Report Number 21; Oklahoma Archeological Survey; Norman.

Hoagland, Bruce W.

2008 Vegetation of Oklahoma. In Earth Sciences and Mineral Resources of Oklahoma. Oklahoma Geological Survey Educational Publication No. 9. Oklahoma Geological Survey; Norman.

Natural Resources Conservation Service

2009 http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Oklahoma State Historic Preservation Office

2011 Determination of Eligibility in Oklahoma, SHPO bulletin October.

Palmer, Michael W.

- 2007 The Vascular Flora of the Tallgrass Prairie Preserve, Osage County, Oklahoma. *Castanea*. Vol. 72. no. 4, pp. 235-246.
- Palmer, Michael W., José Remón Arévalo, María del Carmen Cobo, and Peter G. Earls
 2003 Species Richness and Soil Reaction in a Northeastern Oklahoma Landscape.
 Folia Geobotanica. Vol. 38, pp. 381-389.

Tucker, Gordon C. Jr., Brian J. Carter and Robert J. Mutaw

2008 *Geomorphological and Archeological Investigations of Specific Areas of Candy Lake, Osage County, Oklahoma.* Contract survey report on file at the US Army Corps of Engineers, Tulsa District, Tulsa, Oklahoma.

Appendix A:

Shovel Test Log of the Proposed Barge Fleeting Area in Catoosa, OK

Shovel Test #	Easting	Northing	Setting/Soil Description
St1	0254673	4011709	Upper terrace overlooking former Verdigris River channel, gently sloping, wooded, 20% visibility/ Medium brown clay to 50cmbs. Negative
50	0254075	4011707	Upper terrace overlooking former Verdigris River channel, level,
St2	0254649	4011690	wooded, 20% visibility/ Medium brown clay to 50cmbs. Negative
			Upper terrace overlooking former Verdigris River channel, level, wooded, 20% visibility/ Medium brown clay to 50cmbs.
St3	0254655	4011642	Negative
St4	0254618	4011631	Northern portion of island, level, open pasture, 40% visibility/ Medium brown clay to 50cmbs. Negative
St5	0254570	4011611	Northern portion of island, level, open pasture, 75% visibility/ Brown clay with pea-size river gravels to 50cmbs. Negative
St6	0254583	4011725	Northern portion of island, level, open pasture, 75% visibility/ Brown clay with pea-size river gravels to 50cmbs. Negative
St7	0254562	4011677	Northern portion of island, level, open pasture, 75% visibility/ Brown clay with pea-size river gravels to 50cmbs. Negative
St8	0254558	4011540	Center of northern portion of island, level, wooded, 40% visibility/ Brown clay with pea-size river gravels to 50cmbs. Negative
510	0234330	+0115+0	Upper terrace overlooking former Verdigris River channel, level, wooded, 20% visibility/ Medium brown clay to 50cmbs.
St9	0254657	4011500	Negative
			Center of northern portion of island, level, wooded, 40% visibility/ Brown clay with pea-size river gravels to 50cmbs.
St10	0254642	4011591	Negative
			Upper terrace overlooking former Verdigris River channel, level, wooded, 20% visibility/ Medium brown clay to 50cmbs.
St11	0254630	4011453	Negative
6410	0254545	4011216	Upper terrace overlooking former Bird Creek channel, level, wooded, 50% visibility/ Medium brown clay to 50cmbs.
St12	0254545	4011316	Negative Lower terrace overlooking former Bird Creek channel, gently sloping, wooded, 50% visibility/ Medium brown clay to 50cmbs.
St13	0254540	4011239	Negative
			Upper terrace overlooking former Bird Creek channel, level, wooded, 50% visibility/ Medium brown clay to 50cmbs.
St14	0254486	4011393	Negative
St15	0254550	4011448	Center of island, level, wooded, 50% visibility/ Medium brown sandy clay to 50cmbs. Negative

[
			Center of northern portion of island, level, wooded, 30%
~			visibility/ Mottled red-brown clay over dense gravel lens at
St16	0254578	4011515	15cmbs. Negative
~			Northern portion of island, level, open pasture, 75% visibility/
St17	0254485	4011700	Brown clay with pea-size river gravels to 50cmbs. Negative
			Upper terrace overlooking former Verdigris River channel, level,
			wooded, 20% visibility/ Medium brown clay to 50cmbs.
St18	0254658	4011303	Negative
			Upper terrace overlooking former Verdigris River channel, level,
~			wooded, 20% visibility/ Medium brown clay to 50cmbs.
St19	0254643	4011400	Negative
			Southern portion of island, level, wooded, 50% visibility/
St20	0254651	4011212	Medium brown sandy clay to 50cmbs. Negative
			Northern portion of island, level, open pasture, 75% visibility/
St21	0254522	4011726	Brown clay with pea-size river gravels to 50cmbs. Negative
			Northern portion of island, level, open pasture, 75% visibility/
St22	0254523	4011650	Brown clay with pea-size river gravels to 50cmbs. Negative
			Center of island, level, wooded, 50% visibility/ Medium brown
St23	0254602	4011473	sandy clay to 50cmbs. Negative
			Center of island, level, wooded, 50% visibility/ Medium brown
St24	0254474	4011477	sandy clay to 50cmbs. Negative
			Upper terrace overlooking former Bird Creek channel, level,
			wooded, 50% visibility/ Medium brown clay to 50cmbs.
St25	0254466	4011446	Negative
			Upper terrace overlooking former Bird Creek channel, level,
			wooded, 50% visibility/ Medium brown clay to 50cmbs.
St26	0254607	4011179	Negative
			Center of island, level, wooded, 50% visibility/ Medium brown
St27	0254545	4011369	sandy clay to 50cmbs. Negative
			Center of northern portion of island, level, wooded, 30%
			visibility/ Mottled red-brown clay over dense gravel lens at
St28	0254502	4011527	15cmbs. Negative
			Center of northern portion of island, level, wooded, 30%
			visibility/ Mottled red-brown clay over dense gravel lens at
St29	0254437	4011575	15cmbs. Negative
			Northern portion of island, level, open pasture, 75% visibility/
St30	0254344	4011738	Brown clay with pea-size river gravels to 50cmbs. Negative
			Northern portion of island, level, open pasture, 75% visibility/
St31	0254497	4011762	Brown clay with pea-size river gravels to 50cmbs. Negative
			Center of island, level, wooded, 50% visibility/ Medium brown
St32	0254588	4011376	sandy clay to 50cmbs. Negative
			Center of island, level, wooded, 50% visibility/ Medium brown
St33	0254605	4011316	sandy clay to 50cmbs. Negative

			Upper terrace overlooking former Bird Creek channel, level,
			wooded, 50% visibility/ Medium brown clay to 50cmbs.
St34	0254576	4011260	Negative
			Center of northern portion of island, level, wooded, 30%
			visibility/ Mottled red-brown clay over dense gravel lens at
St35	0254409	4011537	15cmbs. Negative
			Center of northern portion of island, level, wooded, 30%
			visibility/ Mottled red-brown clay over dense gravel lens at
St36	0254465	4011547	15cmbs. Negative
			Center of northern portion of island, level, open pasture, 40%
			visibility/ Mottled red-brown clay over dense gravel lens at
St37	0254388	4011607	15cmbs. Negative
			Upper terrace overlooking former Bird Creek channel, level,
			wooded, 50% visibility/ Medium brown clay to 50cmbs.
St38	0254308	4011619	Negative
			Upper terrace overlooking former Bird Creek channel, level,
0.00	0054000	4011650	wooded, 50% visibility/ Medium brown clay to 50cmbs.
St39	0254283	4011652	Negative
			Upper terrace overlooking former Bird Creek channel, level,
S+40	0254248	4011706	wooded, 50% visibility/ Medium brown clay to 50cmbs.
St40	0254248	4011706	Negative Upper terrace overlooking former Bird Creek channel, gently
			sloping, wooded, 50% visibility/ Medium brown clay to 50cmbs.
St41	0254211	4011734	Negative
5(+1	0234211	-01175-	Upper terrace overlooking former Bird Creek channel, level,
			wooded, 50% visibility/ Medium brown clay to 50cmbs.
St42	0254402	4011504	Negative
			Center of island, level, wooded, 50% visibility/ Medium brown
St43	0254499	4011433	sandy clay to 50cmbs. Negative
			Southern portion of island, level, wooded, 20% visibility/ Brown
St44	0254643	4011362	clay becoming more sandy with depth to 60cmbs.
			Center of island, level, wooded, 50% visibility/ Medium brown
St45	0254623	4011288	sandy clay to 50cmbs. Negative
			Southern portion of island, level, wooded, 50% visibility/
St46	0254640	4011182	Medium brown sandy clay to 50cmbs. Negative
			Southern portion of island, level, wooded, 50% visibility/
St47	0254645	4011155	Medium brown sandy clay to 50cmbs. Negative
			Upper terrace overlooking former Verdigris River channel, level,
G . 40		4011117	wooded, 20% visibility/ Medium brown clay to 50cmbs.
St48	0254695	4011115	Negative
0.40	0054505	4011076	Upper terrace overlooking, level, wooded, 50% visibility/
St49	0254705	4011076	Medium brown clay to 50cmbs. Negative

St50	0254652	4011109	Upper terrace overlooking former Bird Creek channel, level, wooded, 50% visibility/ Medium brown clay to 50cmbs. Negative
			0
G(51	0254702	4011701	Lower terrace, moderately sloping, wooded, 10%
St51	0254792	4011721	visibility/Compact dark gray clay to 50cmbs. Negative
~ ~~			Lower terrace, moderately sloping, wooded, 10%
St52	0254765	4011673	visibility/Compact dark gray clay to 50cmbs. Negative
			Upper terrace, gently sloping, adjacent levee in moderately
			wooded area, 30% visibility/ Brown silty clay loam 0-10cmbs,
			mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs.
St53	0254803	4011665	River gravels increasing with depth. Negative
			Upper terrace, gently sloping, adjacent levee in moderately
			wooded area, 30% visibility/ Brown silty clay loam 0-10cmbs,
			mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs.
St54	0254797	4011623	River gravels increasing with depth. Negative
			Lower terrace, moderately sloping, wooded, 10%
St55	0254770	4011637	visibility/Compact dark gray clay to 50cmbs. Negative
			Lower terrace, moderately sloping, wooded, 10%
St56	0254778	4011624	visibility/Compact dark gray clay ending at 30cmbs. Negative
			Upper terrace, gently sloping, adjacent levee in moderately
			wooded area, 30% visibility/ Brown silty clay loam 0-10cmbs,
			mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs.
St57	0254797	4011601	River gravels increasing with depth. Negative
5137	0231177	1011001	Lower terrace, moderately sloping, wooded, 10%
St58	0254776	4011596	visibility/Compact dark gray clay to 50cmbs. Negative
51.50	0234770	4011370	Upper terrace, gently sloping, adjacent levee in moderately
			wooded area, 30% visibility/ Brown silty clay loam 0-10cmbs,
			mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs.
St59	0254790	4011594	River gravels increasing with depth. Negative
51.59	0234790	4011394	Upper terrace, gently sloping, adjacent levee in moderately
			wooded area, 30% visibility/ Brown silty clay loam 0-10cmbs,
			mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs.
8460	025 4705	4011571	
St60	0254795	4011571	River gravels increasing with depth. Negative
0.01	005 1755	4011550	Lower terrace, moderately sloping, wooded, 10%
St61	0254775	4011568	visibility/Compact dark gray clay to 50cmbs. Negative
			Upper terrace, gently sloping, adjacent levee in moderately
			wooded area, 30% visibility/ Brown silty clay loam 0-10cmbs,
			mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs.
St62	0254807	4011708	River gravels increasing with depth. Negative
			Upper terrace, gently sloping, adjacent levee in moderately
			wooded area, 30% visibility/ Brown silty clay loam 0-10cmbs,
			mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs.
St63	0254840	4011676	River gravels increasing with depth. Negative

			Lavel open hey field 0 visibility/ Compact brown silty loom 0
			Level, open hay field, 0 visibility/ Compact brown silty loam 0- 20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St64	0254945	4011319	clay to 50cmbs. Negative
5104	0234943	4011319	Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St65	0254951	4011312	clay to 50cmbs. Negative
5105	0234931	4011312	Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St66	0254969	4011297	clay to 50cmbs. Negative
5100	0234909	4011297	Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St67	0254950	4011279	clay to 50cmbs. Negative
5107	0234930	4011277	Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St68	0254973	4011288	clay to 50cmbs. Negative
5100	0201775	1011200	Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St69	0254950	4011262	clay to 50cmbs. Negative
	0201900	.011202	Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St70	0254964	4011241	clay to 50cmbs. Negative
			Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St71	0254984	4011269	clay to 50cmbs. Negative
			Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St72	0254998	4011240	clay to 50cmbs. Negative
			Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St73	0254960	4011230	clay to 50cmbs. Negative
			Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St74	0255014	4011198	clay to 50cmbs. Negative
			Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St75	0254969	4011184	clay to 50cmbs. Negative
			Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St76	0254959	4011157	clay to 50cmbs. Negative
			Level, open hay field, 0 visibility/ Compact brown silty loam 0-
a - -	0.0.5	101110	20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St77	0254958	4011136	clay to 50cmbs. Negative

0.70	0254050	4011100	
St78	0254950	4011123	Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
			clay to 50cmbs. Negative
			Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St79	0254963	4011085	clay to 50cmbs. Negative
			Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St80	0254963	4011039	clay to 50cmbs. Negative
			Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St81	0255002	4011021	clay to 50cmbs. Negative
			Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St82	0255008	4011062	clay to 50cmbs. Negative
			Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St83	0254986	4011105	clay to 50cmbs. Negative
			Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St84	0255045	4011124	clay to 50cmbs. Negative
			Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St85	0255046	4011111	clay to 50cmbs. Negative
			Level, open hay field, 0 visibility/ Compact brown silty loam 0-
			20cmbs, reddish brown silty loam 20-25cmbs, medium brown
St86	0255047	4011073	clay to 50cmbs. Negative
			Industrial area overlooking the Bird Creek cut-off, level, open
			pasture, 75% visibility/ Gray brown clay with pea-size river
St87	0254313	4011850	gravels to 50cmbs. Negative
			Industrial area overlooking the Bird Creek cut-off, level, open
			pasture, 75% visibility/ Gray brown clay with pea-size river
St88	0254372	4011863	gravels to 50cmbs. Negative
'			Industrial area overlooking the Bird Creek cut-off, level, open
			pasture, 60% visibility/ Gray brown clay with pea-size river
St89	0254673	4011848	gravels to 50cmbs. Negative
/			Industrial area point overlooking the Bird Creek cut-off and main
			channel, level, open pasture, 60% visibility/ Gray brown clay with
St90	0254724	4011854	pea-size river gravels to 50cmbs. Negative
			Industrial area point overlooking the Bird Creek cut-off and main
			channel, level, open pasture, 60% visibility/ Gray brown clay with
St91	0254773	4011830	pea-size river gravels to 50cmbs. Negative
	0201113	1011050	Francis Control Control Control
1	1	1	

Si92 0254696 4011905 Industrial area point overlooking the Bird Creek cut-off and main channel, level, open pasture, 60% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. Negative Si93 0253977 4011771 gravels to 50cmbs. Negative Si93 0253977 4011771 gravels to 50cmbs. Negative Si94 0253954 4011701 gravels to 50cmbs. Negative Si94 0253954 4011723 gravels to 50cmbs. Negative Si94 0253851 4011723 gravels to 50cmbs. Negative Si95 0253851 4011723 gravels to 50cmbs. Negative Si96 0253854 4011708 gravels to 50cmbs. Negative Si97 0253854 4011708 gravels to 50cmbs. Negative Si96 0253805 4011708 gravels to 50cmbs. Negative Si96 0253805 4011708 gravels to 50cmbs. Negative Si97 0253794 4011701 10cmbs. Negative Si98 0254689 4011791 10cmbs. Negative Si99 0254689 4010978 50cmbs. Negative Si99 0254689 4010978 50cmbs. Negative Lower terr		1		
Image: constraint of the second sec	St92	0254696	4011905	Industrial area point overlooking the Bird Creek cut-off and main
St9302539774011771Industrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt9402539544011761Industrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size riverSt9402539544011761gravels to 50cmbs. NegativeSt9402539544011761gravels to 50cmbs. NegativeIndustrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt9502538054011723gravels to 50cmbs. NegativeSt9602538054011708gravels to 50cmbs. NegativeSt9702537944011701Industrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt9702538054011708gravels to 50cmbs. NegativeUpper terrace overlooking former confluence, moderately sloping, wooded, 50% visibility/ Brown clay with pea-size river gravels toSt990254689401097850cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels toSt1000254701401091850cmbs. NegativeUpper terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels toSt10002547014010918sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeUpper terrace overlooking former co				
St9302539774011771wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt9402539544011761gravels to 50cmbs. NegativeSt9402539544011761gravels to 50cmbs. NegativeIndustrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt9502538514011723gravels to 50cmbs. NegativeIndustrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt9502538054011708gravels to 50cmbs. NegativeIndustrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt9602538054011708gravels to 50cmbs. NegativeSt970253794401179110cmbs. NegativeUpper terrace overlooking former confluence, moderately sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt990254685401097850cmbs. NegativeSt1000254719401091750cmbs. NegativeSt10102547014010918sloping, wooded, 50% visibility/ Brown clay the pe-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river				pea-size river gravels to 50cmbs. Negative
St9302539774011771gravels to 50cmbs. NegativeSt9402539544011761gravels to 50cmbs. NegativeSt9402539544011761gravels to 50cmbs. NegativeSt9502538514011723gravels to 50cmbs. NegativeSt9602538514011723gravels to 50cmbs. NegativeSt9702538054011708gravels to 50cmbs. NegativeSt9602538054011708gravels to 50cmbs. NegativeSt9702537944011791Industrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt9702537944011791Industrial area, level, open pasture, 50% visibility, standing water on surface/ Gray brown clay with pea-size river gravels toSt9802546894010935sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt990254685401097850cmbs. NegativeSt1000254719401093750cmbs. NegativeSt10002547014010918sloping, wooded, 50% visibility/ Brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray				6
St94Industrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt9402539544011761gravels to 50cmbs. NegativeSt9502538514011723gravels to 50cmbs. NegativeSt9502538514011723gravels to 50cmbs. NegativeSt9602538054011708Industrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt9602538054011708Industrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt9702537944011791Industrial area, level, open pasture, 50% visibility, standing water on surface/ Gray brown clay with pea-size river gravels to 10cmbs. NegativeSt9802546894010935sloping, wooded, 50% visibility/ Brown clay to 50cmbs. Negative Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt1000254719401097850cmbs. NegativeSt1000254701401093750cmbs. NegativeSt10102547014010918sloping, wooded, 50% visibility/ Brown clay to 50cmbs. Negative Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray				wooded, 50% visibility/ Gray brown clay with pea-size river
St9402539544011761wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt9502538514011723gravels to 50cmbs. NegativeSt9502538514011723gravels to 50cmbs. NegativeSt9602538054011703gravels to 50cmbs. NegativeSt9602538054011708gravels to 50cmbs. NegativeSt9702537944011791Industrial area, level, open pasture, 50% visibility, standing water on surface/ Gray brown clay with pea-size river gravels toSt9802546894010935sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt9902546854010978Cocmbs. NegativeSt990254685401097850cmbs. NegativeSt1000254719401097850cmbs. NegativeSt1000254701401093750cmbs. NegativeSt10102547014010918sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt1000254701401093750cmbs. NegativeSt1010254701401093750cmbs. NegativeSt10102547014010938Sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt10002547014010938Sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt1000254701401093750cmbs. NegativeSt1000254701401093750cmbs. NegativeSt1000254701401093750cmbs. NegativeSt10002547014010938Sloping, wooded, 50% visibility/ Brown clay to 50cm	St93	0253977	4011771	gravels to 50cmbs. Negative
St9402539544011761gravels to 50cmbs. NegativeSt9502538514011723Industrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size riverSt9502538514011723gravels to 50cmbs. NegativeIndustrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size riverSt9602538054011708gravels to 50cmbs. NegativeIndustrial area, level, open pasture, 50% visibility, standing water on surface/ Gray brown clay with pea-size river gravels toSt970253794401179110cmbs. NegativeUpper terrace overlooking former confluence, moderately sloping, wooded, 50% visibility/ Gray brown clay with pea-size river gravels toSt9802546894010935sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels toSt10002547194010978St10102547014010918St10102547014010918St01002547014010918St01002547014010918St02547014010918sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels toSt10002547014010918St02547014010918St02547014010918St02547014010918St02547014010918St025				Industrial area overlooking the former Bird Creek channel, level,
St9502538514011723Industrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt9502538514011723Industrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt9602538054011708gravels to 50cmbs. NegativeSt9702537944011791Industrial area, level, open pasture, 50% visibility, standing water on surface/ Gray brown clay with pea-size river gravels toSt970253794401179110cmbs. NegativeUpper terrace overlooking former confluence, moderately sloping, wooded, 50% visibility/ Brown clay to 50cmbs. Negative Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels toSt990254685401097850cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to St1000254719401093750cmbs. Negative Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to St1000254701401093750cmbs. Negative Lower terrace overlooking former confluence, moderately sloping, wooded, 50% visibility/ Brown clay to 50cmbs. Negative Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to St10102547014010918sloping, wooded, 50% visibility/ Brown clay to 50cmbs. Negative Lower terrace overlooking former confluence, level, wooded, 50% visi				wooded, 50% visibility/ Gray brown clay with pea-size river
St9502538514011723wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt9502538514011723Industrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size riverSt9602538054011708gravels to 50cmbs. NegativeSt9702537944011791Industrial area, level, open pasture, 50% visibility, standing water on surface/ Gray brown clay with pea-size river gravels toSt970253794401179110cmbs. NegativeSt9802546894010935sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt990254685401097850cmbs. NegativeSt1000254719401091750cmbs. NegativeSt10102547014010918sloping, wooded, 50% visibility/ Brown clay usith pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to	St94	0253954	4011761	gravels to 50cmbs. Negative
St9502538514011723gravels to 50cmbs. NegativeIndustrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size riverSt9602538054011708gravels to 50cmbs. NegativeIndustrial area, level, open pasture, 50% visibility, standing water on surface/ Gray brown clay with pea-size river gravels toSt970253794401179110cmbs. NegativeSt9802546894010935sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt990254685401097850cmbs. NegativeSt900254685401097850cmbs. NegativeSt9100254719401093750cmbs. NegativeSt10002547014010918sloping, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to S0% visibility/ Gray brown clay with pea-size river gravels to S0% visibility/ Gray brown clay with pea-size river gravels to S0% visibility/ Gray brown clay with pea-size river gravels to S0% visibility/ Gray brown clay with pea-size river gravels to S0% visibility/ Gray brown clay with pea-size river gravels to S0% visibility/ Gray brown clay with pea-size river gravels to S0% visibility/ Gray brown clay with pea-size river gravels to S0% visibility/ Gray brown clay with pea-size river gravels to S0% visibility/ Gray brown clay with pea-size river gravels to S0% visibility/ Gray brown clay with pea-size river gravels to S0% visibility/ Gray brown clay with pea-size river gravels to				Industrial area overlooking the former Bird Creek channel, level,
St96D2538054011708Industrial area overlooking the former Bird Creek channel, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt9602538054011708gravels to 50cmbs. NegativeSt9702537944011791Industrial area, level, open pasture, 50% visibility, standing water on surface/ Gray brown clay with pea-size river gravels toSt970253794401179110cmbs. NegativeSt9802546894010935sloping, wooded, 50% visibility/ Brown clay to 50cmbs. Negative Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels toSt990254685401097850cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels toSt1000254719401093750cmbs. NegativeSt10102547014010918sloping, wooded, 50% visibility/ Brown clay to 50cmbs. Negative Lower terrace overlooking former confluence, moderately sloping, wooded, 50% visibility/ Gray brown clay with pea-size river gravels toSt10102547014010918sloping, wooded, 50% visibility/ Brown clay to 50cmbs. Negative Lower terrace overlooking former confluence, noderately sloping, wooded, 50% visibility/ Brown clay to 50cmbs. Negative Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to				wooded, 50% visibility/ Gray brown clay with pea-size river
St9602538054011708wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt9602538054011708gravels to 50cmbs. NegativeSt9702537944011791Industrial area, level, open pasture, 50% visibility, standing water on surface/ Gray brown clay with pea-size river gravels toSt9702537944011791I0cmbs. NegativeSt9802546894010935sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt990254685401097850cmbs. NegativeSt990254685401097850cmbs. NegativeSt1000254719401093750cmbs. NegativeSt10102547014010918sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt10102547014010918sloping, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to	St95	0253851	4011723	gravels to 50cmbs. Negative
St9602538054011708gravels to 50cmbs. NegativeIndustrial area, level, open pasture, 50% visibility, standing water on surface/ Gray brown clay with pea-size river gravels toSt970253794401179110cmbs. NegativeSt9802546894010935sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt9802546894010935sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt990254685401097850cmbs. NegativeSt990254685401097850cmbs. NegativeSt1000254719401093750cmbs. NegativeSt10102547014010918sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt10102547014010918sloping, wooded, 50% visibility/				Industrial area overlooking the former Bird Creek channel, level,
St9702537944011791Industrial area, level, open pasture, 50% visibility, standing water on surface/ Gray brown clay with pea-size river gravels to 10cmbs. NegativeSt9802546894010935Upper terrace overlooking former confluence, moderately sloping, wooded, 50% visibility/ Brown clay to 50cmbs. Negative Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to St99St990254685401097850cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to St100St1000254719401093750cmbs. NegativeSt10102547014010918sloping, wooded, 50% visibility/ Brown clay to 50cmbs. Negative Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to St00				wooded, 50% visibility/ Gray brown clay with pea-size river
St9702537944011791I0cmbs. NegativeSt970253794401179110cmbs. NegativeSt9802546894010935sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt9802546894010935sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt990254685401097850cmbs. NegativeSt990254685401097850cmbs. NegativeSt1000254719401093750cmbs. NegativeSt10102547014010918Upper terrace overlooking former confluence, noderatelySt10102547014010918sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeLower terrace overlooking former confluence, noderatelyUpper terrace overlooking former confluence, noderatelySt10102547014010918sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeLower terrace overlooking former confluence, noderatelySloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt10102547014010918sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Brown clay to 50cmbs. Negative	St96	0253805	4011708	
St970253794401179110cmbs. NegativeSt9802546894010935Upper terrace overlooking former confluence, moderately sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt9802546894010935sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt990254685401097850cmbs. NegativeSt990254685401097850cmbs. NegativeSt1000254719401093750cmbs. NegativeSt10102547014010918sloping, wooded, 50% visibility/ Brown clay to 50cmbs. Negative				Industrial area, level, open pasture, 50% visibility, standing water
St9802546894010935Upper terrace overlooking former confluence, moderately sloping, wooded, 50% visibility/ Brown clay to 50cmbs. Negative Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50% visibility/ Gray brown clay with pea-size river gravels to St99St990254685401097850cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels toSt1000254719401093750cmbs. NegativeSt10102547014010918sloping, wooded, 50% visibility/ Brown clay to 50cmbs. Negative Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels toSt10102547014010918sloping, wooded, 50% visibility/ Brown clay to 50cmbs. Negative Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to				on surface/ Gray brown clay with pea-size river gravels to
St9802546894010935sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels toSt990254685401097850cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels toSt10002547194010937St10102547014010918St10102547014010918St00isibility/ Gray brown clay with pea-size river gravels toSt0102547014010918St00sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to	St97	0253794	4011791	10cmbs. Negative
kitLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt990254685401097850cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels toSt10002547194010937St10102547014010918St10102547014010918St0ping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to				Upper terrace overlooking former confluence, moderately
St990254685401097850% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt990254685401097850cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels toSt10002547194010937St10102547014010918St10102547014010918Lower terrace overlooking former confluence, moderately sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to	St98	0254689	4010935	
St990254685401097850cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels toSt1000254719401093750cmbs. NegativeUpper terrace overlooking former confluence, moderately sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeSt10102547014010918sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to				Lower terrace overlooking former confluence, level, wooded,
St10002547194010937Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt10102547014010918Upper terrace overlooking former confluence, moderately sloping, wooded, 50% visibility/ Brown clay to 50cmbs. Negative Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to				50% visibility/ Gray brown clay with pea-size river gravels to
St1000254719401093750% visibility/ Gray brown clay with pea-size river gravels to 50cmbs. NegativeSt10102547014010918Upper terrace overlooking former confluence, moderately sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to	St99	0254685	4010978	50cmbs. Negative
St1000254719401093750cmbs. NegativeSt10102547014010918Upper terrace overlooking former confluence, moderately sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to				Lower terrace overlooking former confluence, level, wooded,
St10102547014010918Upper terrace overlooking former confluence, moderately sloping, wooded, 50% visibility/ Brown clay to 50cmbs. Negative Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to				50% visibility/ Gray brown clay with pea-size river gravels to
St10102547014010918sloping, wooded, 50% visibility/ Brown clay to 50cmbs. NegativeLower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to	St100	0254719	4010937	50cmbs. Negative
Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to				
Lower terrace overlooking former confluence, level, wooded, 50% visibility/ Gray brown clay with pea-size river gravels to	St101	0254701	4010918	sloping, wooded, 50% visibility/ Brown clay to 50cmbs. Negative
St102 0254735 4010952 50cmbs. Negative				50% visibility/ Gray brown clay with pea-size river gravels to
	St102	0254735	4010952	50cmbs. Negative

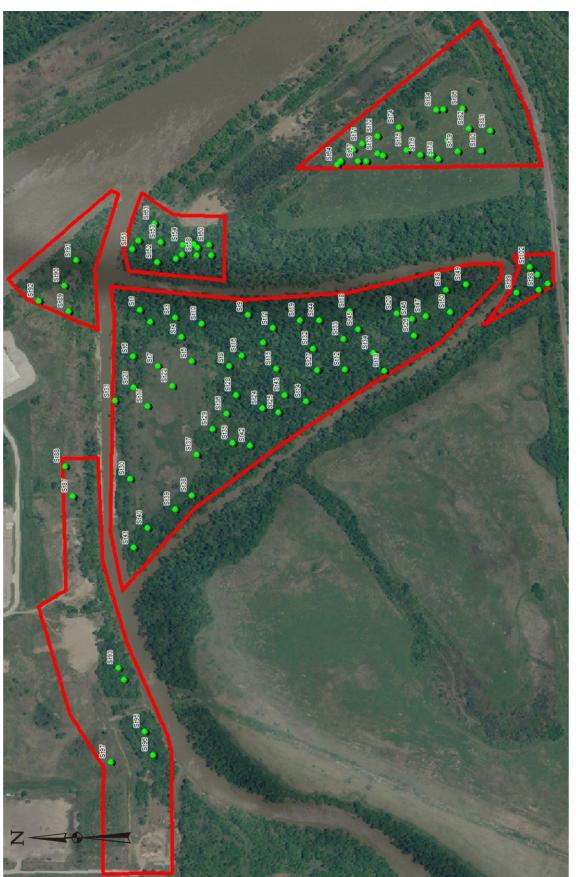


Figure 10. Shovel test placement

Supplemental Investigation of the Soil Morphology and Stratigraphy of the Proposed Barge Fleeting Area in Catoosa, OK

Scott T. Fine

4800 S. 104th St.

Muskogee, OK 74401

PhD. Candidate

Plant and Soil Science Department

Oklahoma State University

January 23, 2012

Introduction

Soil morphology and sediment stratigraphy investigations were accomplished on two cores from the Proposed Barge Fleeting Area in Catoosa, Oklahoma. Investigations were performed to determine the extent of buried soils and possibility of dating deposits in reference to possible human occupation at the study area (personal communication, Chris Cojeen). Cores B-5 and B-6 were the only cores investigated in this manner as instructed. Location of the cores can be seen in the attached map, which appears to be a floodplain of Bird Creek and the Verdigris River. Cores were obtained from Kleinfelder Central, Inc. (Tulsa, OK) and consisted of various random core sections from selected depth intervals in between the surface and 38.6 and 40 ft. (11.8 and 12.1 M), respectively. Majority of the cores were presented as 2 inch (5 cm) diameter cores from a split spoon (SS) corer placed in Ziploc bags (without vertical orientation) with a few larger intact cores (3 to 4 inches (7.6-10 cm) in diameter by 2 feet (5 cm) length) from a Shelby Tube (ST). Cores were described using standard soil morphology as outline in Schoeneberger et al. (2002) with identification of stratigraphic units in reference to geoarchaeology, as defined by Waters (1992). Soil boundaries were undistinguishable in most core sections due to the loss of orientation when bagged.

Results and Discussion

Core B-5

The first section investigated in Core B-5 was at 3.5 to 5 feet (1.1-1.5 m) described as a buried A horizon with weak soil structure, silt loam soil texture and few fine and medium roots throughout the core section (Table 1). All core sections examined from 5.0 to 20.0 feet (1.5-6.1 m) were interpreted as C horizons with little if any soil development and dominated by evidence of alluvial features and silt loam

textures. The last three core sections (28.5 to 40 feet (8.7-12.2 m)) were interpreted as buried A horizons (Ab) with moderate structure indicating stability and gleyed color (Ag) indicating the presence of organic materials and reduction by anaerobic microbes established during a time of surface stability. Gley (dominantly gray) color also indicates poorly drained soils containing a high water table with swamp-like conditions. Within this core section four different buried A horizons and four C horizons were distinguished based on changes in texture, structure, color, consistence, redoximorphic, and other specialized features (Table 1).

Core B-6

Core B-6 was comprised of significantly more observable soil units than core B-5 probably due to added core sections. The first section examined from Core B-6 (Table 2) at a depth of 3.5 to 5 feet (1.1-1.5 m) revealed a C horizon demonstrating little soil development dominated by bedded laminae implying landscape instability and alluvial deposition. At 5 to 5.2 feet (1.5-1.6 m) soil structure was strong enough to indicate a significant buried A horizon that transformed into a BC transition horizon with minor soil development to a depth 5.5 feet (1.7 m). The C horizon continued downward to depth of 7 feet (2.1 m) comprised of bedding (laminae) and inclusion of course sand dominated materials for the last 4 inches with lack of soil development (structure) indicating a prominent fluvial event. At 8.5 to 13.6 feet (2.6-4.1 m) another period of deposition and stability is present as a sequence of soil formation occurs with the change from a weakly developed BC to a structureless laminae dominated C horizon. This C included bedding of silt, sands, and well preserved organic (plant) debris that could be used for C14 dating and the interpretation of plant communities at that time. The remainder of the core sub-samples, until the contact with the bedrock material at 38.5 feet (11.7 m) were interpreted as buried A horizons exhibiting well developed structure and gleyed colors indicating landscape stability. Lack of depositional horizons and identification of a continuous A through this and other sequence is mostly likely the result of lack of

continuous core and slow sediment accumulation in what would be assumed to be a backwater location in the floodplain.

Summary

Both cores contained alluvial deposited sediments demonstrated by the presence of thin beds (laminae, <1 cm). Fine grained sediments dominated the cores (silt loam, clay loam, silty clay loam, silty clay, fine sandy loam, and fine loamy sand soil textures). These soil textures correlate to the source-sedimentary bedrock within the drainage area dominated by shales, limestones, and fine grained sandstone. Lack of translocated clays and intense oxidation with in the profiles supports the interpretation that particlesize distribution throughout the sequence is produced by fluvial deposition and not soil pedogenesis. Horizons suggesting stability were dominated by significant soil structure, lack of bedding, and soil organic matter accumulation. Soil horizons dominated by bedding and overall lack of significant pedogenesis were interpreted as times of instability. Bimodal sequences of landscape stability and instability as alternations of soil horizons suggesting stability (Ag,BCb) are intertwined with sedimentary horizons (C) demonstrating instability are typical for alluvial depositional environment that occurred throughout the Holocene. Wood fragments are present in multiple core sections and present the possibility of radiocarbon dating within these horizons (Table 1-2). Core sections designated as A horizon also possess the ability to produce radiocarbon ages through dating of soil carbon from the top of these A horizons. Multiple zones of surface landscape stability were interpreted through the core sequence, yet evidence of anthropogenic occupation was not observed in this investigation.

Based on prior work by Carter (2007) on the nearby Candy Creek Terrace, radiocarbon dates for the various sequences can be suggested. Based on the above work's dating of soils buried at similar depths, a date of around 8,000 rybp would be expected for the first buried A horizon with dates centering around 10,000 rybp for the deeper A horizons exhibiting stability.

References

Carter, B.J. 2007. Final Report: Soil Geomorphology of the Candy Creek Terrace. Unpublished data.

- Schoeneberger, P.J., D.A. Wysocki, E.C. Benham, W.D. Broderson. 2002. Field book for describing and sampling soils, Version 2.0. Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska.
- Waters, M.R. 1992. Principles of Geoarchaeology, A North American Perspective, The University of Arizona Press, Tucson.

Table 1: Soil Profile Description for Core B-5 from the Proposed Barge Fleeting Area Catoosa, OK

Soil Profile Description: Proposed Barge Fleeting Area Catoosa, OK

Date: 1-13-12				Core B-5				Project # 121181			
	Core Type [§]	Horizon	Depth (ft.)	Color (moist)	Struct- ure [*]	Tex- ture	Consist -ence	Boun -dary **	Effer- vesce	Special Features	
1	SS	Ab	3.5- 5.0	10YR 5/3 (10YR 3/1)	1fSBK	Silt Loam	Firm	_	NE	Few Fine roots. Thin horizontal bedded laminae	
2	ST (loose)	C1b	5.0- 7.0	10YR 6/3 (10YR 4/2)	Massive	Silty Clay Loam	Very Hard	_	NE	Few fine roots	
3	SS	C2b	8.5- 10.0	10YR 5/3 (10YR 4/2)	Massive	Silt Loam	Hard	_	NE	Few fine and medium roots Few med Fe concentrations within matrix 10YR 5/6	
4	ST (core)	C3b	13.0- 13.4	10YR 6/3 (10YR 5/3)	Massive	Silt Loam	Hard	Clear	NE	Few fine roots Thin horizontal bedded laminae Common medium Fe concentrations within matrix 10YR 5/6	
5	ST (core)	C4b	13.4- 14.2	10YR 5/3 (10YR 4/2)	Massive	Silt Loam	Firm	Clear	NE	Few fine roots Faint thin horizontal bedded laminae Common medium Fe concentrations along root channels 10YR 5/6	
6	ST (core)	C4b	14.2- 15.0	10YR 5/3 (10YR 4/2)	Massive	Silt Loam	Hard	_	NE	Few fine roots Thin horizontal bedded laminae Common medium Fe concentrations along root channels 10YR 5/6	
7	SS	C5b	18.5- 20.0	10YR 5/3 (10YR 4/2)	1mSBK	Silt Loam	Friable	_	NE	Compacted from coring. Siltans (gray) Thin horizontal bedded laminae Common medium Fe concentrations within matrix (5YR 3/4)	
8	SS	Ag1b2	28.5- 30.0	Gley1 5/N (Gley1 3/N)	1mSBK	Silt Loam	Friable	_	NE	Siltans (gray) Common medium Fe concentrations within matrix (5YR 3/2)	
9	SS	Ag2b2	33.5- 35.0	Gley1 5/N (Gley1 3/N)	2mSBK	Silt Loam	Friable	_	NE	Siltans (gray) Common medium and course Fe concentrations within matrix (5YR 3/2)	
10	SS	Ag3b2	38.5- 40.0	Gley1 4/N (Gley1 3/N)	2mSBK	Silty Clay Loam	Friable	_	NE	Siltans (gray) Common medium and course Fe concentrations within matrix (5YR 4/4)	

§ Core Type: SS=Split Spoon (Ziploc bagged, fragmented core); ST=Shelby Tube;

*Structure: 1=weak 2=moderate; f=fine m=medium; SBK= sub-angular blocky

** Horizon left blank no determinable boundary due to coring irregularity

*** NE=non effervescent

Soil	Profile De	escription:	Proposed	Barge Fleeting	g Area Catoo	sa, OK				Describer: Scott T Fine
Date	<u>e: 1-13-12</u>			Core B-6						Project # 121181
	Core Type	Horizon	Depth (ft)	Color (moist)	Struct- ure	Tex- ture	Consist -ence	Bound- ary	Efferve -sce ^{***}	Special Features
1	SS	С	3.5- 5.0	10YR 5/3 (10YR 3/1)	Massive	Loam	Hard	_	NE	Few Fine roots. Thin horizontal bedded laminae. Few fine Fe concentrations 5YR 5/6
2	ST (core)	Ab	5.0- 5.2	10YR 5/3 (10YR 3/2)	2mSBK	Silt Loam	Firm	Clear	NE	Few fine roots Siltans (gray)
3	ST (core)	BCb	5.2- 5.5	10YR 5/3 (10YR 3/2)	Massive	Silt Loam	Friable	Clear	NE	Few fine and medium roots, worm castings Thin horizontal bedded laminae Few fine Fe concentrations along laminae 5YR 5/6
4	ST (core)	C1b	5.5- 5.8	10YR 5/3 (10YR 3/2)	Massive	Loam	Friable	Clear	NE	Few fine and medium roots Thin horizontal bedded laminae Few fine Fe concentrations along laminae 5YR 5/6
5	ST (core)	C2b	5.8- 6.0	10YR 4/3 (10YR 3/1)	Massive	Silty Clay Loam	Firm	_	NE	Few fine and medium roots Thin horizontal bedded laminae Few fine Fe concentrations along laminae 5YR 5/6
6	ST (core)	C3b	6.0- 6.4	10YR 5/2 (10YR 3/2)	Massive	Silt Loam	Friable	Clear	NE	Few fine and medium roots Thin horizontal bedded laminae Common medium Fe concentrations along laminae 5YR 5/6
7	ST (core)	C3b	6.4- 6.7	10YR 5/3 (10YR 3/2)	Massive	Silt Loam	Friable	Abrupt	NE	Few fine roots Thin horizontal bedded laminae Common fine Fe concentrations along laminae 5YR 5/6
8	ST (core)	C4b	6.7- 6.8	10YR 5/3 (10YR 3/2)	Single Grain	Med. Sandy Loam	Loose	Abrupt	NE	Few fine roots
9	ST (core)	C5b	6.8-7	10YR 5/4 (10YR 4/2)	Single Grain	Med. Loamy Sand	Loose	_	NE	Few fine roots
10	SS	BCb2	8.5- 10.0	10YR 5/2 (10YR 3/2)	1mSBK	Loam	Friable	_	NE	Few fine roots Common fine Fe concentrations in matrix along root channels

11	ST (core)	BCb2	13.0- 13.3	Gley1 5/10Y (Gley1 2.5/N)	2mSBK	Silty Clay Loam	Friable	Abrupt	NE	Few fine roots and wood fragments Thin horizontal bedded laminae Few fine Fe concentrations in matrix
12	ST (core)	Cb2	13.3- 13.6	2.5 YR 5/1 (10YR 3/1)	Massive	Clay Loam	Friable	Clear	NE	Thin horizontal bedded laminae, consisting of alternating silt, sand, and organic debris Common fine Fe concentrations along laminae 5YR 5/6
13	ST (core)	Ag1b3	13.6- 13.9	2.5YR 5/2 (2.5YR 3/1)	2mSBK	SiL	Friable	Abrupt	NE	Very few fine roots Siltans (gray) Common fine Fe concentration within matrix 5YR 5/6
14	ST (core)	Ag1b3	13.9- 14.3	2.5YR 5/2 (2.5YR 3/1)	2mSBK	SiL	Friable	_	NE	Siltans (gray) Common fine Fe concentration within matrix 5YR 5/6
15	SS	Ag2b3	18.5- 23.0	2.5YR 5/2 (2.5YR 3/1)	2mSBK	SiCL	Firm	_	NE	Siltans (gray) Common fine Fe concentration within matrix 5YR 5/6
16	SS	Ag3b3	23.5- 25.0	Gley1 4/N (Gley1 2.5/N)	2mSBK	SiL	Firm	_	NE	Siltans (gray) Wood fragments Common fine Fe concentration within matrix 5YR 5/6
17	SS	Ag4b3	28.5- 29.0	Gley1 5/N (Gley1 3/N)	2mSBK	SiCL	Firm	_	NE	Siltans (gray) Few gravels (chert, shale, sandstone) Common fine Fe concentration within matrix 5YR 5/6
18	SS	ABgb3	33.5- 35.0	Gley1 4/N (Gley1 2.5/N)	2fSBK	SiCL	Firm	_	NE	Siltans (gray) Common fine Fe concentration within matrix 5YR 5/6
19	SS	2Rb3	38.5- 38.6	2.5YR 6/1 (2.5YR 4/1)	Massive	_	Rigid	_	NE	Gray Shale

§ Core Type: SS=Split Spoon (Ziploc bagged, fragmented core); ST=Shelby Tube;

*Structure: 1=weak 2=moderate; f=fine m=medium; SBK= sub-angular blocky

**Horizon left blank no determinable boundary due to coring irregularity

*** NE=non effervescent

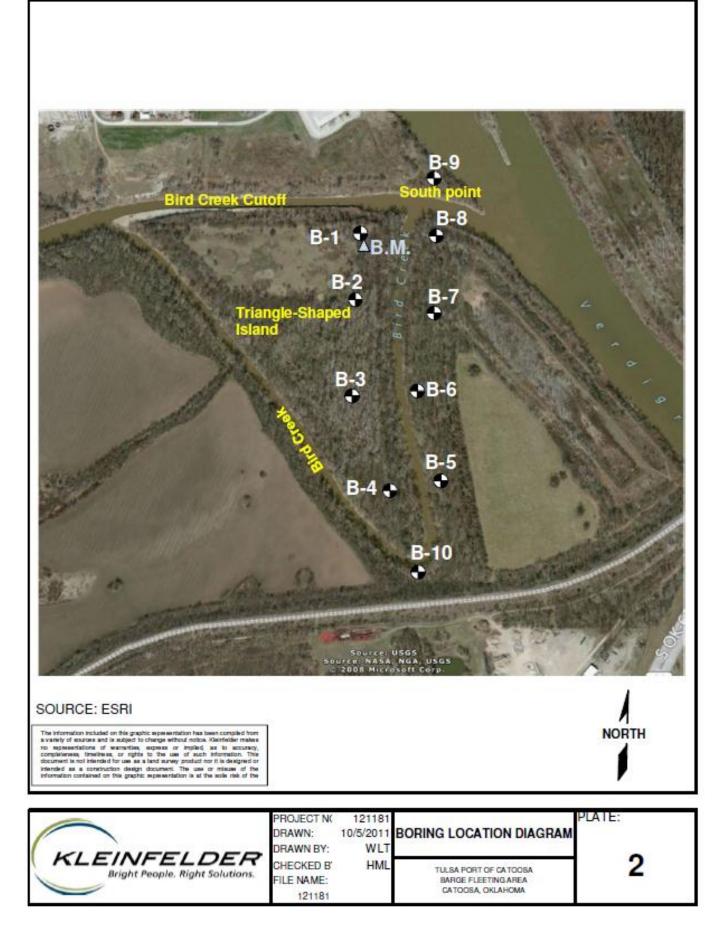


Figure 1: Map of boring locations (B-5 and B-6) from the Proposed Barge Fleeting Area Catoosa, OK from Kleinfelder Central, Inc. (Tulsa, OK).

Christopher A. Cojeen Principal Investigator Cojeen Archaeological Services, LLC

Archaeology Research History

Report on the Preliminary Archeological Site Assessment of the Tulsa Port of Catoosa, East Bank Portion of the Barge Fleeting Area Project, Rogers County, Oklahoma

Land Administration: Tulsa Port Authority

Client: Dewberry, representative: Andrea Burk (973)739-9400 Location: E/2 of the E/2 of the NE/4 of Section 17 T20N, R15E (approximately 30 acres) USGS Catoosa, OKLA quadrangle, 7.5-minute series 1963 (photo revised 1980)

> File Search: Amy Cojeen, 11/05/2010 Survey: Christopher Cojeen, Amy Cojeen, David Boling, Barker Fariss and Adam Wooten, 11/07-09/2010 Report: Christopher Cojeen and Amy Cojeen, 12/08/2010

P.O. Box 1186 | Norman, Oklahoma 73070 | (405) 360-9996 FAX: (405) 366-7020

Abstract:

On 11/07-09/2010, Cojeen Archaeological Services, LLC (CAS) conducted a preliminary archeological site assessment of approximately 30-acre area (study area) for Dewberry, on Tulsa Port Authority (Port) lands located in portions of the NE/4 of Sections 17 T20N, R15E, Rogers County, Oklahoma. The Port proposes a land swap with the United States, Army Corps of Engineers (USACE). The approximately 30 acres of land area studied for this report represents the portion of the footprint of proposed impact on the east bank of Bird Creek. Prior to a larger study of both, the Port Authority requested this project footprint be examined for what might be "fatal flaws" in the project logistics.

This report discusses the concern for deeper buried deposits but does not include field work testing that possibility. In discussion with Dewberry, that concern could be addressed when coring for engineering purposes is conducted.

According to files at the Oklahoma Archeological Survey (OAS) no previously recorded sites are located within the specific study area. One new archeological site, 34RO343, was recorded in the study area during the course of this survey. This site is the remains of a 20th century homestead. Artifacts and aerial photographs indicate an occupation period from the 1940's to the 1970's. Based on the lack of integrity of the artifacts (a mixture of flotsam, modern dumping activity and occupation-related debris) and the poor condition of the features, the site would not appear eligible under Criterion C or D of the National Register of Historic Places (NRHP). An initial records check of the NE/NE of Section 17 T20N, R15E did not suggest association with an event or important persons. Therefore, this site would not appear eligible under Criterion A or B of the NRHP. No further concern for 34RO343 is recommended.

Additionally, three isolated occurrences of artifacts (IO) were located (Appendix B). IO by their isolated nature are not considered NRHP eligible resources, and no further archeological concern is warranted for the identified IO.

Location and Setting:

Specific Location:

The Tulsa Port of Catoosa, Barge Fleeting Area Project is located in the E/2 of the E/2 of the NE/4 of Sections 17 T20N, R15E, Rogers County, Oklahoma (Figure 1). The study area is approximately 30 acres in size.

The study area occupies a lowland floodplain overlooking the old confluence of Bird Creek and Verdigris River (Figure 2). This area consists of level, open grazing pasture and moderately wooded rocky terraces along the channel. Short to medium height grasses cover the majority of the floodplain area with scattered areas of brush and hardwoods (Photos 1 and 2). Surface visibility in the pasture areas averaged 0-10% at the time of survey with two-track roads, cattle trails and areas of erosion offering up to 40% visibility.

The Verdigris River is lined by heavily wooded areas with mostly post oak and blackjack oak with a moderate scrub understory. Surface visibility along the creek channels ranged from 0-30% with leaf litter and mixed grasses covering the surface. Areas offering higher visibility (up to 60%) including areas of erosion, game trails and the river bank were noted.

General Location:

The project is located within Claremore Cuesta Plains Geomorphic province (within the Prairie Plains Physiographic Region [Bruner 1976]), an area generally described as "resistant Pennsylvanian sandstones and limestones dipping gently westward, forming cuestas between broad shale plains" (Curtis Jr., Ham and Johnson 2008). The study area is considered within the Tallgrass Prairie Vegetation type (Hoagland 2008), characterized by "prominent grass species buffalograss, gramas (blue, black, hairy, and sideoats), and silver bluestem". Elevation in the study areas ranges from 530-575 ft. AMSL.

Soils in the project area are floodplain alluvial deposits associated with the Verdigris River and the Bird Creek basin. Soils in the study area consist of Verdigris silt loam, 0 to 1 percent slopes, occasionally flooded and Verdigris silty clay loam, 0 to 2 percent slopes, frequently flooded. These soils are described as linear, well drained soils occupying floodplains and floodplain steps parented from silty alluvium (Natural Resources Conservation Service, 2009). At present, the study area has a temperate, subhumid climate, typical of the north-central part of Oklahoma. Seasonal changes vary in intensity, but the changes between seasons are gradual. Summer is usually the wettest season. Average annual precipitation varies from 36 cm to 40 cm.

Vegetation in the project area is associated with the Tallgrass Prairie Plains (Hoagland 2008). The Tallgrass Prairie Preserve managed by the Nature Conservancy has documented the native plant and animal communities in this region (Coppedge et. al 1999, Palmer et. al 2003, Palmer 2007). The dominant plants on the uplands are Indiangrass, big and little bluestem, sideoats grama, blue grama, and hairy grama. Recent invasive species such as the Eastern Red Cedar (*Juniperous virginiana*) are scattered over the prairie, creating a savanna-like vegetation community. Small groves of low

broadleaf deciduous trees and shrubs occur along major drainages and valley bottoms as riparian woodlands and crosstimbers on some north-facing slopes. The dominant species in these groves are oaks (*Quecus stellata* and *Quercus marilandica*), hackberry (*Celtis occidentalis*), cottonwood, plum (*Prunus* sp.), and coralberry (*Symphoricarpos orbicultus*).

Research Biases:

The purpose of this investigation was to locate any cultural resources within the defined impact area of the project, and to provide sufficient detail for the protection and management of such resources. Interpretation of any cultural resources found followed standard methodology practices. By strict definition, cultural resources are any evidence of human use or occupation without any age limitations, but for this project, the term was restricted to cultural remains that were at least 45 years in age.

Land management and modification activities including land clearing for use as pasture, plowing, contour terracing, roads, fences, and overhead utility corridors have all impacted the study area. Modern trash dumping activity and flotsum was observed throughout the study area particularly in the south and west portion adjacent the two-track road and along the wooded terraces adjacent the old Verdigris River channel. Deer stands and debris related to hunting activity was also observed. These items and modifications were discounted as cultural resources for the purposes of this report.

Paleontological Resources:

No vertebrate paleontological resources or significant invertebrate resources were observed during the course of this archeological investigation.

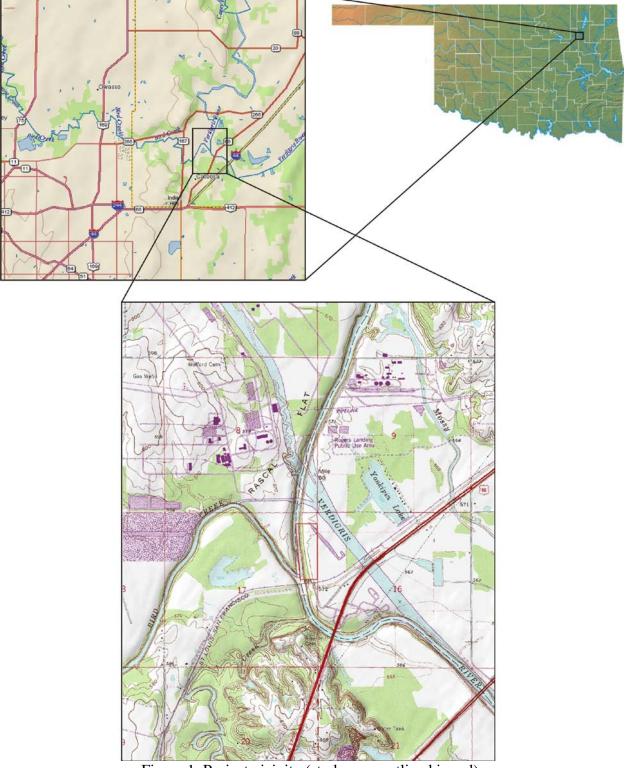
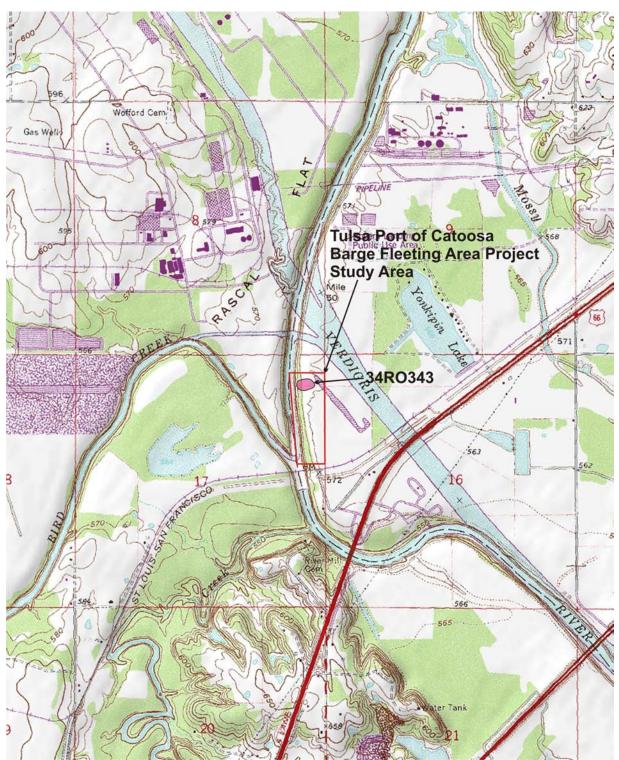


Figure 1. Project vicinity (study area outlined in red).



CAS Archeological Report, Tulsa Port of Catoosa Barge Fleeting Area Project, page 6

Figure 2. Study area (outlined in red), USGS Catoosa, OKLA quadrangle, 7.5-minute series 1963 (photo revised 1980).





Photo 1. Facing northeast from the southern boundary of the study area.



Photo 2. Facing west to lower benches adjacent the Verdigris River.

Relevant Previous Archeological Studies In or Near the Project Area:

The most relevant major study near this project was conducted by Richard Drass in 1985, discussing archeological resources within the Bird Creek Basin. Drass acknowledges that the sparse site distribution of Archaic time period occupations in the Bird Creek Basin may be a function of geological processes due to the extensive alluvial deposition in the river valleys of the region. With this in mind, Drass concludes only extensive subsurface explorations into bottom lands will add to the knowledge of Archaic site distributions and densities in these settings of alluvial deposition. For example, both the Oolagah and Copan reservoirs have deeply buried Archaic camps exposed by creek bank erosion.

Plains Woodland period sites are more abundant in the north-central Oklahoma region, with representative artifacts including Scallorn and Reed points (the Von Elm site at Kaw Reservoir is the type site for the Scallorn point). The abundance of Woodland period sites may be a reflection of greater population density during this period; or, Drass notes (1985) that it again may be the alluvium covering Archaic (and older) sites that alter our perception of the settlement activity adjacent these waterways.

One consideration of the Bird Creek study was to examine the impact of Tulsa metroplex development on Bird Creek archeological resources. Much of Bird Creek has not been affected by urban growth, as development has favored the tributaries and avoided the flood-prone bottom lands. Drass indicates (as of 1984) that modern quarry and transportation development have reached a limit, and expects few additional concerns for impact to Bird Creek sites, with the exception to developments of railroads and port facilities (Drass 1984).

Drass states that future work should concentrate on impacts to potential buried habitation materials; summarizing that unless deep excavations occur with construction, little impact will occur to archeological sites.

As Drass' comments relate to the current project in consideration, this port expansion project does offer an opportunity to examine potential effects on deeper buried deposits, if they indeed exist and if they can be identified. However, the (potential) sites need to be extensive enough (containing enough cultural materials) to be found by soil coring or other deeper sampling methods.

Another large format study touching on the boundaries of the Port of Catoosa project area was the Tulsa North Triangle, an archeological study of northern Tulsa and western Rogers counties, Oklahoma (Dickerson et. al 1991). The Port of Catoosa itself was excluded from the study area. The concern for potential sites buried in the deep alluvial settings adjacent waterways was also expressed (Dickerson et. al 1991:107).

Efforts at identifying buried soils on USACE projects in the general region have previously been conducted, with limited results. In particular, the Candy Creek study in Osage County, Oklahoma (Tucker et. al 2008) identified two named buried pedostratigraphic units, both within a time period known for human occupation of the general area (determined through C-14

samples within soil core samples). No identifiable artifacts were recovered in the limited number of cores placed over a relatively large area. The authors note a concern that the coring sample was too small to locate artifacts, and they describe an artifact search in this method as a 'needle in a haystack' search; also, ephemeral prehistoric land use within time periods represented by the buried soils may contribute to a lack of ability to identify cultural materials.

Still, the Candy Creek study identified allovium to a depth of 25 to 40 ft. and, according to C-14 dates, from the early to late Pleistocene through the late Holocene in chronological age, lending to the possibility for buried human activity areas.

Although well summarized, written and researched by geophysicist Dr. Brian Carter, there remains a lack of decision and objective as to how to proceed with investigating deeply buried soils. The report acknowledges that cost factors would inhibit a greater sampling capacity by increased coring, and for the likely sparse and ephemeral nature of potential early occupations these sites do not lend well to this method of detection, even when buried soils are known to exist.

Geophysical methods to compliment coring are suggested, such as ground penetrating radar (Tucker 2008:55), however if sites are deeply buried and sparse in nature one would question if this method would successfully identify physical cultural remains.

In personal communication with Leland Bement, who also utilized coring under the direction of Dr. Carter at the now well known Cooper site (a buried Folsom bone bed), Dr. Bement suggests once deeper soils are identified, removal of soils (such as with a backhoe) and spreading the matrix out in search of larger artifacts or concentrations of artifacts represents a realistic research method.

Thus, relating the above discussions to the Port project, in particular to the 30 acres of project impact, a combination of soil coring and/or backhoe trench testing to identify possible buried soil may be possible. If identified, the buried soils may be "spread out" during monitoring of the disturbance activities. According to Dr. Bement looking for larger objects (i.e., bone beds or non-naturally occurring rock features) may be the only realistic way to determine if cultural materials associate with potential age appropriate buried soils.

Soils Within the 30-Acre Project Area, Natural Resources Conservation Service Soil Descriptions:

Soils noted during the surface and shovel testing study of the Port of Catoosa Barge Fleeting Project 30-acre footprint are Verdigris silty clay loam (Vf) and Verdigris silt loam (Vd), described as follows:

According to the United States Department of Agriculture, Natural Resources Conservation Service, soils within the specific area of the project footprint include Verdigris silty clay loam, 0-2% slopes (channel and embankment areas) and Verdigris silt loam, 0-1% slopes (pasture areas adjacent the old channel of Bird Creek). Both these soils are similar in composition, with slight

variations in slope varying the properties and qualities. Both soils are silty alluvium with a typical profile of silt loam from 0-19 inches (0-48cm), and a silty clay loam to 80 inches (48-203cm). For the Verdigris silt loam; the water table is encountered at approximately 80 inches (203cmbs). For the Verdigris silty clay loam, a typical profile consists of 0-17 inches (0-43cm) of silty clay loam, and 17-80 inches (43-203cm) silty clay loam. Contact with lower soils (the contact at 17-19cm) is gradual and undefined.

File Search:

CAS visited the OAS in Norman, Oklahoma, to examine maps and files pertaining to the study area in an effort to identify previously recorded cultural resources within the proposed project location. OAS files indicate that no previously recorded archeological sites are located within the specific study area.

On 12/02/2010 an initial records search was performed at the Rogers County Court house in Claremore, Oklahoma. The earliest entries in the index book for T20N, R15E revealed NE/NE of Section 17:

- Bearl Deweese et ux granted an Amortization Mortgage to the Land Bank Commissioners on 104/01/936

-L. O. Gravitt and Newton M. Foster granted an Affidavit to the Public on 10/13/1939. -State of Oklahoma Corporation Commission granted a Certificate of non-Deed to the Public (Conservancy District #30) on 03/29/1962

-Public Service Company of Oklahoma granted a Quit Claim Deed to the United States of America on 09/24/1969.

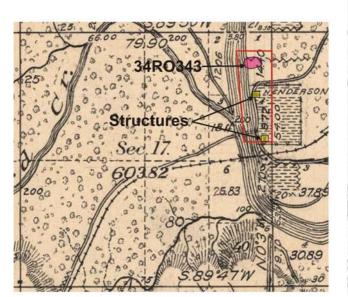
According to the most recent listings, no properties listed on the NRHP are within the specific study area of this project. No properties considered eligible for the NRHP but not yet nominated (Oklahoma SHPO Determinations of Eligibility listings, October 2009, supplemental listing April 2010) are noted in the specific study area.

Early and mid-20th century maps as well as mid to late-20th century and current aerial photographs were examined for structures, trails and roads in the study area. General Land Office (GLO) plat maps of the study area were examined including the Original Survey dated 04/09/1898 (survey completed 07/03/1896) (Bureau of Land Management 2008). The map shows the study area as both plowed field and open pasture with two structures, one labeled Henderson, plotted adjacent a road within the study area (Figure 3a). No indications of these two structures were observed on the surface or in shovel tests.

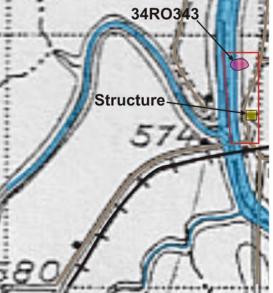
The USGS Claremore, OKLA quadrangle, 30-minute series, 1916 map (surveyed 1913-1914) was also examined (Figure 3b). This map shows one structure adjacent a road trending through the center of the study area. This structure is plotted within the vicinity of the southern-most 1898 structure and may represent the same occupation. No remains of this structure were noted on the surface or in shovel tests.

The 1936 Oklahoma State Highway Department's General Highway and Transportation Map of

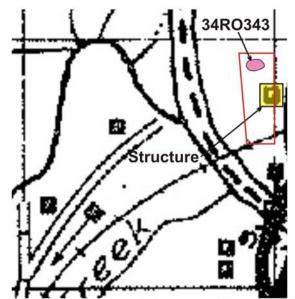
Rogers County was also examined (Figure 3c). One structure indicated with a "dwelling- other than farm" symbol is within the study area. This structure is plotted within the vicinity of the southern-most 1898 structure and may represent the same occupation. No remains of this structure were noted on the surface or in shovel tests.



a. 1898 GLO Original Survey plat map.



b. 1916 USGS Claremore, OKLA quadrangle, 30-minute series.

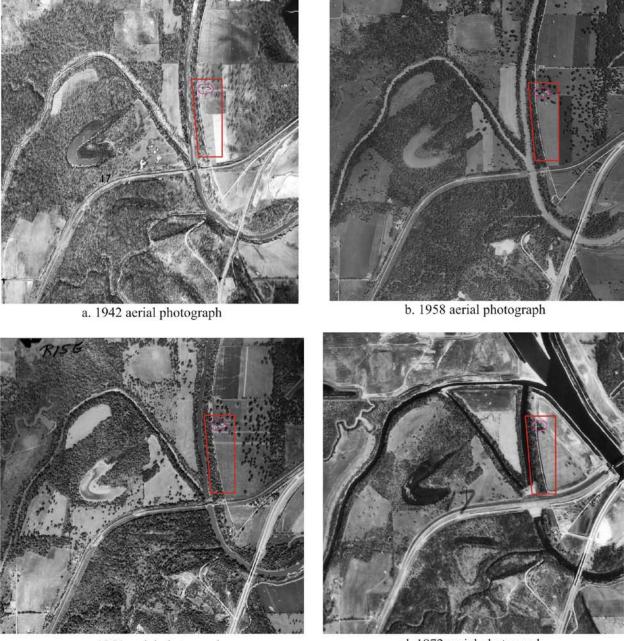


c. 1936 Rogers County General Highway and Transportation Map.

Figure 3. Early and mid-20th century maps of study area (outlined in red).

Aerial photographs at the Oklahoma Geological Survey (Norman, Oklahoma) were also examined. The 1942, 1958, 1964 and 1972 aerial images show the study area as predominantly

open pasture with wooded areas adjacent the waterway (Figure 4a-4d). 34RO343 is visible on the 1942, 1958 and 1964 aerial photographs. The 1972 aerial photograph shows the site area as wooded with no visible standing structures.



c. 1964 aerial photograph

d. 1972 aerial photograph

Figure 4. Aerial photographs of study area (outlined in red) and 34RO343 (outlined in magenta).

The 2008 satellite image shows the study area as it exists today (National Agricultural Inventory Project 2008) (Figure 5). Figure 6 shows a computer generated oblique view of the study area illustrating the geographic features.



Figure 5. 2008 NAIP satellite image of the study area (outlined in red) and 34RO343 (outlined in magenta).



Figure 6. Computer generated oblique view of the 2008 NAIP satellite image of the study area. The view is to the north and the vertical exaggeration is x2.

Archeological Investigations

On 11/07-09/2010, CAS conducted an archeological site assessment of an approximate 30-acre area (study area) for Dewberry, on Tulsa Port Authority (Port) lands located in portions of the NE/4 of Sections 17 T20N, R15E, Rogers County, Oklahoma.

Pedestrian transects augmented by hand dug shovel tests were utilized as field methodology. Matrix was screened through ¼ inch screen mesh, excavated to between 30 and 70 cm. No deep testing methods were utilized during this preliminary reconnaissance (see shovel test log, Appendix A).

One new archeological site was recorded during the course of these investigations.

Newly Recorded Archeological Site:

34RO343

C E/2 NE/NE Section 17 T20N, R15E Site area: 110x65 m (360x215 ft.) UTM NAD27 CONUS Zone 15S E0254827 N4011445

This site is the remains of a mid-20th century farmstead located on a terrace overlooking the Verdigris River channel to the west. Features observed at the site include a house foundation (Feature 1), a cellar (Feature 2), two 12 inch (30 cm) cement circular casings (Feature 3), a possible water well represented by a metal pipe set in concrete (Feature 4), and two rectangular cement stem wall foundations (Feature 5). The five features and associated artifacts were observed on the surface in a moderately wooded setting over a 360x215 ft. (110x65 m) area with leaf litter and sparse understory showing 40-50% visibility.

Feature 1 consists of a partial cement block stem wall foundation with poured cement over native stone steps at the entry way. The south facing entry way steps are 2x3.5 ft. (0.6x1.2 m) flanked by cement block 5 ft. (1.5 m) on either side. The west wall extends 17 ft. (5.1 m) terminating at a push pile on the north end of the foundation. Only 5 ft. (1.5 m) of the east wall remains in place. Cement block and plain red brick pavers are scattered around the foundation.

Feature 2, the cellar, is located 55 ft. (16.8 m) southwest of the house foundation. The cellar is constructed of reinforced concrete with a vaulted ceiling, an east facing 6x3.5 ft. (1.8x1.2 m) entrance, and measures 14x7 ft. (4.3x2.1 m) The door has been removed and some modern debris fills the interior.

Feature 3 consists of two 12 inch (30 cm) cylindrical concrete casings spaced 10 ft. (3 m) apart adjacent the cellar to the southeast.

Feature 4 is a 12 inch (30 cm) metal pipe set in concrete possibly representing a water well pipe west of the cellar approximately 30 ft. (10 m).

Feature 5 consists of two rectangular concrete foundations located on a lower terrace approximately 100 ft. (30 m) west of the cellar. The northern-most foundation measure 8x6 (2.4x1.8 m) and adjacent 8.5 ft. (2.5 m) south is a10x8 ft. (3x2.4 m) foundation set at a slight angle.

The majority of the debris related to the occupation is located west and south of the cellar including metal 55 gallon drums, portable outdoor grill, carpet, carpet padding, a large "EVER FRESH WIND POWER" freezer, pull-tab beverage cans, aluminum food cans, plastic bottles, 1950's style Chevrolet truck hood. Artifacts with maker's marks include an amber "Duraglas" bottle with Owens-Illinois "I" inside the "O" and 15 6 on either side and Duraglas script used after 1940 (Toulouse 1971), a Dr. Pepper bottle stamped "1947" on the base, a Karo Syrup bottle

with the Owens-Illinois diamond IO mark with 7 and 9 on either side produced in Alton, Illinois 1930 to present (Toulouse 1971), a large amber glass bottle base with the Owens-Illinois diamond IO mark with 7 and 3. (date code 1943) on either side and 12 below it (Lockhart 2004), and a cobalt glass Vicks Vaporub bottle with three overlapping "V" and 57 below it. More recent debris was also observed such as beer bottles, plastic containers and Styrofoam.

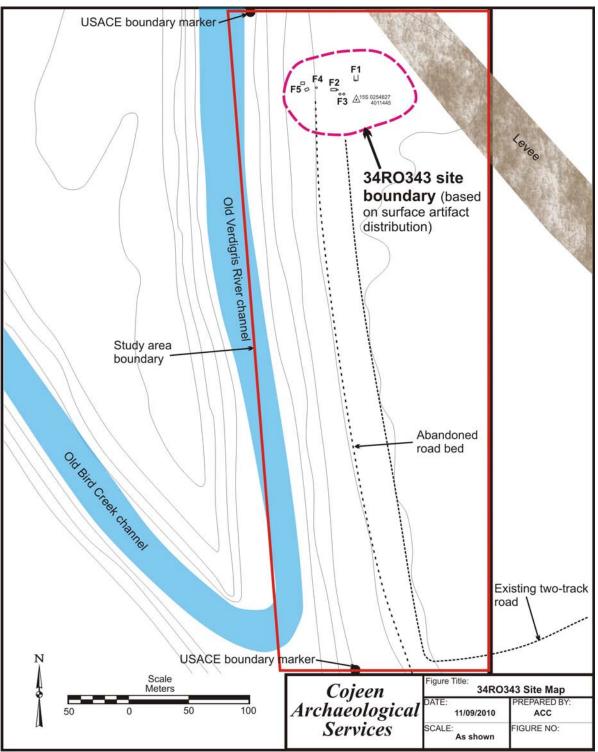
Modern activities such as trash dumping, camping and hunting are evident in the site area; a deer stand is located adjacent to the north of the foundation features.

The farmstead appears to have been built in the late 1930's to early 1940's (first appearing on the 1942 aerial photographs). The 1942, 1958 and 1964 aerial photographs show three discernible standing structures (Figure 4a-4c). The farmstead is extant on the 1972 aerial photograph.

Based on the lack of integrity of the artifacts (a mixture of flotsam, modern dumping activity and occupation-related debris) and the poor condition of the features, the site would not appear eligible under Criterion C or D of the NRHP. An initial records check of the NE/NE of Section 17 T20N, R15E did not suggest association with an event or important persons. Therefore, this site would not appear eligible under Criterion A or B of the NRHP. No further concern for 34RO343 is considered necessary.



Photo 3. Facing southwest to cellar at 34RO343.



CAS Archeological Report, Tulsa Port of Catoosa Barge Fleeting Area Project, page 17

Figure 7. Site map of 34RO343.

Recommendations:

The 20th century farmstead site 34RO343 and the associated artifacts do not appear to be resources warranting inclusion on the NRHP.

The location is adjacent major waterways and has alluvial deposition. In discussion with the USACE archeologist Kenneth Shingleton and Michelle Horn (office meeting 11/10/2010) six to nine coring placements spaced over the east triangle would be a sufficient search for buried sites. This would require the assistance of a geomorphologist to interpret the core soils and an archeologist to inspect core matrix for archeological materials.

the lyear

Christopher Cojeen Principal Investigator

copies:

Dewberry 600 Parsippany Rd., Suite 301 Parsippany, NJ 07054-3715 attention: Andrea Burk

References

Bement, Leland C.

1999 Bison Hunting at Cooper Site: Where Lightning Bolts Drew Thundering Herds. University of Oklahoma Press; Norman.

Bruner, W.E.

1976 *Physiographic Regions of Oklahoma.* Map reproduced by the Oklahoma Highway Department, Planning Division, Oklahoma City.

Bureau of Land Management

2008 http://www.glorecords.blm.gov/SurveySearch/Default.asp

Coppedge, Bryan R., Samuel D. Fuhlendorf, David M. Engle, Brian J. Carter, and James H. Shaw

- 1999 Grassland Soil Depressions: Relict Bison Wallows or Inherent Landscape Heterogeneity? American Midland Naturalist. Vol. 142, pp. 382-392
- Curtis, Neville M. Jr., William E. Ham and Kenneth S. Johnson

2008 Geomorphic Provinces of Oklahoma. In Earth Sciences and Mineral Resources of Oklahoma. Oklahoma Geological Survey Educational Publication No. 9. Oklahoma Geological Survey, Norman, Oklahoma.

Dickerson, Kent E., Kenneth L. Shingleton, Jr., Kerstin Miller and Donald O. Henry
 1991 Tulsa/North Triangle: An Archeological Survey of Northern Tulsa and
 Western Rogers Counties, Oklahoma. Contributions in Archeology No.
 18, Department of Anthropology; University of Tulsa; Tulsa, Oklahoma.

Drass, Richard R.

1985 Archeological Resources in the Bird Creek Basin Rogers, Tulsa and Osage Counties, Oklahoma. Archeological Resource Survey Report Number 21; Oklahoma Archeological Survey; Norman.

Hoagland, Bruce W.

2008 Vegetation of Oklahoma. In Earth Sciences and Mineral Resources of Oklahoma. Oklahoma Geological Survey Educational Publication No. 9. Oklahoma Geological Survey, Norman, Oklahoma.

Lockhart, Bill

2004 *The Dating Game*. In Bottles and Extras Published by The Federation of Historical Bottle Collectors Volume No. 15, Number 3.

National Agricultural Inventory Project

2008 ftp://ftp.okcc.state.ok.us/gis/county/2008/

Oklahoma State Historic Preservation Office

2009 Determination of Eligibility in Oklahoma, SHPO bulletin October 2009, supplemental listing April 2010.

Palmer, Michael W.

- 2007 The Vascular Flora of the Tallgrass Prairie Preserve, Osage County, Oklahoma. *Castanea*. Vol 72, no. 4, pp. 235-246.
- Palmer, Michael W., José Remón Arévalo, María del Carmen Cobo, and Peter G. Earls
 2003 Species Richness and Soil Reaction in a Northeastern Oklahoma Landscape.
 Folia Geobotanica. Vol 38. Pp. 381-389.

Toulouse, Julian Harrison

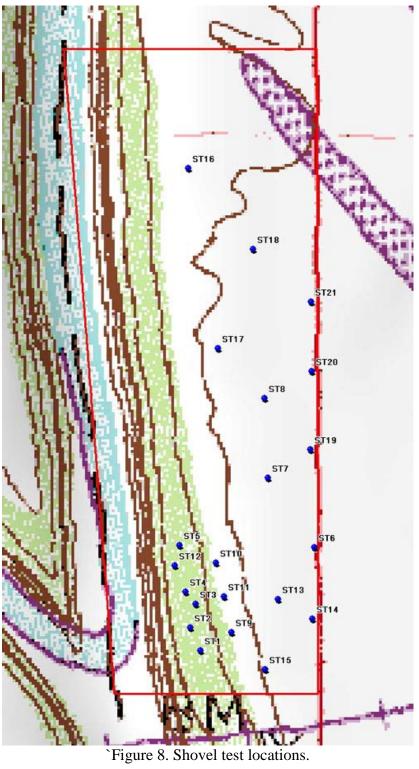
1971 Bottle Makers and Their Marks. Thomas Nelson Inc, Nashville, Tennessee.

Appendix A: Shovel Test Log

Shovel Test #	Easting	Northing	Setting/Soil Description
ST1	0254824	4011008	Lower terrace, moderately sloping, wooded, 10% visibility/Compact dark gray clay to 45cmbs. Negative
ST2	0254825	4011019	Lower terrace, gently sloping, wooded, 10% visibility/Compact gray brown silty loam 0-40cmbs, mottled with gray clay to 45-50cmbs. Negative
ST3	0254822	4011030	Lower terrace, moderately sloping, wooded, 10% visibility/Compact dark gray clay to 45cmbs. Positive with 5 pieces of clear, non-solarized glass in top 10cmbs.
ST4	0254813	4011041	Lower terrace, moderately sloping, wooded, 10% visibility/Compact dark gray clay to 50cmbs. Negative
ST5	0254809	4011082	Lower terrace, moderately sloping, wooded, 10% visibility/Compact dark gray clay ending at 30cmbs. Negative
ST6	0254935	4011074	Level, open hay field, 0 visibility/ Compact brown silty loam 0-30cmbs, reddish brown silty loam 30-50cmbs, medium brown clay 55-70cmbs. Negative
ST7	0254890	4011140	Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs.
ST8	0254888	4011210	Level, open hay field, 0 visibility/ Compact brown silty loam 0-20cmbs, reddish brown silty loam 20-25cmbs, medium brown clay to 50cmbs. Negative
ST9	0254853	4011001	First terrace, gently sloping, adjacent hay field in moderately wooded area, 30% visibility/ Brown sily clay loam 0- 10cmbs, mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs. River gravels increasing with depth. Negative
ST10	0254840	4011065	First terrace, gently sloping, adjacent hay field in moderately wooded area, 30% visibility/ Dark brown sily clay loam 0- 10cmbs, mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs. River gravels increasing with depth. Negative
ST11	0254847	4011033	First terrace, gently sloping, adjacent hay field in moderately wooded area, 30% visibility/ Brown sily clay loam 0-cmbs, mottled with gray clay 10-35cmbs, dark gray clay to 50cmbs. River gravels increasing with depth. Negative
ST12	0254804	4011064	Lower terrace, moderately sloping, wooded, 10% visibility/Compact dark gray clay ending at 30cmbs. Negative
ST13	0254895	4011032	Level, open hay field adjacent two-track road, 0 visibility /Compact brown silty loam 0-30cmbs, reddish brown silty loam 30-55cmbs, medium brown clay 55-70cmbs. Negative
ST14	0254925	4011014	Level, open hay field, 0 visibility/ Compact brown silty loam

CAS Archeological Report, Tulsa Port of Catoosa Barge Fleeting Area Project, page 22

			0-30cmbs, reddish brown silty loam 30-50cmbs, medium
			brown clay 55-70cmbs. Negative
ST15	0254882	4010970	Level, open hay field adjacent two-track road, 0 visibility
			/Compact brown silty loam 0-30cmbs, reddish brown silty
			loam 30-55cmbs, medium brown clay 55-70cmbs. Negative
ST16	0254826	4011415	Level, open hay field, 0 visibility /Compact brown silty loam
			0-30cmbs, reddish brown silty loam 30-55cmbs, medium
			brown clay at 65cmbs. Negative
ST17	0254848	4011255	Level, open hay field, 0 visibility/ Compact brown silty loam
			0-20cmbs, reddish brown silty loam 20-25cmbs, medium
			brown clay to 50cmbs. Negative
ST18	0254880	4011343	Level, open hay field, 0 visibility /Compact brown silty loam
			0-30cmbs, reddish brown silty loam 30-55cmbs, medium
			brown clay 55-70cmbs. Negative
ST19	0254935	4011154	Level, open hay field, 0 visibility /Compact brown silty loam
			0-30cmbs, reddish brown silty loam 30-55cmbs, medium
			brown clay 55-70cmbs. Negative
ST20	0254941	4011227	Level, open hay field, 0 visibility/Compact brown silty loam
			0-30cmbs, reddish brown silty loam 30-55cmbs, medium
			brown clay 55-70cmbs. Negative
ST21	0254932	4011294	Level, open hay field, 0 visibility/Compact brown silty loam
			0-30cmbs, reddish brown silty loam 30-55cmbs, medium
			brown clay 55-70cmbs. Negative



Appendix B: Isolated Occurrences

IO1 15S E0254864 N4011044

This IO is a utility pole, metal tie down hook and steel cable observed adjacent an abandoned road bed in a moderately wooded setting. Visibility was 40% in leaf litter and short grasses.

IO2 15S E0254811 N4011125

This IO consists of a 55 gallon metal drum, a car fender, metal frame and springs of a car seat front loading washing machine, paint, coffee and food cans observed adjacent an abandoned road bed in a moderately wooded setting. Visibility was 40% in leaf litter and short grasses.

IO3 15S E0254828 N4010984

This IO is the base to a medicinal bottle with the maker's make H A 7. This IO was observed in a modern dump area consisting of a glass measuring cup, a Coke bottle and aluminum food cans observed on a lower terrace adjacent the Verdigris River in a moderately wooded setting. Visibility was 30% in leaf litter and short grasses.

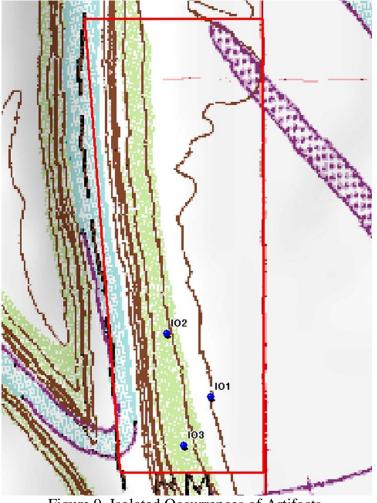


Figure 9. Isolated Occurrences of Artifacts.



DEPARTMENT OF ARMY CORPS OF ENGINEERS, TULSA DISTRICT TULSA, OKLAHOMA 74128-4609

February 8, 2013

Planning and Environmental Division Environmental Analysis and Compliance Branch

Mekko George Scott Thlopthlocco Tribal Town, Oklahoma P.O. Box 188 Okemah, OK 74859

Dear Mekko Scott:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

In addition to the fleeting area there are other ancillary construction features. For example, construction of the fleeting area will require the removal of a point of land at the confluence of the existing Bird Creek channel and the Verdigris River so that barges can appropriately enter and exit the fleeting area. Lastly, a bridge over the existing Bird Creek channel will be required for the removal of fill material and an associated road for transport will be required along the north bank of Bird Creek. Fill material will be transported to the immediate west of the project area and deposited on Tulsa Port of Catoosa property. This action will be handled separately (with an accompanying cultural resources survey) under Section 404 of the Clean Water Act, for which a permit may be required.

In order to comply with Section 106, Tulsa Port of Catoosa engaged Cojeen Archaeological Services to conduct an archaeological investigation of the entire project area. The investigation included the area proposed for the land sale, barge fleeting area, bridge over Bird Creek, fill transport road, and land removal at the point of confluence for Bird Creek and the Verdigris River. The investigations are detailed in two separate reports, which are enclosed.

Two historic archaeological sites, 34R0343 and 34R0347, were identified in the investigations. No prehistoric archaeological sites or historic standing structures were identified. Neither 34R0343 nor 34R0347 appear to retain sufficient integrity to be considered eligible for listing on the National Register of Historic Places.

Please review this area for information that you may be willing to share with us on archaeological or historic sites, sacred sites, or traditional cultural properties that may be significant to you. Information you may be able to provide will assist us in assessing the effects of the proposed project on cultural resources. Any information or comments you may be able to provide will be appreciated. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

Journ June

Jeff Knack Chief, Environmental Analysis and Compliance Branch

2 Encls



February 8, 2013

Planning and Environmental Division Environmental Analysis and Compliance Branch

Principal Chief Leonard Harjo Seminole Nation of Oklahoma P.O. Box 1498 Wewoka, OK 74884

Dear Principal Chief Harjo:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

In order to comply with Section 106, Tulsa Port of Catoosa engaged Cojeen Archaeological Services to conduct an archaeological investigation of the entire project area. The investigation included the area proposed for the land sale, barge fleeting area, bridge over Bird Creek, fill transport road, and land removal at the point of confluence for Bird Creek and the Verdigris River. The investigations are detailed in two separate reports, which are enclosed.

Two historic archaeological sites, 34RO343 and 34RO347, were identified in the investigations. No prehistoric archaeological sites or historic standing structures were identified. Neither 34RO343 nor 34RO347 appear to retain sufficient integrity to be considered eligible for listing on the National Register of Historic Places.

Please review this area for information that you may be willing to share with us on archaeological or historic sites, sacred sites, or traditional cultural properties that may be significant to you. Information you may be able to provide will assist us in assessing the effects of the proposed project on cultural resources. Any information or comments you may be able to provide will be appreciated. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

Journ Dunn

Jeff Khack Chief, Environmental Analysis and Compliance Branch



February 8, 2013

Planning and Environmental Division Environmental Analysis and Compliance Branch

Principal Chief John Red Eagle Osage Nation, Oklahoma P.O. Box 779 Pawhuska, OK 74056

Dear Principal Chief Red Eagle:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

In order to comply with Section 106, Tulsa Port of Catoosa engaged Cojeen Archaeological Services to conduct an archaeological investigation of the entire project area. The investigation included the area proposed for the land sale, barge fleeting area, bridge over Bird Creek, fill transport road, and land removal at the point of confluence for Bird Creek and the Verdigris River. The investigations are detailed in two separate reports, which are enclosed.

Two historic archaeological sites, 34RO343 and 34RO347, were identified in the investigations. No prehistoric archaeological sites or historic standing structures were identified. Neither 34RO343 nor 34RO347 appear to retain sufficient integrity to be considered eligible for listing on the National Register of Historic Places.

Please review this area for information that you may be willing to share with us on archaeological or historic sites, sacred sites, or traditional cultural properties that may be significant to you. Information you may be able to provide will assist us in assessing the effects of the proposed project on cultural resources. Any information or comments you may be able to provide will be appreciated. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

Journ Dunn Jeff Knack

Jeff Knack Chief, Environmental Analysis and Compliance Branch



February 8, 2013

Planning and Environmental Division Environmental Analysis and Compliance Branch

Principal Chief A.D. Ellis Muscogee (Creek) Nation, Oklahoma P.O. Box 580 Okmulgee, OK 74447

Dear Principal Chief Ellis:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

In order to comply with Section 106, Tulsa Port of Catoosa engaged Cojeen Archaeological Services to conduct an archaeological investigation of the entire project area. The investigation included the area proposed for the land sale, barge fleeting area, bridge over Bird Creek, fill transport road, and land removal at the point of confluence for Bird Creek and the Verdigris River. The investigations are detailed in two separate reports, which are enclosed.

Two historic archaeological sites, 34RO343 and 34RO347, were identified in the investigations. No prehistoric archaeological sites or historic standing structures were identified. Neither 34RO343 nor 34RO347 appear to retain sufficient integrity to be considered eligible for listing on the National Register of Historic Places.

Please review this area for information that you may be willing to share with us on archaeological or historic sites, sacred sites, or traditional cultural properties that may be significant to you. Information you may be able to provide will assist us in assessing the effects of the proposed project on cultural resources. Any information or comments you may be able to provide will be appreciated. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

Jeff Knack Chief, Environmental Analysis and Compliance Branch



February 8, 2013

Planning and Environmental Division Environmental Analysis and Compliance Branch

Mekko Tiger Hobia Kialegee Tribal Town, Oklahoma P.O. Box 332 Wetumka, OK 74883

Dear Mekko Hobia:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

In order to comply with Section 106, Tulsa Port of Catoosa engaged Cojeen Archaeological Services to conduct an archaeological investigation of the entire project area. The investigation included the area proposed for the land sale, barge fleeting area, bridge over Bird Creek, fill transport road, and land removal at the point of confluence for Bird Creek and the Verdigris River. The investigations are detailed in two separate reports, which are enclosed.

Two historic archaeological sites, 34RO343 and 34RO347, were identified in the investigations. No prehistoric archaeological sites or historic standing structures were identified. Neither 34RO343 nor 34RO347 appear to retain sufficient integrity to be considered eligible for listing on the National Register of Historic Places.

Please review this area for information that you may be willing to share with us on archaeological or historic sites, sacred sites, or traditional cultural properties that may be significant to you. Information you may be able to provide will assist us in assessing the effects of the proposed project on cultural resources. Any information or comments you may be able to provide will be appreciated. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

Jeff Knack Chief, Environmental Analysis and Compliance Branch



February 8, 2013

Planning and Environmental Division Environmental Analysis and Compliance Branch

Chairperson Brenda Shemayme Edwards Caddo Indian Tribe of Oklahoma P.O. Box 487 Binger, OK 73009

Dear Chairperson Edwards:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

In order to comply with Section 106, Tulsa Port of Catoosa engaged Cojeen Archaeological Services to conduct an archaeological investigation of the entire project area. The investigation included the area proposed for the land sale, barge fleeting area, bridge over Bird Creek, fill transport road, and land removal at the point of confluence for Bird Creek and the Verdigris River. The investigations are detailed in two separate reports, which are enclosed.

Two historic archaeological sites, 34RO343 and 34RO347, were identified in the investigations. No prehistoric archaeological sites or historic standing structures were identified. Neither 34RO343 nor 34RO347 appear to retain sufficient integrity to be considered eligible for listing on the National Register of Historic Places.

Please review this area for information that you may be willing to share with us on archaeological or historic sites, sacred sites, or traditional cultural properties that may be significant to you. Information you may be able to provide will assist us in assessing the effects of the proposed project on cultural resources. Any information or comments you may be able to provide will be appreciated. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

Jeff Knack

Jeff Knack Chief, Environmental Analysis and Compliance Branch



February 8, 2013

Planning and Environmental Division Environmental Analysis and Compliance Branch

President Leslie Standing Wichita and Affiliated Tribes of Oklahoma P.O. Box 729 Anadarko, OK 73005

Dear President Standing:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

In order to comply with Section 106, Tulsa Port of Catoosa engaged Cojeen Archaeological Services to conduct an archaeological investigation of the entire project area. The investigation included the area proposed for the land sale, barge fleeting area, bridge over Bird Creek, fill transport road, and land removal at the point of confluence for Bird Creek and the Verdigris River. The investigations are detailed in two separate reports, which are enclosed.

Two historic archaeological sites, 34RO343 and 34RO347, were identified in the investigations. No prehistoric archaeological sites or historic standing structures were identified. Neither 34RO343 nor 34RO347 appear to retain sufficient integrity to be considered eligible for listing on the National Register of Historic Places.

Please review this area for information that you may be willing to share with us on archaeological or historic sites, sacred sites, or traditional cultural properties that may be significant to you. Information you may be able to provide will assist us in assessing the effects of the proposed project on cultural resources. Any information or comments you may be able to provide will be appreciated. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

Journ Jum Jeff Knack

Jeff Knack Chief, Environmental Analysis and Compliance Branch

-2-



February 8, 2013

Planning and Environmental Division Environmental Analysis and Compliance Branch

Chief George Wickliffe United Keetoowah Band of Cherokee Indians in Oklahoma P.O. Box 746 Tahlequah, OK 74465-0746

Dear Chief Wickliffe:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

In order to comply with Section 106, Tulsa Port of Catoosa engaged Cojeen Archaeological Services to conduct an archaeological investigation of the entire project area. The investigation included the area proposed for the land sale, barge fleeting area, bridge over Bird Creek, fill transport road, and land removal at the point of confluence for Bird Creek and the Verdigris River. The investigations are detailed in two separate reports, which are enclosed.

Two historic archaeological sites, 34RO343 and 34RO347, were identified in the investigations. No prehistoric archaeological sites or historic standing structures were identified. Neither 34RO343 nor 34RO347 appear to retain sufficient integrity to be considered eligible for listing on the National Register of Historic Places.

Please review this area for information that you may be willing to share with us on archaeological or historic sites, sacred sites, or traditional cultural properties that may be significant to you. Information you may be able to provide will assist us in assessing the effects of the proposed project on cultural resources. Any information or comments you may be able to provide will be appreciated. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

Journ Durn MJeff Knack

Jeff Knack Chief, Environmental Analysis and Compliance Branch



February 8, 2013

Planning and Environmental Division Environmental Analysis and Compliance Branch

Principal Chief Bill John Baker Cherokee Nation, Oklahoma P.O. Box 948 Tahlequah, OK 74465

Dear Principal Chief Baker:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

In order to comply with Section 106, Tulsa Port of Catoosa engaged Cojeen Archaeological Services to conduct an archaeological investigation of the entire project area. The investigation included the area proposed for the land sale, barge fleeting area, bridge over Bird Creek, fill transport road, and land removal at the point of confluence for Bird Creek and the Verdigris River. The investigations are detailed in two separate reports, which are enclosed.

Two historic archaeological sites, 34RO343 and 34RO347, were identified in the investigations. No prehistoric archaeological sites or historic standing structures were identified. Neither 34RO343 nor 34RO347 appear to retain sufficient integrity to be considered eligible for listing on the National Register of Historic Places.

Please review this area for information that you may be willing to share with us on archaeological or historic sites, sacred sites, or traditional cultural properties that may be significant to you. Information you may be able to provide will assist us in assessing the effects of the proposed project on cultural resources. Any information or comments you may be able to provide will be appreciated. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

John Dun Jeff Knack

✓ Jeff Knack Chief, Environmental Analysis and Compliance Branch



February 8, 2013

Planning and Environmental Division Environmental Analysis and Compliance Branch

Dr. Robert Brooks Oklahoma Archeological Survey 111 E. Chesapeake Norman, OK 73019-5111

Dear Dr. Brooks:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

(with an accompanying cultural resources survey) under Section 404 of the Clean Water Act, for which a permit may be required.

In order to comply with Section 106, Tulsa Port of Catoosa engaged Cojeen Archaeological Services to conduct an archaeological investigation of the entire project area. The investigation included the area proposed for the land sale, barge fleeting area, bridge over Bird Creek, fill transport road, and land removal at the point of confluence for Bird Creek and the Verdigris River. The investigations are detailed in two separate reports, which are enclosed.

Two historic archaeological sites, 34R0343 and 34R0347, were identified in the investigations. No prehistoric archaeological sites or historic standing structures were identified. Neither 34R0343 nor 34R0347 appear to retain sufficient integrity to be considered eligible for listing on the National Register of Historic Places.

We request your comment on our determination of "not eligible" for archaeological sites 34RO343 and 34RO347, and on our determination of "no historic properties affected" for the proposed sale of federal land and all connected actions associated with the construction of the barge fleeting area for the Tulsa Port of Catoosa. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

Janya Dun Jeff Knack

Jeff Knack Chief, Environmental Analysis and Compliance Branch



February 8, 2013

Planning and Environmental Division Environmental Analysis and Compliance Branch

Dr. Bob Blackburn State Historic Preservation Officer Oklahoma Historical Society Oklahoma History Center 800 Nazih Zuhdi Dr. Oklahoma City, OK 73105

Dear Dr. Blackburn:

This letter is to initiate consultation as required by Section 106 of the National Historic Preservation Act (NHPA) of 1966 (as amended) for the proposed sale of approximately 50 acres of federal land to the Tulsa Port of Catoosa on the McClellan-Kerr Arkansas River Navigation System. The area proposed for sale is owned and managed by the U.S. Army Corps of Engineers, Tulsa District. The legal description of the area encompasses the following: Portions of Sections 8, 16, and 17 T 20N, R15E in Rogers County, Oklahoma.

Connected to the proposed sale of approximately 50 acres of federal land, the Tulsa Port of Catoosa proposes to construct a barge fleeting area in a portion of the old Bird Creek channel immediately west of the Verdigris River. The barge fleeting area will function as a "parking lot" for barges and enable the Port to serve increasing volumes of shipping cargo. Current plans call for the portion of the old Bird Creek channel to be widened to approximately 300 feet in order to accommodate the barges. This work will require both banks of the channel to be trimmed back significantly and for the channel to be deepened.

immediate west of the project area and deposited on Tulsa Port of Catoosa property. This action will be handled separately (with an accompanying cultural resources survey) under Section 404 of the Clean Water Act, for which a permit may be required.

In order to comply with Section 106, Tulsa Port of Catoosa engaged Cojeen Archaeological Services to conduct an archaeological investigation of the entire project area. The investigation included the area proposed for the land sale, barge fleeting area, bridge over Bird Creek, fill transport road, and land removal at the point of confluence for Bird Creek and the Verdigris River. The investigations are detailed in two separate reports, which are enclosed.

Two historic archaeological sites, 34RO343 and 34RO347, were identified in the investigations. No prehistoric archaeological sites or historic standing structures were identified. Neither 34RO343 nor 34RO347 appear to retain sufficient integrity to be considered eligible for listing on the National Register of Historic Places.

We request your comment on our determination of "not eligible" for archaeological sites 34RO343 and 34RO347, and on our determination of "no historic properties affected" for the proposed sale of federal land and all connected actions associated with the construction of the barge fleeting area for the Tulsa Port of Catoosa. If you have any questions, please contact Mr. Ken Shingleton at 918-669-7661.

Sincerely,

Jory Dun

APPENDIX C

AGENCY AND PUBLIC COORDINATION

U. S. DEPARTMENT OF COMMERCE ECONOMIC DEVELOPMENT ADMINISTRATION

U.S. ARMY CORPS OF ENGINEERS

TULSA PORT OF CATOOSA

SCOPING MEETING

for

BARGE FLEETING AREA ENVIRONMENTAL ASSESSMENT at the

Tulsa Port of Catoosa, Oklahoma

Meeting Date: Time: Location:	10:00 a.m.		
Attendees: Dr. Jonathon Markley		U.S. Dept. of Commerce, Economic Development Admin (EDA) 512.381.8156 <u>jmarkley@eda.doc.gov</u>	
Rick Gardner		U.S. Army Corps of Engineers (USACE) 918.669.7090 <u>Rick.gardner@usace.army.mil</u>	
Shane Charlson		USACE Regulatory 918.669.7395 <u>Shane.charlson@usace.army.mil</u>	
Steve Nolan		USACE Environmental 918.669.7660 <u>Stephen.I.nolan@usace.army.mil</u>	
Mark Moore		USACE	
Patricia Newell		USACE 918.669.4937 <u>Patricia.a.newell@usace.army.mil</u>	

Attendees (Continued):

Ken Shingleton	USACE Cultural Resources 918.669.7661 <u>Kenneth.I.shingleton@usace.army.mil</u>
Richard Stark	U.S. Fish & Wildlife Service (USFWS) 918.382.4520 <u>Richard_stark@fws.gov</u>
Cheryl Brown	Indian Nations Council of Governments (INCOG) 918.579.9483 <u>cbrown@incog.org</u>
David Yarbrough	Tulsa Port of Catoosa (TPC) 918.266.2291 <u>david@tulsaport.com</u>
Scott Legate	PSA-Dewberry (PSA-D) 918.295.5262 <u>slegate@dewberry.com</u>
Craig Swengle	PSA-Dewberry (PSA-D) 918.295.5255 <u>cswengle@dewberry.com</u>

PLEASE NOTE: These Meeting Notes constitute PSA-D's recollection of the items discussed and decisions reached at this meeting. Please contact Craig Swengle by cob Thursday, November XXth with changes that are required of these notes.

DISCUSSION ITEMS

David Yarbrough, Tulsa Port of Catoosa (TPC), briefed group on the Port's plans to construct a Barge Fleeting Area 300 feet wide by 2,100 feet long ... large enough to store upwards of 60 barges. The Port's concept is to construct this slack water arm of the Port along the old Verdigris River channel. Drawing that was used as an exhibit is attached.

Rick Gardner, U.S. Army Corps of Engineers (USACE) briefed the group on the land swap that has been proposed to facilitate the Barge Fleeting Area. A green / red shaded figure was used to explain the limits of the USACE and TPC land that could change ownership. The TPC would use the current USACE land (85 acres) for the barge fleeting area and for mitigation of the land that will be removed from riparian habitat. The USACE would use the current TPC land (34 acres) as a dredge spoil storage area.

USACE will need to have both parcels appraised as part of the Land Swap process.

NEPA documents will be required for both the Land Swap and the Barge Fleeting Area construction. USACE agreed to combine the two documents in order to shorten the Project timeframe. EDA will share in the cost of preparing the NEPA Document.

USACE NEPA requirements –

- Grown to Fleeting area,
- Construction, disposal,
- Social, economics, traffic patterns,
- Broad analysis,
- Disposal areas.

The NEPA Document can be prepared by a consultant as long as the Document meets the applicable requirements and is adopted by USACE. The same goes for the preparation of Section 404 and 10 permits.

Prepare only one document, will e-mail to attendees.

Cultural Resources field survey, information already sent to Oklahoma State Historic Preservation Office (SHPO), but no comments received back yet. Dr. Bob Perocks (?) indicated that there will likely be buried archeological sites in this area.

Pedestrian survey and limited subsurface investigation will be likely required. Pre-historic archeology sites are a possibility. SHPO is focused on buried archeological sites. What triggered this requirement was not USACE obtaining 34 acres but disposing of the 85 acres and the construction of a new channel.

Dumping dredged material is not a problem, but construction of dikes will be a problem.

Geomorphology. A previous study was done in the 3-forks area. USACE will contract this out as well as EDA. Geotechnical investigation and field samples can be done by same firm. Not interested in rock, archeology only is possible in the earthen area.

Waste site is the same as a dredge disposal area.

National Historical Preservation Act -

- EIS: Environmental Impact Statement,
- EA: Environmental Assessment,
- FONSI: Finding of No Significant Impact

The USACE EA will likely cover the EA required for the 404 Permit

Ken Shingleton summarized the requirements for the Cultural Resources studies -

Step 2 – Testing, limited archeological work required, archival research, eligible for register, adverse affect, mitigation, photos, architectural drawings.

If buried archeological site found, then a Memorandum of Agreement will need to be worked out with SHPO and the State Archeologist.

SHPO website has a list of recommended archeological study consultants.

David Yarbrough asked if the Port should be meeting with SHPO? No, SHPO coordination should be left up to USACE and EDA.

Shane Charlson briefly discussed permitting items -

- Shane is the point of contact for the 404 and 10 permits.
- Depending on value of the site ????
- Tribal coordination will be required as part of the 404 permit. This coordination will be government to government. Shane will prepare the Gov't to Gov't letter.
- USACE will be the lead agency for the 404 permit. EDA is the lead agency for the entire project.
- Good analysis of barge fleeting alternatives will be required.
- Studies will need to cover waste sites, effected streams, and whatever mitigation is required.
- Once Final Design is complete, then the 404 permit can be finalized.

Wetland Delineation is important. This can be contracted out to a consultant. Wetlands will need to be delineated on all of the EDA construction project related areas, including the barge fleeting channel and all excavated material fill sites.

Richard Stark with USFWS summarized the requirements of the Endangered Species Act -

- Need to get the Rogers County list of endangered and threatened species. There is a good likelihood that these species will be present somewhere within the project limits.
- A written analysis will be required to be prepared. List alternatives to proposed construction.
- If there is no effect whatsoever, then put this in writing, file it, and do not contact USFWS.
- If there is an effect, then prepare a Section 7 consultation.
- If a Formal consultation is required, then it is a 130-day plus process.
- American Burying Beetle, if project greater than 1.2 acres, then surveys will be required along the barge channel and within the limits of the excavated material fill sites. Surveys are only valid for one year. May 15 thru September 15 is the active season for the Beetle. Trappings can only be done within the window of time.
- Oklahoma Ecological Services website has a list of authorized American Burying Beetle trappers.
- Fish and Wildlife Coordination Act protects against impacts to animal and plant habitat.
- There will definitely be stream / riparian issues.
- Temporary access to the Corps' island can be permitted under the Nationwide Permit 33. This permit can be approved by USACE (Shane Charlson) in one week.
- The Port and USACE already have a real estate right-of-entry in place for the Corps' island.

Bottomland Hardwood Wetlands -

• USACE believes that most if not all of the recently Port-purchased 500 acres was formerly Bottomland Hardwood Wetlands.

- In areas that have restorative acreage, the mitigation ratio is 3 to 1, for every acre that is disturbed, 3 acres must be restored.
- In areas that does not have restorative acreage, the mitigation ratio is 10 to 1, for every acre disturbed ten acres must be restored.
- USACE stated that a corridor along the old Bird Creek channel will not be enough mitigation for the amount of disturbance area being discussed. Port should be ready to restore agricultural fields as part of the mitigation requirements.

EA requires a Public Scoping Meeting be held -

- Meeting will be for the general public and will provide information of the upcoming Port plans.
- These meetings are typically informal in nature, with a come & go format.
- Normally 2 to 4 weeks notice is given.
- Port can host the meeting at their offices.
- Representatives need to be present from EDA, USACE, USFWS, and TPC.
- Meetings should not be held on Wednesday. Best weekdays are Tuesday or Thursday.
- Once the Public Meeting is held, that fulfills the EA's public notice requirement.

Rick Gardner summarized the final steps -

- NEPA Document must be completed before EDA grant can be awarded.
- Land swap between TPC and USACE cannot start until a FONSI is issued and approved.
- A 401 Certification will be required from the Oklahoma Department of Environmental Quality (ODEQ).
- Finding of Sustibility to transfer ...(?)
- The 404 permit is not tied to the Land Swap.
- An Environmental Phase I is required for the Land Swap, therefore USACE will complete this process and will pay for it.
- If contamination is found, USACE will clean it up before the transfer can take place.
- The transfer execution order requires a 30-day notice.
- The draft EA will be sent out by USACE on CD to multiple agencies for a 30-day review period. This is normal practice for USACE.
- Public notices are required for the Public Scoping Meeting and the Draft EA Review.

USACE offered that fees for just the consultants to do the Archeology and Wetland Delineation could be in the neighborhood of \$325,000.

David Yarbrough reported that the proposal for determining whether or not the Bird Creek floodplain could be used as an excavation fill site is being prepared and will likely be approved in the coming weeks.

END OF MEETING

Mailing List for Port of Catoosa Land Exchange Environmental Assessment Coordination Revised 2/1/2013

Honorable Mary Fallin Governor of Oklahoma State Capitol Building 2300 North Lincoln Boulevard, Room 212 Oklahoma City, OK 73105

Honorable James M Inhofe U. S. Senator 1900 NW Expressway, Suite 1210 Oklahoma City, OK 73118

Honorable Tom Coburn U. S. Senator 100 North Broadway, Suite 1820 Oklahoma City, OK 73102

Honorable James F Bridenstein Representative in Congress, District 001 2448 E 81st Street Tulsa, OK 74137

Honorable Markwayne Mullin Representative in Congress, District 002 104 South Muskogee Claremore, OK 74017

Senator Nathan Dahm State Senate, District 033 2300 North Lincoln Blvd., Rm. 533A Oklahoma City, OK 73105

Senator Rick Brinkley State Senate, District 034 2300 North Lincoln Blvd., Rm. 512 Oklahoma City, OK 73105

Senator Bill Brown State Senate, District 036 2300 North Lincoln Blvd., Rm. 413A Oklahoma City, OK 73105 Senator Sean Burrage State Senate, District 002 2300 N. Lincoln Blvd., Rm. 522 Oklahoma City, OK 73105

Senator Brian Crain State Senate, District 039 2300 North Lincoln Blvd., Rm. 417B Oklahoma City, OK 73105

Senator Kim David State Senate, District 018 2300 North Lincoln Blvd., Room 428B Oklahoma City, OK 73105

Senator Jabar Shumate State Senate, District 011 2300 North Lincoln Blvd., Rm. 521 Oklahoma City, OK 73105

Senator Dan Newberry State Senate, District 037 2300 North Lincoln Blvd., Rm. 414 Oklahoma City, OK 73105

Senator Gary Stanislawski State Senate, District 035 2300 North Lincoln Blvd., Room 427A Oklahoma City, OK 73105

Senator Earl Garrison State Senate, District 009 2300 North Lincoln Blvd., Room 528A Oklahoma City, OK 73105

Senator Mike Mazzei State Senate, District 025 2300 North Lincoln Blvd., Room 424 Oklahoma City, OK 73105

Senator Wayne Shaw State Senate, District 003 2300 North Lincoln Blvd., Rm. 513A Oklahoma City, OK 73105 Representative Earl Sears State Representative, District 011 2300 North Lincoln Blvd., Rm. 333 Oklahoma City, OK 73105

Representative Glen Mulready State Representative, District 068 2300 north Lincoln Blvd., Rm. 338 Oklahoma City, OK 73105

Representative Wade Rousselot State Representative, District 012 2300 North Lincoln Blvd., Rm. 507 Oklahoma City, OK 73105

Representative David Derby State Representative, District 074 Post Office Box 2150 Owasso, OK 74055

Representative Jerry McPeak State Representative, District 013 2300 North Lincoln Blvd., Rm. 503 Oklahoma City, OK 73105

Representative Arthur Hulbert State Representative, District 014 2300 North Lincoln Blvd., Rm. 321 Oklahoma City, OK 73105

Representative Skye McNeil State Representative, District 029 2300 North Lincoln Blvd., Rm. 433-B Oklahoma City, OK 73105

Representative Mark McCullough State Representative, District 030 2300 North Lincoln Blvd., Rm. 435-A Oklahoma City, OK 73105

Representative Sean Roberts State Representative, District 036 2300 North Lincoln Blvd., Rm. 537-B Oklahoma City, OK 73105 Representative Marty Quinn State Representative, District 009 2300 North Lincoln Blvd., Rm. 300-C Oklahoma City, OK 73105

Representative Fred Jordan State Representative, District 069 2300 North Lincoln Blvd., Rm. 405 Oklahoma City, OK 73105

Representative Dan Kirby State Representative, District 075 2300 North Lincoln Blvd., Rm. 302-B Oklahoma City, OK 73105

Representative Jadine Nollan State Representative, District 066 2300 North Lincoln Blvd., Rm. 329-A Oklahoma City, OK 73105

Representative Jeannie McDaniel State Representative, District 078 2300 North Lincoln Blvd., Rm. 508 Oklahoma City, OK 73105

Representative Ken Walker State Representative, District 070 2300 North Lincoln Blvd., Rm. 317 Oklahoma City, OK 73105

Representative Pam Peterson State Representative, District 067 2300 North Lincoln Blvd., Rm. 442 Oklahoma City, OK 73105

Representative Eric Proctor State Representative, District 077 2300 North Lincoln Blvd., Rm. 540-A Oklahoma City, OK 73105

Representative Mike Ritze State Representative, District 080 2300 North Lincoln Blvd., Rm. 303-A Oklahoma City, OK 73105 Representative Seneca Scott State Representative, District 072 2300 North Lincoln Blvd., Rm. 539 Oklahoma City, OK 73105

Representative Ben Sherrer State Representative, District 008 2300 North Lincoln Blvd., Rm. 500 Oklahoma City, OK 73105

Representative Kevin Matthews State Representative, District 073 2300 North Lincoln Blvd., Rm. 510-B Oklahoma City, OK 73105

Representative Terry O'Donnell State Representative, District 023 2300 North Lincoln Blvd., Rm. 319 Oklahoma City, OK 73105

Representative John Trebilcock State Representative, District 098 2300 North Lincoln Blvd., Rm. 410 Oklahoma City, OK 73105

Representative Weldon Watson State Representative, District 079 2300 North Lincoln Blvd., Rm. 302 Oklahoma City, OK 73105

Representative David Brumbaugh State Representative, District 076 2300 North Lincoln Blvd., Rm. 400B Oklahoma City, OK 73105

Mr. Mike Helm, Commissioner Rogers County District 2 6190 E. 400 Road Oologah, OK 74053

Mr. Kirt Thacker, Commissioner Rogers County District 3 2425 S. Warehouse Road Claremore, OK 74019 Mr. Dan DeLozier, Commissioner Rogers County District 1 1201 S. Maple Chelsea, OK 74016

Mr. Ron Curry Federal Region VI Administrator U. S. Environmental Protection Agency 1445 Ross Ave., Suite 1200 Dallas, TX 75202

Mr. Larry Curtis, CFM Rogers County Floodplain Administrator 219 South Missouri, Room 102 Claremore, OK 74017

Dr. Dixie Porter, Field Supervisor U.S. Fish and Wildlife Service Oklahoma Ecological Services Field Office 9014 E. 21st St. Tulsa, OK 74129- 1428

Mr. Ronald L. Hilliard State Conservationist USDA, Natural Resources Conservation Service 100 USDA, Suite 206 Stillwater, OK 74074-2655

Ms. Kim Winton Director, Oklahoma Water Science Center U.S. Geological Survey, South Central Area 202 NW 66th, Building 7 Oklahoma City, OK 73116

Ms. Deidre Smith, Manager Waterways Branch Oklahoma Department of Transportation 4002 North Mingo Valley Expressway Tulsa, OK 74116-5002

Mr. Dave Lopez, Secretary Oklahoma Department of Commerce 900 North Stiles Ave. Oklahoma City, OK 73104 Mr. Richard Hatcher Director Oklahoma Department of Wildlife Conservation 1801 N. Lincoln Blvd. Oklahoma City, OK 73105

Mr. Steve Thompson Executive Director Oklahoma Department of Environmental Quality P.O. Box 1677 Oklahoma City, OK 73101-1677

Mr. J. D. Strong Executive Director Oklahoma Water Resources Board 3800 N. Classen Boulevard Oklahoma City, OK 73118

Mr. Derek Smithee Chief, Water Quality Programs Division 3800 North Classen Boulevard Oklahoma City, OK 73118

Mr. Mike Thralls Executive Director Oklahoma Conservation Commission 2800 N. Lincoln Blvd., Suite 160 Oklahoma City, OK 73105

Ms. Shanon Phillips, Director Water Quality Programs Oklahoma Conservation Commission 2800 N. Lincoln Blvd., Suite 160 Oklahoma City, OK 73105

Mr. Ian H. Butler Oklahoma Natural Heritage Inventory Oklahoma Biological Survey 111 E. Chesapeake Street Norman, OK 73019-0575

INCOG Attn: Richard Smith, Manager Environmental and Engineering Services 2 West 2nd Street, Suite 800 Tulsa, OK 74103 INCOG Attn: Julie Miner, Principal Economic Development Planner Economic Development 2 West 2nd Street, Suite 800 Tulsa, OK 74103

Dr. Robert L. Brooks University of Oklahoma Oklahoma Archeological Survey 111 E. Chesapeake Norman, OK 73019-0575

Dr. Bob Blackburn State Historic Preservation Officer Oklahoma Historical Society Oklahoma History Center 800 Nazih Zuhdi Drive Oklahoma City, OK 73105

Chief Tarpie Yargee Alabama-Quassarte Tribal Town, Oklahoma PO Box 187 Wetumka, OK 74883

Principal Chief Bill John Baker Cherokee Nation, Oklahoma PO Box 948 Tahlequah, OK 74465

Mekko Tiger Hobia Kialegee Tribal Town, Oklahoma PO Box 332 Wetumka, OK 74883

Principal Chief George Tiger Muscogee (Creek) Nation, Oklahoma PO Box 580 Okmulgee, OK 74447

Chairperson Brenda Shemayme Edwards Caddo Nation, Oklahoma PO Box 487 Binger, OK 73009 Mekko George Scott Thlopthlocco Tribal Town, Oklahoma PO Box 188 Okemah, OK 74859

Chief George Wickliffe United Keetoowah Band of Cherokee Indians in Oklahoma PO Box 746 Tahlequah, OK 74465-0746

Governor Bill Anoatubby Chickasaw Nation, Oklahoma PO Box 1548 Ada, OK 74821

Principal Chief John Red Eagle Osage Tribe, Oklahoma PO Box 779 Pawhuska, OK 74056

President Terri Parton Wichita and Affiliated Tribes of Oklahoma PO Box 729 Anadarko, OK 73005

Principle Chief Leonard Harjo Seminole Nation of Oklahoma PO Box 1498 Wewoka, OK 74884

Chief Gregory E. Pyle Choctaw Nation, Oklahoma PO Drawer 1210 16th and Locust Street Durant, OK 74072-1210

Mr. N. Cord Colwell District Conservationist Claremore Field Service Center 1900 W. Will Rogers Circle, Suite C Claremore, OK 74017-1319 Jonathan L. Markley, Ph.D. Regional Environmental Officer US Department of Commerce Economic Development Administration 504 Lavaca, Suite 1100 Austin, TX 78701-2858

U. S. DEPARTMENT OF COMMERCE EDA U.S. ARMY CORPS OF ENGINEERS TULSA PORT OF CATOOSA

SCOPING CLARIFICATION MEETING

for

BARGE FLEETING AREA ENVIRONMENTAL ASSESSMENT at the Tulsa Port of Catoosa, Oklahoma

Meeting Date: Time: Location:	September 21, 2009 10:30 a.m. USACE Conference Room #		
Attendees: Rick Gardner	U.S. Army Corps of Engineers (USACE) 918.669.7090 <u>Rick.gardner@usace.army.mil</u>		
Shane Charlson	USACE Regulatory 918.669.7395 Shane.charlson@usace.army.mil		
Steve Nolen	USACE Environmental 918.669.7660 <u>Stephen.I.nolen@usace.army.mil</u>		
Ken Shingleton	USACE Cultural Resources 918.669.7661 <u>Kenneth.I.shingleton@usace.army.mil</u>		
Keith Francis	USACE		
John Tenner	USACE		
David Yarbrough	Tulsa Port of Catoosa (TPC) 918.266.2291 david@tulsaport.com		

PSA-Dewberry (PSA-D) 918.295.5255 cswengle@dewberry.com

No one was in attendance at this meeting from U.S. Dept. of Commerce EDA.

PLEASE NOTE: These Meeting Notes constitute PSA-D's recollection of the items discussed and decisions reached at this meeting. Please contact Craig Swengle by cob Thursday, November XXth with changes that are required of these notes.

DISCUSSION ITEMS

David Yarbrough, Tulsa Port of Catoosa (TPC), thanked everyone for making time to meet and explained that there were a couple of items that he wanted to discuss with USACE in order to have a better idea of what would be required with the Environmental Assessment (EA) document the Port was about to embark on. He reported that Dewberry had submitted a fee proposal to prepare the EA and the Port had it under consideration.

Topics discussed included:

- The Land Exchange process between the Tulsa Port of Catoosa (TPC) and USACE cannot begin until the EA document has been prepared, reviewed, and accepted and a FONSI has been determined and signed.
- Nationwide Permit 33 is a permit that allows access to be constructed across waterways for temporary purposes only. TPC and Dewberry (TPC's Engineer) has discussed numerous ways to cross the Bird Creek Cutoff in order to gain access to the Corps' Island, including corrugated metal pipes topped with aggregate, a surplus military Bailey bridge, and the use of barges. Each of these ideas looked to have fatal flaws; CMPs with aggregate surface - Bird Creek Cutoff is upwards of 10 feet deep; surplus bridge – significant design would still be required to make such a bridge safe to transport construction loaded vehicles; and barge use – too dependent on Verdigris River water levels and barge availability

The latest idea is to cross the former Verdigris River Channel near where is joins with the former Bird Creek Channel. During a recent boat tour of the area, the depth of the former River channel dwindled to less than 18 inches the farther south the boat went. Crossing the channel with metal pipes and an aggregate surface would be feasible in this case and this location would be less likely to wash out since the current along this reach is not as strong even in flood events. USACE agreed that this would be a better crossing alternative.

Land access could be provided along the former Route 66 alignment, along which TPC has an agreement with the landowner to access the TPC land south of Bird Creek.

• TPC needed a clarification of how Bottomland Hardwood Wetlands are defined. Shane Charlson stated that any area having the traits of a Bottomland Hardwood Wetland would be defined as one. He said that most of the new 500 acres appears to have those

traits and could be reverted back to wetlands. TPC noted that the the majority of the 500 acres has been farmed for many years, as long as the current Port Director can remember. Mr. Charlson said even so that does not matter. Any man-made use over 5 years old that changes is required to revert back to wetlands

- What areas should the EA cover?
- 404 / 10 Permits
- Pre-construction notification, submit paperwork

END OF MEETING

U.S. ARMY CORPS OF ENGINEERS, TULSA DISTRICT

TULSA PORT OF CATOOSA

INITIAL ENVIRONMENTAL RESULTS REVIEW MEETING

for

BARGE FLEETING AREA ENVIRONMENTAL ASSESSMENT Tulsa Port of Catoosa, Oklahoma

Meeting Date:	May 3, 2011
Time:	9:30 a.m.
Location:	USACE – Tulsa District Offices

Attendees:	Connie Holliday	USACE – Real Estate	918.669.7688
	Ken Shingleton	USACE – Environmental	918.669.7661
	Patricia Newell	USACE – Environmental	918.669.4937
	Shane Charlson	USACE - Regulatory Office	918.669.7395
	Ed Parisotto	USACE - Regulatory Office	918.669.7549
	Keith Francis	USACE – Counsel	918.669.7364
	Doug Beck	USACE – Counsel	918.669.7178
	Patrick McQueen	USACE – Operations	918.775.4475 x- 5815
	Kenneth Todd	USACE – Navigation	918.687.4501
	Tom Heathcock	USACE – Ft. Gibson Office	918.682.4314
	Gary Sallee	Consultant – USACE	918.669.7264
	Bob Portis	Tulsa Port of Catoosa	918.266.2291
	David Yarbrough	Tulsa Port of Catoosa	918.266.2291
	Kim Shannon	Kleinfelder – Environmental	918.627.6161
	Mike Arand	PSA-Dewberry	918.295.5226
	Andrea Burk	Dewberry	973.576.9681
	Brian Sayre	Dewberry	973.576.9637
	Matt Schlitzer	Dewberry	973.576.9638
	Craig Swengle	PSA-Dewberry	918.295.5255

NOTE: These Meeting Notes constitute Dewberry's recollection of the topics discussed and

decisions reached at this meeting.

Recorded By: Craig Swengle



DISCUSSION

Craig Swengle, PSA-Dewberry (PSA-D), facilitated the meeting. Dewberry displayed PowerPoint slides on the conference room's monitor and used them throughout the meeting to support the topics discussed. There were three goals for the meeting:

- Overview of Tulsa Port of Catoosa and the proposed Barge Fleeting Area;
- Review of Dewberry's initial environmental investigation findings; and
- Environmental Assessment approach and schedule.

David Yarbrough, Tulsa Port of Catoosa (TPC), briefed attendees on the Port's location, size, number of industries, shipping tonnage, method of operation, number of employees, and benefit to the Tulsa Metro region. David described the proposed Barge Fleeting Area, its proposed location on the former Verdigris River channel, and how this improvement will facilitate future Port growth.

Brian Sayre and Andrea Burk, Dewberry, presented a brief summary of Dewberry's findings in the following three areas:

- Archaeology;
- Natural Resources; and
- Wetlands.

Archaeology – Andrea Burk explained that no previously recorded archaeological sites are located within the project area. An initial archaeological investigation was conducted for the 30-acre Port-owned land. Although the remains of a 20th century building were recorded during this investigation, the site does not appear to be eligible for listing in the National Register of Historic Places and no further investigation is recommended. Ms. Burk explained that based on initial consultation with Ken Shingleton of the USACE, there is a concern regarding the potential for deeper buried deposits to exist in the project area. Such areas would be investigated in coordination with proposed geotechnical coring, and in consultation with the USACE.

Natural Resources – Brian Sayre explained that eight federally threatened, endangered or candidate species are listed for Rogers County that have the potential to occur at or near the project site. No critical habitat has been identified in Rogers County by the US Fish and Wildlife Service (USFWS) for these species. However, during the completed field activities, suitable habitat (approximately 50 acres) for the American Burying Beetle (ABB) was determined to be present within the study area. Further studies will be needed to determine the presence or absence of the ABB within the project area. Based on data requests and record reviews, no state listed species are believed to be present in the study area.

Wetlands – Brian Sayre stated that, based on field investigations, approximately 73 acres of potentially jurisdictional waters/wetlands and approximately 23 acres of potentially non-jurisdictional waters/wetlands were identified in the study area; however, the US Army Corps of Engineers (USACE) will ultimately decide what is under its jurisdiction based on an area's "nexus" to a jurisdictional water, i.e. either connected to or somehow associated with an adjacent, navigable waterway. A slide depicting these waters/wetlands was included in the presentation and a slide depicting the potential Historic Wetlands was also included. Two potential wetland mitigation areas were shown on a third slide; one being acreage in the



Riverside Business Park located between SH-266 and the Verdigris River and the other being acreage north of Bird Creek within the parcel purchased by the Port for development.

Craig Swengle explained that a companion project is nearing completion that identified the developable land within the purchased property when looked at solely from a floodplain perspective (i.e., not constrained by the floodplain). The 100-year floodplain boundary was relocated as close to the creek as possible without raising the 100-year water surface upstream. Since this area (green hatched area on slide) cannot have any buildings constructed within it, this area may be suitable for wetlands mitigation.

Shane Charlson, USACE, stated that wetland mitigation ratios can be as low as 1:1, but can go as high as 10:1 and that open water mitigation can be difficult. Matt Schlitzer asked if impacts and mitigation for open waters would be best described in linear feet of stream, to which Shane responded "yes". Shane stated that use of the former Bird Creek channel may be suitable for open water mitigation. Mr. Charlson also commented that the long, rectangular open water body on the Port property (the failed port project by another party) might also be suitable mitigation for open water impacts. A function and value assessment will need to be completed in order to determine what functions and values the mitigation must replace and what the mitigation ratio(s) would be. The Tulsa District does not have an officially adopted function/value assessment method, but on a prior project, Mr. Charlson said that the "Kansas City Stream Assessment" method had been used and was acceptable to commenting agencies.

Shane Charlson asked Kim Shannon if the areas of potential historic wetlands were researched to see if they were prior converted farmlands, as identified by the NRCS. This designation could have an impact on the overall amount of wetlands (including former wetlands) that will need to be mitigated, as well as on the amount of land that could be developed by the Port. Kim responded that she had not, but would look into it.

Ken Shingleton said there are no "red flags" in the materials that were presented. He also stated that there is nothing in the USACE process that will "kill" a project. However, depending upon what is required to mitigate potential impacts to the environment, the developer (Port) will have to determine if the Project is economically feasible.

Brian Sayre described the steps necessary for the **completion of the Environmental Assessment (EA)** for the proposed Barge Fleeting Area. Two areas were delineated on the slide; one was colored red and the other blue. The red areas have been evaluated for wetlands and natural resources. The rectangular red area has been investigated for archaeological resources, while the blue area has not. Dewberry is in the process of developing an approach and assembling updated project fees in order to complete the EA.

Craig Swengle summarized the **EA completion schedule**. The Port has asked that the EA be completed prior to the end of 2012. While Dewberry believes it is technically feasible to complete the field and office work within this timeframe, the question was posed if it is feasible for the EA to be completed in such a timeframe from the USACE's point of view? The USACE personnel stated that yes, the EA can be completed and reviewed within the described timeframe.

Connie Holliday, USACE, reviewed the draft **Right-of-Entry for Investigative Work** Agreement between the USACE and the Port of Catoosa. This agreement was drafted and circulated to the Port for review earlier in the week. The Port inquired whether restoration of damaged



vegetation on USACE-owned land needed to be covered in the Agreement. The question was discussed and all agreed that such text was not required. The Port signed the Agreement at the meeting.

Dewberry will need to submit a Pre-Construction Notification (PCN) for a Nationwide Permit for impacts to **Section 10 resources (open waters)** detailing the location, area of impact, and construction techniques used to access the USACE-owned island. Temporary construction timber mats would be best and would result in less damage to the environment. The USACE is only concerned with bank to bank impacts to the stream (former channel of Bird Creek) to be crossed. Ken Shingleton said there will not be any Section 106 or Section 404 issues. The PCN will need a site map, description of the type of access construction, and potential limits of disturbance. If temporary construction timber mats are used, the permit could be approved by the USACE within two working days.

The meeting concluded at 11:00 a.m.

END OF MEETING



U.S. ARMY CORPS OF ENGINEERS, TULSA DISTRICT

TULSA PORT OF CATOOSA

ENVIRONMENTAL RESULTS PROGRESS BRIEFING

For

BARGE FLEETING AREA ENVIRONMENTAL ASSESSMENT Tulsa Port of Catoosa, Oklahoma

Meeting Date:	Feb 14, 2012
Time:	2:00 p.m.
Location:	USACE – Tulsa District Offices, Conference Room # 210

Attendees:	John Roberts Connie Holliday Ed Parisotto Ken Shingleton Patricia Newell Kalli Clark Jonathan Polk Rhonda Sallee Tom Angel David Yarbrough Kim Shannon Craig Swengle Brian Sayre Matthew Schlitzer Billy Cox	918.669.7201 918.669.7688 918.669.7548 918.669.7661 918.669.4937 918.669.7271 918.682.4314 918.669.7255 918.669.7545 918.857.0313 918.627.6161 918.295.5255 973.576.9637 973.576.9638 918.295.5246	john.h.roberts@us.army.mil connie.holiday@usace.army.mil edward.parisotto@us.army.mil kenneth.l.shingleton@usace.army.mil patricia.a.newell@usace.army.mil kalli.clark@us.army.mil jonathan.polk@usace.army.mil rhonda.sallee@usace.army.mil tom.angel@usace.army.mil david@tulsaport.com kshannon@kleinfelder.com cswengle@dewberry.com bsayre@dewberry.com mschlitzer@dewberry.com
------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Recorded By: Billy Cox

PLEASE NOTE: These Meeting Notes constitute Dewberry's recollection of the topics discussed and decisions reached at this meeting.

DISCUSSION

Craig Swengle / Dewberry facilitated the meeting and used a slide presentation to describe the progress on the Environmental Assessment (EA) to date.

David Yarbrough / Tulsa Port of Catoosa stated that the greatest need on the McClellan-Kerr navigation channel was additional barge fleeting areas. The current terminal channel is, at certain times of the year, at or near capacity. Companies wanting to transport new commodities, such as fracking sand for oil drilling processes, have expressed interest in using the Port to ship large amounts of the material into the region. However, due to the lack of barge fleeting areas, the Port is unable to accommodate these requests or can do so only on a limited basis. Such a situation, if left unresolved, will limit the amount of growth and lessen the potential economic development of the region.

Brian Sayre / Dewberry explained the preliminary investigation findings. He added that the required American Burying Beetle study will be completed within the May 20th to September 20th study window. Mr. Sayre also described potential wetland mitigation areas and approaches.

Craig Swengle concluded the presentation with a discussion of the originally developed barge fleeting area concepts and those concepts that have been selected for further study. The remaining concepts were identified and the reasons for their dismissal were outlined. Mr. Swengle presented the upcoming steps required to complete the EA, so that a NEPA decision can be made by the end of 2012. Mr. Yarbrough stated there is a limited window available to apply for funding of this project through the EDA (Economic Development Administration). He explained that is why such an aggressive schedule has been identified.

John Roberts / USACE requested that a progress meeting be scheduled for the end of March to review the Project again.

Following the presentation, several questions were raised and discussed:

Mr. Roberts asked what the depth to bedrock was in the preferred barge fleeting area. Mr. Swengle responded that a recent Geotechnical investigation shows the bedrock layer to be below the bottom of proposed excavation. Based on these findings, it is anticipated that the volume of required bedrock excavation for the preferred alternative will be insignificant.

Mr. Roberts inquired about the Land Swap progress. Kalli Clark / USACE reported that the USACE has set this action aside, waiting on further direction. Ms. Clark said an appraisal of the land is needed before moving ahead. Mr. Roberts asked if there was a difference in appraisal values, and what the procedure for exchanging the land will be. It was concluded there would be a possible fee involved in the exchange of land based on the appraisal value of each property. Ms. Clark also stated that excavated material from the preferred Barge Fleeting Area would not be required to build the dredge disposal area. The USACE will build the dredge disposal area by pushing material from the bottom of the proposed disposal area to construct the containment pond berms.

Further discussion of the mitigation process began with Ed Parisotto / USACE, who stated that the Port will need to demonstrate that it's Initially Preferred Alternative, is the "least environmentally damaging, practicable alternative" and that alternatives that avoid and or minimize impacts to wetlands must also be considered. The preservation of existing wetlands may be used as mitigation, but at a ratio of at least 10:1. Kim Shannon / Kleinfelder stated that enhancing the existing wetlands in the proposed mitigation area by removing invasive plants can be used as a justification for lowering the 10:1 ratio (i.e., for every one acre of impacted wetland, 10 acres of existing wetlands must be preserved). Ms. Shannon and Mr. Sayre indicated



that they will further investigate the mitigation ratios required by reviewing the Mitigation Guidelines for the Tulsa USACE District.

Mr. Swengle and Mr. Sayre reviewed the Port's proposal to preserve the 65 acres of wetlands in the Riverview Business Park as mitigation. Mr Parisotto stressed the importance of demonstrating that wetland impacts in the proposed disposal area have been minimized, which will also result in less mitigation requirements.

Mr. Swengle will provide a preliminary grading plan for the potential fill areas once the Port agrees on the limits of grading in the proposed fill area.

Mr. Yarbrough inquired if the Port will be required to allow public access to the areas used for wetland mitigation? Mr. Parisotto stated that it would not.

Permitting issues were discussed with Patricia Newell / USACE. Ms. Newell suggested combining the agency review with the public review. Mr. Parisotto stated he would like to have the final FONSI approved before the Port submits the Section 404 wetland permit application. A response to the application is estimated to take approximately 120 days following receipt of a complete application.

Mr. Swengle asked if the land swap and 404 permit reviews can be done concurrently, to which Mr. Parisotto and Ms. Newell replied it would not be a problem. Mr. Sayre asked if a mitigation plan should be included in the 404 permit application, to which Mr. Parisotto replied yes. Ken Shingleton / USACE added that he would coordinate with the State Historic Preservation Office (SHPO) on the wetlands mitigation, as needed.

Ms. Newell suggested adding a discussion regarding the economic impact the Port has on the regional economy to the NEPA document and a discussion of the expansion of the Panama Canal and Port 33, which is anticipated to have an impact on the McClellan-Kerr Navigation System.

Ms. Holliday discussed possible meeting dates in late March with Mr. Swengle. Due to Spring Break and other conflicts, it was decided to schedule the requested meeting during the first week of April.

The meeting concluded at 3:45 pm.

END OF MEETING



U.S. ARMY CORPS OF ENGINEERS / U.S. FISH & WILDLIFE SERVICE TULSA PORT OF CATOOSA

AMERICAN BURYING BEETLE PROTOCOL MEETING for the BARGE FLEETING AREA ENVIRONMENTAL ASSESSMENT DOCUMENT

Meeting Date: Time: Location:	June 21, 2012 9:00 a.m. U.S. Fish & Wildlife Service, Tulsa Office
Dewberry Proj #:	50042679 / 99601039
Attendees:	Patricia Newell, USACE – Environmental Programs (Meeting Moderator) Anita Barstow, USFWS Angela Burgess, USFWS Kevin Stubbs, USFWS Stacy Dunkin, USACE - Biology Ken Shingleton, USACE – Environmental Programs Craig Swengle, Dewberry
Recorded By:	Craig Swengle

NOTE: These Meeting Notes constitute Dewberry's recollection of the topics discussed during this meeting.

DISCUSSION TOPICS

Ms. Newell facilitated the meeting, noting that due to the USFWS' recent change in policy as to how American Burying Beetles' (ABB) presence is confirmed and beetles are relocated away from a project site, the Corps and Dewberry desired to meet to better understand future requirements. The following topics were discussed:

- Formal consultation is the process currently in place.
- Non-Federal projects if ABB habitat will be destroyed, mitigation will be required. If <u>prime</u> ABB habitat will be destroyed, the mitigation ratio will start at 3 acres replaced for every 1 acre destroyed.



ABB Protocol Meeting June 21, 2012 Page 2 of 3

- Federal projects Set-asides, habitat banking, and offsets are allowed. Currently, there are no habitat banks in place within the state of Oklahoma. A future habitat bank could be in place within 6 months.
- "Bait-away" was done away with because the procedure did not work. There was no way of determining if beetles were lured away from project areas permanently or not.
- "Trap and relocate" worked, but this mitigation did not address the habitat that was destroyed and not replicated somewhere else. In addition, no follow up was required, therefore, it is not known if the relocated beetles survived their relocation.
- For the Barge Fleeting Area the Port is not a federal entity, but the land transfer is a federal action.
- Two possible documents: Biological Opinion (BO) this has the shortest timeframe of the two options and the USFWS prepares this document; and Biological Assessment (BA) this is a longer process and the Port (or Dewberry) would be expected to prepare this document.
- USFWS suggested the Port conduct an ABB Presence Survey. Each trap used to entice ABB have
 a one-mile effective circumference (or 0.5 mile radius) of the trap. All agreed that a trap located
 south of the Port's new salt storage building would encompass the potential footprint of the
 Project. Therefore, only one trap would be required. If two traps were used, there would be
 the potential of luring beetles from beyond the project limits. If beetles came from beyond the
 Project limits, the Port still would have to mitigate for any beetle trapped. It will be determined
 after the survey is completed whether to involve the USFWS depending upon whether beetles
 are trapped or not.
- USFWS pointed out that an ABB Habitat Study is different from an ABB Presence Study.
- USACE suggested that it is unlikely that ABB are present because of the wetland habitat identified along the former Verdigris River channel. ABB cannot live within wetland habitat.
- USFWS stated that if ABB are present, then a USFWS Take Permit will be required.
- USFWS recommended that an Eagle Nest Survey be conducted to determine whether or not Bald Eagles are present within the Project footprint. USACE suggested contacting the Sutton Center (The George Miksch Sutton Avian Research Center) in Bartlesville to determine if eagle nests are documented in the Port area. An Eagle Nest Survey could be a significant delay to the Project.
- Possible Study / Action scenarios are attached to these notes.



ABB Protocol Meeting June 21, 2012 Page 3 of 3

Dewberry asked if there was one permit to obtain from USFWS if ABB were present or is two
permits required. From the discussion, it sounded like a Take permit and a "habitat" permit
would be required if ABB's were present. But if ABB's were not present, would the Port still be
required to obtain a "habitat" or Take permit from the USFWS? Neither the USACE nor USFWS
could say for sure if the Port will need to fund ABB habitat mitigation or not. This decision will
be made during the USFWS' review of the Section 10 / 404 permit application.

Meeting concluded at 10:35 a.m.



U.S. ARMY CORPS OF ENGINEERS TULSA PORT OF CATOOSA <u>COMMENT REVIEW MEETING</u>

on

BARGE FLEETING AREA ENVIRONMENTAL ASSESSMENT DOCUMENT

Meeting Date: Time: Location: Dewberry Proj #:	January 30, 2013 1:00 p.m. USACE – Tulsa District 3 rd Floor Conference Room 50042679 / 99601039
Attendees:	Shaun Lenz, USACE - Real Estate (Meeting Moderator) Ed Parisotto, USACE – Regulatory Patricia Newell, USACE – Environmental Programs Stacy Dunkin, USACE - Biology Craig Swengle, Dewberry
Call-ins:	David Yarbrough, Tulsa Port of Catoosa Michelle Measday, Dewberry Parsippany Brian Sayre, Dewberry Parsippany Matt Schlitzer, Dewberry Parsippany
Recorded By:	Craig Swengle

NOTE: These Meeting Notes constitute our recollection of the items discussed at this meeting.

DISCUSSION ITEMS

Mr. Swengle thanked everyone for attending this meeting to discuss several of the USACE comments on the Tulsa Port of Catoosa's Barge Fleeting Area Environmental Assessment document received on January 24, 2013 via email from Dawn Rice, USACE project manager. Ms. Measday in Parsippany NJ was given the floor to identify the comments that Dewberry needed clarification on.

A. Ed Parisotto Comments

Section 2.1.4 Build Alternatives

1.a)Build alternative 5; references 12 acres of wetland impacts. How does Dewberry need to delineate the 12 acres of wetlands to confirm their presence?



USACE Comment Review Meeting February 14, 2013 Page 2 of 4

> <u>Discussion</u> - Ed asked how the limits of wetlands were identified on the Alternative 5 site. Dewberry used US Fish & Wildlife Service's online National Wetlands Inventory to estimate the 12 acres of wetlands. Ed Parisotto advised Dewberry that this is not an acceptable way to quantify wetlands. The National Wetland Inventory uses aerial photography and is not very reliable. If wetlands were a comparison criterion, wetland field surveys would be required for each alternative being compared. Therefore, Dewberry agreed to remove wetlands as a comparison criterion and will replace it with open water criterion which can be estimated accurately using aerial photography for all build alternatives.

1.b)Build alternative 6; this alternative has no wetland impacts and has the lowest estimated cost of construction. Pat indicated that the alternative is located on an active dredge disposal site

<u>Discussion</u> – Pat commented that if this location were pursued, the transfer of ownership would have to go through the same process as the current preferred alternative. Pat suggested that this alternative could be removed because of its current use as a dredge disposal area. Or, Dewberry could go into greater detail on the undesirable characteristics of the alternative due to the Verdigris River current and difficulty in moving barges around. In the end, the group decided to move this alternative to the list of alternatives not advanced due to safety issues and unavailability.

1.c) Build alternative 2 (PA); this alternative references the "temporary" haul road which would block small vessels from entering Bird Creek. A timeline should be considered and approved by the Corps considering the duration of this blockage.

Discussion - Craig explained that Dewberry's design of this crossing has progressed and placing pipes in Bird Creek is no longer being considered. The proposed location of the crossing as been moved to the narrowest point of the cut-off and a single span bridge will be specified for the crossing. The distance between low chord and the normal pool elevation is approximately five feet. Such clearance will allow typical recreational vessels (fishermen in low-profile boats) to travel upstream on Bird Creek without hindrance. USACE was in agreement with the design. Ed said a timeline is no longer required.



USACE Comment Review Meeting February 14, 2013 Page 3 of 4

2. Mitigation

Compensatory Mitigation is discussed in Section 4.2.1.4.

<u>Discussion</u> – Michelle explained that Dewberry is preparing a draft Mitigation Plan. David reported that the Port's legal counsel said that it would be okay for the Port to donate money to the Redbud Nature Preserve for future identified Open Water restoration projects. Dewberry explained that this could be a part of the Port's proposed Mitigation Plan that will be presented to the Corps in the coming week or so. Ed indicated that while all of the Port's proposed plan elements would be considered, he discouraged dewberry from moving ahead with the Nature Preserve option. He urged that the mitigation elements be contained on Port property. Pat agreed that the Port has sufficient property available to restore and create open water and wetland areas. A suggestion was made by the Corps to create a meandering stream that would flow from the kidney-shaped wetland at the southwest corner of the 500-acre parcel, south to Bird creek. Even though the Bird Creek stream banks are guite a bit higher in this location, it was thought that the meandering stream could have small ponds periodically to hold the water before it would drain into Bird Creek. Pat said that the EA only needs to contain a stated commitment from the Port that the acreage will be restored or created to mitigate for impacts to open waters, wetlands, and upland forest, and identify where the mitigated acreage will be located. Mitigation details will be worked out at the permit stage.

B. Pat Newell's Comments

Page 2-1, Section 2.1.1.1 Alternative 1: Direct Sale.

<u>Discussion</u> – The Direct Sale discussion no longer applies. Dewberry will insert Shaun's text describing the 25-year lease in its place. The sentence "This EA will include the application for a DA Permit in Appendix ____." Found in the section titled 'Application for the Department of the Army Permit Alternatives' was agreed to be removed.

C. Stacy Dunkin's Comments

Page 4-1, 3rd paragraph, Line 5; Please include a copy of the projects Storm Water Pollution Prevention Plan.

<u>Discussion</u> - Craig reported that the Storm Water Pollution Prevention Plan (SWP3) has been drafted and is being refined. Dewberry plans on meeting with the Oklahoma Department of Environmental Quality (ODEQ) prior to including the SWP3 in the EA. Stacy stated that the SWP3 does not need to be included in the EA document. Pat said it will need to be included in the 404 Permit application, but not in the EA.



USACE Comment Review Meeting February 14, 2013 Page 4 of 4

Page 4-2, Section 4.2.1.1 Surface Water, Line 14; Please describe the BMP's that will be employed to mitigate activities.

<u>Discussion</u> - Craig stated that he will list the best management practices (BMPs) that have been selected from EPA's national menu of Stormwater Best Management Practices referenced in ODEQ's SWP3 guidelines in both the second and third paragraphs of Section 4.2.1.1, Surface Water, Construction Impacts. Stacy and Pat agreed with this approach.

D. Port Comments

David Yarbrough thanked everyone for meeting to discuss USACE's comments on this Document. He said the Port is anxious to move ahead with this project and that construction of the initial phases could begin as soon as the permits are issued. The Corps project schedule shows this could happen as early as mid-August 2013. Pat said that if this is the case, then the Port should complete the American Burying Beetle (ABB) Presence Survey as soon as the calendar permits. The ABB study is good for one year.

Meeting concluded at 1:50 p.m.



Measday, Michelle

From:Sasha Kirk [sashagkirk@gmail.com]Sent:Tuesday, January 25, 2011 12:12 PMTo:Measday, MichelleSubject:OBS Information Request: Tulsa Port of Catoosa Project

OBS Ref. 2011-030-BUS-MEA

Dear Ms. Measday,

We have reviewed occurrence information on any species currently in the Oklahoma Natural Heritage Inventory database for the following location you provided:

Tulsa Port of Catoosa Project Sections 07 & 17-19, T20N, R15E, Rogers County, Oklahoma Within approximately 1 mile:

ORCONECTES NAIS Common Name: A CRAYFISH Organism Type: CRUSTACEANS Rank: Unknown State Rank First Observed: 1991 Township Range: 20N15E 19 Precision: S

You can find an explanation of the codes used to rank endangered and threatened species at: http://vmpincel.ou.edu/heritage/ranking_guide.html If you have any questions about this response, please send me an email, or telephone the number given below.

Sincerely,

Sasha Kirk For Ian Butler Oklahoma Biological Survey 111 East Chesapeake St. Norman, OK 73019 405.325.1985 APPENDIX D

FISH AND WILDLIFE COORDINATION