Wetland Mitigation Monitoring Report

Project Site:

East Cape Girardeau Wetland Mitigation Site
Alexander County, Illinois

IDOT Sequence Number: 633

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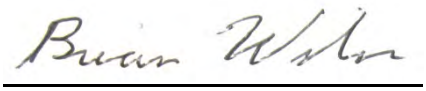
Project Summary

A first-year monitoring survey was conducted at the IL 146 (FAP 312) East Cape Girardeau wetland mitigation site in Alexander County, Illinois. Introductory information, goals, objectives, performance criteria, methods, and results are presented in this report, followed by discussion and recommendations. Wetland determination results and a printout of the digital orthoquad (DOQ) showing wetland boundaries and sampling points are also included. Wetland determination forms can be found in Appendix A, species lists in Appendices B and C, figures in Appendix D, and photographs in Appendix E.

Signed:  Date: February 26, 2013

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Cover Photo: Facing south from photo station 4.

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Introduction

First-year monitoring was conducted on September 24, 2012 at the IL 146 (FAP 312) East Cape Girardeau wetland mitigation site. This project is located near the intersection of IL 146 and IL 3 in Alexander County (T14S, R3W, Section 16), east of Cape Girardeau, MO (Figure 1). The project site comprises 18 acres in total, with 7.6 acres of mitigated wetland area sought (1.2 emergent and 6.4 forested) [Illinois Department of Transportation (IDOT) 2008]. The remaining area is pre-existing wetland or is to be buffer. The site lies within the Mississippi River Valley drainage basin (Hydrologic Unit Code 07140108).

East Cape Girardeau mitigation site was developed in order to compensate for unavoidable wetland impacts along IL 146 in Alexander County, IL. Pre-settlement conditions for the area consisted primarily of forest (Schwegman et al. 1973). Prior to mitigation, two pre-existing wetlands were located within the project site: a farmed wetland in the northeast corner and a forested wetland, dominated by black willow (*Salix nigra*), abutting the south end of the farmed wetland (Keene et al. 2008). Agricultural fields formed the remainder of the site (Keene et al. 2008). The National Wetlands Inventory did not map any wetlands within the site.

The Illinois State Geological Survey (ISGS) began monitoring hydrology at the site in 2009 and found wetland hydrology present over nearly the entire parcel from 2009 to 2011 (Fucciolo et al. 2009, Miner et al. 2010, Miner et al. 2011). Prior habitat assessments had found hydric soils (Karnak silty clay) over the entire site (Keene et al. 2008) as well as a predominance of hydrophytic vegetation (Keene et al. 2008). The ISGS identified this site as having moderate to high for mitigation potential (Plankell 2010).

East Cape Girardeau wetland mitigation site was constructed in 2011. An approximate 1.2 acre area was created, via shallow excavation in the southwest portion of the parcel, east of the East Cape Main Ditch (ECMD), with the goal of creating emergent wetland. This area was planted with a wetland grass and sedge mixture (IDOT 2008) and two drainage control structures were constructed to connect this area to the ECMD. Trees were planted to the east and north of the excavated area, covering approximately 6.4 acres in total.

This report discusses the goals, objectives, and performance criteria for the mitigation project, the methods used for monitoring the site, monitoring results, and discussion and recommendations based on the results. Methods and results are discussed by performance criterion for each goal.

Goals, Objectives, and Performance Criteria

Goals, objectives, and performance criteria for the IL 146 (FAP 312) East Cape Girardeau wetland mitigation site follow those specified in the wetland compensation plan (IDOT 2008) developed for this site. Performance criteria are based on those specified in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987), *Illinois Wetland Restoration and Creation Guide* (Admiraal et al. 1997), and in *Guidelines for Developing Mitigation Proposals* (USACE 1993). Project goals should be attained by the end of the 5-year monitoring period. Goals, objectives, and performance criteria are listed below.

Project goal 1: Each planned wetland community should be a jurisdictional wetland as defined by current federal standards.

Objective: Create 7.6 acres of wetland (1.2 acres of emergent wetland and 6.4 acres of forested wetland).

Performance criteria:

a. Predominance of hydrophytic vegetation: More than 50% of the dominant plant species must be hydrophytic.
b. Presence of hydric soils: Hydric soil characteristics should be present, or conditions favorable for hydric soil formation should persist at the site.
c. Presence of wetland hydrology: The compensation area must be inundated or saturated for a minimum of 14 consecutive days during the growing season. Soils may be considered saturated if the water table is within 1.0 feet of the surface (0.5 feet from the surface for sandy soil) (USACE 2010).

Project goal 2: The replacement wetlands should emulate natural wetlands; that is, they should be dominated by native plants and should meet minimum standards for planted species survival and floristic composition.

Objective: Planting tree species will create a forested wetland.

Performance criteria:

a. Planted species survivorship: At least 80% of the planted containerized trees and shrubs should be established and living by the end of the five-year monitoring period.
b. Native species composition: At least 50% of the plant species present should be non-weedy, native, perennial species.
c. Dominance of vegetation: None of the three most dominant plant species may be non-native or weedy species, such as cattails, sandbar willow, or reed canary grass.

A wetland delineation was also performed on one of two previously identified wetlands found within the monitoring area (Keene et al. 2008). A delineation form for this wetland (Site 4) is found in Appendix A; both wetlands are identified on Figure 2. Site 5 (previously identified as farmed wetland) will also be delineated in future monitoring efforts.

Methods

Wetland boundaries were recorded using a Trimble Global Positioning System (either model Pathfinder Pro XR or Pathfinder Pro XRS), with a presumed accuracy of +/- 0.5 m under optimal field conditions. Spatial data were digitally uploaded to the Illinois Site Assessment Tracking System (http://frostycap.isgs.uiuc.edu/idot_extranet). Locations of determination sites were overlaid on a digital orthophoto quadrangle (DOQ) and approximate area was determined for each wetland site using ArcGIS 10.0 software (ESRI 2010). Resulting areas are calculated in acres, reported to two decimal places.

Project goal 1

a. Predominance of hydrophytic vegetation

The method for determining dominant vegetation at a wetland site is described in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (U.S. Army Corps of Engineers 2010) and further explained in the Federal Manual for Identifying and Delineating Jurisdictional Wetlands (Federal Interagency Committee for Wetland Delineation 1989). It is based on aerial coverage estimates for individual plant species. Each of the dominant plant species is then assigned its wetland indicator status rating (Lichvar and Kartesz 2009). Any plant rated facultative or wetter (FAC, FACW, or OBL) is considered a hydrophyte. A predominance of wetland vegetation in the plant community exists if more than 50% of the dominant species present are hydrophytic. Predominance of hydrophytic vegetation was determined at the sampling point level as part of the routine wetland determination procedure. Site-wide dominant species were estimated visually, and are noted in the site species list.

b. Presence of hydric soils

The soil was sampled in order to monitor hydric soil development. Soil profile morphology including horizon color, texture, and structure was described at various points throughout the site. Additionally, the presence, type, size, and abundance of redoximorphic features were noted. Hydric soils may develop slowly, and characteristics may not be apparent during the first several years after project construction. In the absence of hydric soil indicators at the end of the five-year monitoring period, hydrologic data could be used as corroborative evidence that conditions favorable for hydric soil formation persist at the site.

c. Presence of wetland hydrology

Illinois State Geological Survey personnel have installed a variety of hydrologic monitoring devices at the site and will be responsible for monitoring site hydrology. The current federal standard for wetland hydrology is inundation or saturation for a minimum of 14 consecutive days during the growing season (USACE 2010). Soils are considered saturated if the water table is within 1.0 feet of the surface (0.5 feet from the surface for sandy soil).

Project goal 2

a. Planted species survivorship

In order to create a forested wetland (6.4 acres), tree saplings were to be planted at the compensation site as specified in the Conceptual Wetland Compensation Plan (IDOT 2008) at

109 containerized trees per acre (Figure 3). Initial tree plantings took place in October 2011. All of the trees were to be 4.4 cm (1.75 in) container grown trees. Survivorship and density of planted trees was determined through a census of each site. All live trees were counted. Dead trees, when possible, were identified to species.

b. Native species composition

A complete list of plant species present was compiled and all native and non-native species were identified. Each native plant species was assigned a "coefficient of conservatism" (C) (Taft et al. 1997), a subjective rating of species fidelity to undegraded natural communities, ranging from zero to ten. Conservative species - those more likely to be found in "pristine" natural areas - were assigned high numbers, whereas non-conservative species - those that occur in anthropogenically disturbed areas - were given lower numbers. Non-native species and those not identifiable to species level were not assigned a rating. The Floristic Quality Index (FQI) is computed as FQI = (mean C) X ($\sqrt{N}$), where mean C is the mean coefficient of conservatism for all native plant species at a site and N is the total number of native plant species at the site. In very general terms, higher FQI values for plant communities indicate more similarity to "pristine" natural areas, as compared to those communities with lower FQI values. Botanical nomenclature follows *Vascular Flora of Illinois* (Mohlenbrock 2002).

c. Dominance of vegetation

Plant species dominance was determined using meander surveys at each site. This method for determining dominant vegetation at a wetland site is described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and further explained in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (Federal Interagency Committee for Wetland Delineation 1989). Weedy native species are defined as those with a coefficient of conservatism of one or zero.

Photo stations

Three permanent photography stations were established at the mitigation site to document changes in the plant community over time (Figure 4).

Results

Project goal 1

a. Predominance of hydrophytic vegetation

Dominant plant species for mitigation sites are found within Appendix B. All sites met the dominant hydrophytic vegetation criterion.

b. Occurrence of hydric soils

Soils examined were found to be relatively undisturbed and hydric soil indicators are present at all sites. A soil description of a typical pedon for each site can be found on the data forms in Appendix A.

c. Presence of Wetland Hydrology

The ISGS estimated that the total area that satisfies the wetland hydrology criteria for 14 of more consecutive days during the growing season was 9.75 acres (Figure 5); 2.48 acres of this

area was accounted for by the pre-existing wetlands (Sites 4 and 5). Site 1 (created emergent wetland) accounted for 2.84 acres, Site 2 (tree planted area) accounted for 3.45 acres, and site 3 accounted for 0.98 acres. More detailed hydrologic information can be found in the ISGS *Annual Report for Active IDOT Wetland Mitigation and Hydrologic Monitoring Sites* (Miner et al. 2012).

Project goal 2

a. Planted species survivorship

Results of the planted tree count are shown in Table 1. Six hundred and ninety-seven trees (109 trees/acre) were to be planted at the site (6.4 acres). Based on our field survey, it appears that 606 trees were planted, of which 540 appeared to be alive at the time of the survey. Although not a true measure of survival, the number of live trees counted was 77.4% of the total that should have been planted (as stated in the mitigation plan).

Table 1. Number of live planted trees counted by species, September 2012.

Scientific Name	Common Name	Number counted
Carya illinoensis	Pecan	38
Diospryros virginiana	Persimmon	105
Fraxinus lanceolata	Green Ash	112
^*Liquidambar styraciflua*	Sweet Gum	-
^*Platanus occidentalis*	Sycamore	-
Quercus bicolor	Swamp White Oak	114
^*Taxodium distichum*	Bald Cypress	171
Total (alive)		**540**

^ *Sweet Gum and Sycamore trees were to be planted in the original plans; Bald Cypress trees were not included in the original mitigation plans.* **Note: Six hundred and six trees were counted at the time of the survey with 540 of the trees alive. Six hundred and ninety-seven trees should have been planted at the site according to the mitigation plan.**

b. Native species composition

The native species composition goal was not met for any of the individual mitigation sites (Table 2). As a whole, the East Cape Girardeau wetland mitigation site contained 30.1% non-weedy, native, perennial species.

Table 2. Number of non-weedy, native, perennial species and percent non-weedy, native, perennial species by site, September 2012.

Site	Total Species	Non-Weedy, Native, Perennial Species	% Non-Weedy, Native, Perennial Species
1	32	10	31.3
2	50	11	22.0
3	34	4	11.8
Overall	**73**	**22**	**30.1**

The calculated floristic quality index (FQI) and mean coefficient of conservatism (mCv) for each of the sites is shown below in Table 3. The East Cape Girardeau wetland mitigation site had a collective FQI of 19.1 and mCv of 2.7.

Table 3. FQI and mCv values for each wetland site at the East Cape Girardeau wetland mitigation site, September 2012.

Site	FQI	mCv
1	12.6	2.5
2	13.7	2.4
3	9.0	1.9
Overall	**19.1**	**2.7**

c. Dominance of vegetation

None of the wetland mitigation sites met the performance criterion for dominance of vegetation. All three sites had weedy native species among their dominants (Tables 4-6).

Table 4. Dominant species for Site 1; emergent wetland.

Dominant Plant Species	Common Name	Native/Invasive	Weedy/Non-weedy
Amaranthus tuberculatus	Tall Waterhemp	Native	Weedy
Persicaria lapathifolia	Curttop Lady's Thumb	Native	Weedy

Table 5. Dominant species for Site 2; tree planted area.

Dominant Plant Species	Common Name	Native/Invasive	Weedy/Non-weedy
Desmanthus illinoensis	Illinois Bundle Flower	Native	Non-weedy
Echinochloa muricata	Spiny Barnyard Grass	Native	Weedy
Ipomoea lacunosa	Small Morning Glory	Native	Weedy
Persicaria lapathifolia	Curttop Lady's Thumb	Native	Weedy

Table 6. Dominant species for Site 3; emergent wetland.

Dominant Plant Species	Common Name	Native/Invasive	Weedy/Non-weedy
Echinochloa muricata	Spiny Barnyard Grass	Native	Weedy
Ipomoea lacunosa	Small Morning Glory	Native	Weedy
Persicaria lapathifolia	Curttop Lady's Thumb	Native	Weedy
Sesbania exaltata	Sesbania	Native	Non-weedy

Discussion

Predominance of hydrophytic vegetation, hydric soil, and hydrology:

In regards to project goal 1, the excavated area (site 1) met the criteria for hydrophytic vegetation, hydric soils, and hydrology for 2012. The emergent wetland created through excavation was more than double in size from the mitigation plan, totaling 2.8 acres (Figure 2).

The tree planted area of the mitigation site met dominant hydrophytic vegetation and hydric soils criteria over the entire plot; however, hydrology was only met in the north-eastern and south-western portions. Previous years (2009-2011) well monitoring data indicated that nearly 100% of the tree planted area met hydrology (Fucciola et al. 2009, Miner et al. 2010, Miner et al. 2011). The lack of hydrology over the entire tree planted area is likely an artifact of the severe drought conditions that Alexander County, IL was in for most of 2012 growing season. From January 1 through August 19, 2012, Alexander County experienced a departure of greater than 10 inches of precipitation from the 20-year mean (Illinois State Water Survey 2012). Future mitigation monitoring of East Cape Girardeau should see an increase in wetland area from this year's report of 3.45 acres. To account for the possibility of the tree planted area not making hydrology (i.e., well data) in forthcoming years, point data at site 2 will be taken within the north-eastern portion of the tree planted area. Site 3, an emergent wetland north of the tree planted area, met hydrophytic vegetation, hydric soils, and hydrology criteria. This site totaled 0.98 aces. This site and Site 2 were at a similar elevation and in large part had the same suite of herbaceous species.

Planted species survivorship:
Minimum standards for planted species survival and floristic composition have not been met. Based on the mitigation plan, it appears that less than the required number of trees were planted. Althought not a true measure of survival, the number of live trees counted was 77.4% of the total that should have been planted. In addition, the 2008 mitigation plan called for the planting of *Platanus occidentalis* and *Liquidambar styraciflua*, however, neither of these species was found planted within the site. *Taxodium distichum* appears to have been planted in place of these species. Also, *Fraxinus lanceolata* was planted at Site 2, however there are two issues regarding the planting this species: 1) *F. lanceolata* is an early successional tree species (Harper 2007) and is already appearing at the site within the herb layer, and 2) *F. lanceolata* is no longer recommended for planting because of the potential for spreading the emerald ash borer. We recommend planting *P. occidentalis* and *L. styraciflua* this coming spring to account for tree mortality and for the trees that were apparently not planted.

Native species composition:
Minimum standards for native species composition were not met at any East Cape Girardeau mitigation sites. Many of the species found at the three sites are early successional species and should be replaced by perennial, native, non-weedy species over time. Further disturbance to the site at this time would only further promote early successional species. No indication of reed canary grass (*Phalaris arundinacea*) or broad-leaved cattail (*Typha angustifolia*) is present at the East Cape Girardeau mitigation site. Sandbar willow (*Salix interior*) was present at site 1, however, the density is low and no management at this time is recommended.Floristic quality should increase over time as perennial, native species become established.

Dominance of vegetation:
All sites at the East Cape Girardeau site have problems involving acceptable plant species dominance. Although all dominant species identified at each site were native, at least two

dominant species at each site are considered weedy; these species include *Amaranthus tuberculatus, Echinochloa muricata,* and *Persicaria lapathifolia*. These three species, though weedy, are an important food source for waterfowl (Checkett et al. 2003; Kaminski et al. 2003). All of these dominant weedy species will likely become less abundant over time, as the site matures and accumulates more perennial species.

In summary, the primary concern of the mitigation site is developing wetland acreage (6.4 acres) within the tree planted site. As stated previously, this area met dominant hydrophytic vegetation and hydric soils criteria over the entire area; however, wetland hydrology was found only in the north-eastern and south-western corners. In addition, Site 2 also failed to meet the criterion for planted trees. At least 91 more trees should be planted within this site to meet the goals set forth within the 2008 compensation plan and possibly more to account for the 66 trees that have died since initial planting. We would also recommend that the trees to be planted not include *Fraxinus. lanceolatus*, but rather a mixture of *Liquidambar styraciflua* and *Platanus occidentalis*. Acceptable dominant, native, hydrophytic, non-weedy plant communities are not yet present on the mitigation site; however, this could change as native, perennial species begin to colonize these sites.

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APPENDIX A

Wetland Determination Forms

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: East Cape Girardeau Mitigation City/County: Alexander Sampling Date 9/24/2012

Applicant/Owner: IDOT District 9 State: IL Sampling Point 1A

Investigator(s): Beas, Keene, Marcum Section, Township, Range: Sec 16, T14S, R3W

Landform (hillslope, terrace, etc.): Excavated depression Local relief (concave, convex, none): Concave

Slope (%): 0-1 Lat: 37.29393 Long: -89.45174 Datum: NAD 83

Soil Map Unit Name: NRCS mapped Darwin sic, classified as Undetermined NWI classification: U

Are climatic/hydrologic conditions on the site typical for this time of year? No (If no explain in Remarks.)

Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? No

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	**Is the Sampled Area within a Wetland?**	**Yes**
Hydric Soil Present?	Yes		
Wetland Hydrology Present?	Yes		

Remarks: Community type is wet meadow.
This area of the state is undergoing a moderate to severe drought this year.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 ft radius)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1. *Populus deltoides*	7	Yes	FAC
2. *Salix nigra*	1	No	OBL
3.			
4.			
5.			
	8 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1. *Amaranthus tuberculatus*	40	Yes	OBL
2. *Persicaria lapathifolia*	10	No	FACW
3. *Phyla lanceolata*	3	No	OBL
4. *Populus deltoides*	3	No	FAC
5. *Erechtites hieracifolia*	1	No	FAC
6. *Ipomoea lacunosa*	1	No	FACW
7. *Salix nigra*	1	No	OBL
8.			
9.			
10.			
	59 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft radius)			
1.			
2.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals (A)		(B)
Prevalence Index =B/A =		

Hydrophytic Vegetation Indicators

- ☐ 1-Rapid Test for Hydrophytic Vegetation
- ☑ 2-Dominance Test is >50%
- ☐ 3-Prevalence Index is < or =3.0[1]
- ☐ 4-Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes**

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

SOIL

Sampling Point: 1A

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 7	N 5/	85	10YR 5/4	15	c	m	SICL	
7 - 12	10YR 4/1	95	7.5YR 4/6	5	c	m	SICL	
12 - 20	N 4/	90	7.5YR 4/6	10	c	m	SICL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☑ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes**

Remarks: Site has been excavated

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required: check all that apply)

- ☐ 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☑ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two is required)

- ☐ 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)

Field Observations:

Surface Water Present? No Depth (inches): _____

Water Table Present? No Depth (inches): _____

Saturation Present? (includes capillary fringe) No Depth (inches): _____

Wetland Hydrology Present? **Yes**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Well data reported by ISGS found that this area satisfied the wetland hydrology criteria for 14 or more consecutive days during the growing season (Miner et al. 2012).

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: East Cape Girardeau Mitigation City/County: Alexander Sampling Date 9/24/2012

Applicant/Owner: IDOT District 9 State: IL Sampling Point 2A

Investigator(s): Beas, Keene, Marcum Section, Township, Range: Sec 16, T14S, R3W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave

Slope (%): 0-1 Lat: 37.29286 Long: -89.45195 Datum: NAD 83

Soil Map Unit Name: NRCS mapped Darwin sic, classified as Cape sicl NWI classification: U

Are climatic/hydrologic conditions on the site typical for this time of year? No (If no explain in Remarks.)

Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? No

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	**Is the Sampled Area within a Wetland?**	**No**
Hydric Soil Present?	Yes		
Wetland Hydrology Present?	No		

Remarks: Community type is wet shrubland.
This sampling point is located within the tree planting area. This area of the state is undergoing a moderate to severe drought this year.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 ft radius)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1. *Quercus bicolor*	2	No	FACW
2.			
3.			
4.			
5.			
	2 = Total Cover		
Herb Stratum (Plot size: 5 ft radius)			
1. *Agrostis gigantea*	55	Yes	FACW
2. *Echinochloa muricata*	15	No	OBL
3. *Desmanthus illinoensis*	8	No	FACU
4. *Digitaria ischaemum*	5	No	FACU
5. *Sida spinosa*	5	No	FACU
6. *Abutilon theophrasti*	1	No	FACU
7.			
8.			
9.			
10.			
	89 = Total Cover		
Woody Vine Stratum (Plot size: 30 ft radius)			
1.			
2.			
	= Total Cover		

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)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals (A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

- [x] 1-Rapid Test for Hydrophytic Vegetation
- [ ] 2-Dominance Test is >50%
- [ ] 3-Prevalence Index is < or =3.0[1]
- [ ] 4-Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes**

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

SOIL

Sampling Point: 2A

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 6	2.5Y 4/1	99	7.5YR 3/4	1	c	m	SICL	
6 - 12	2.5Y 4/1	93	7.5YR 3/4	2	c	m	SICL	
6 - 12			7.5YR 4/6	5	c	m		
12 - 20	2.5Y 4/1	99	7.5YR 4/6	1	c	m	SICL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required: check all that apply)

- ☐ 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two is required)

- ☐ 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)

Field Observations:

Surface Water Present? No Depth (inches): _____

Water Table Present? No Depth (inches): _____

Saturation Present? (includes capillary fringe) No Depth (inches): _____

Wetland Hydrology Present? No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Although secondary indicators of wetland hydrology were present, ISGS well data indicated that the area did not satisfy the wetland hydrology criteria for 14 or more consecutive days during the 2012 growing season (Miner et al. 2012). ISGS well data did, however, indicate that wetland hydrology was present at the area the previous years (Fucciola et al. 2009, Miner et al. 2010, Miner et al. 2011).

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: East Cape Girardeau Mitigation City/County: Alexander Sampling Date 9/24/2012

Applicant/Owner: IDOT District 9 State: IL Sampling Point 3A

Investigator(s): Beas, Keene, Marcum Section, Township, Range: Sec 16, T14S, R3W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave

Slope (%): 0-1 Lat: 37.29496 Long: -89.45107 Datum: NAD 83

Soil Map Unit Name: NRCS mapped Darwin sic, classified as Undetermined NWI classification: U

Are climatic/hydrologic conditions on the site typical for this time of year? No (If no explain in Remarks.)

Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? No

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	**Is the Sampled Area within a Wetland?**	**Yes**
Hydric Soil Present?	Yes		
Wetland Hydrology Present?	Yes		

Remarks: Community type is wet meadow.
This area of the state is undergoing a moderate to severe drought this year.

VEGETATION - Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 ft radius)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: 5 ft radius)			
1. *Ipomoea lacunosa*	60	Yes	FACW
2. *Amaranthus tuberculatus*	10	No	OBL
3. *Echinochloa muricata*	8	No	OBL
4. *Sida spinosa*	5	No	FACU
5. *Sorghum halepense*	3	No	FACU
6. *Persicaria lapathifolia*	2	No	FACW
7. *Setaria faberi*	2	No	FACU
8. *Desmodium illinoense*	1	No	UPL
9. *Persicaria bicornis*	1	No	FACW
10. *Setaria viridis*	1	No	UPL
	93	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft radius)			
1.			
2.			
		= Total Cover	

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)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals (A)		(B)

Prevalence Index =B/A =

Hydrophytic Vegetation Indicators

- [x] 1-Rapid Test for Hydrophytic Vegetation
- [ ] 2-Dominance Test is >50%
- [ ] 3-Prevalence Index is < or =3.0[1]
- [ ] 4-Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes**

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

SOIL

Sampling Point: 3A

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 7	N 4/	90	7.5YR 4/6	10	c	m	SICL	
7 - 20	N 4/	99	7.5YR 4/6	1	c	m	SICL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☑ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required: check all that apply)

- ☐ 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)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☑ Gauge or Well Data (D9)
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of two is required)

- ☐ 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)

Field Observations:

Surface Water Present? No Depth (inches): _____

Water Table Present? No Depth (inches): _____

Saturation Present? (includes capillary fringe) No Depth (inches): _____

Wetland Hydrology Present? Yes

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Well data reported by ISGS found that this area satisfied the wetland hydrology criteria for 14 or more consecutive days during the growing season (Miner et al. 2012).

WETLAND DETERMINATION DATA FORM - Midwest Region

Project/Site: East Cape Girardeau Mitigation City/County: Alexander Sampling Date 9/24/2012

Applicant/Owner: IDOT District 9 State: IL Sampling Point 4A

Investigator(s): Beas, Keene, Marcum Section, Township, Range: Sec 16, T14S, R3W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave

Slope (%): 0-1 Lat: 37.29405 Long: -89.45025 Datum: NAD 83

Soil Map Unit Name: NRCS mapped Darwin sic, classified as Undetermined NWI classification: U

Are climatic/hydrologic conditions on the site typical for this time of year? No (If no explain in Remarks.)

Are Vegetation No, Soil No, or Hydrology No significantly disturbed? Are "Normal Circumstances" present? No

Are Vegetation No, Soil No, or Hydrology No naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	**Is the Sampled Area within a Wetland?**	**Yes**
Hydric Soil Present?	Yes		
Wetland Hydrology Present?	Yes		

Remarks: Community type is forested wetland.
This area of the state is undergoing a moderate to severe drought this year.

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size: 30 ft radius)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	70	Yes	OBL
2.			
3.			
4.			
5.			
	70	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft radius)			
1. *Salix nigra*	4	No	OBL
2.			
3.			
4.			
5.			
	4	= Total Cover	
Herb Stratum (Plot size: 5 ft radius)			
1. *Cyperus esculentus*	3	Yes	FACW
2. *Echinochloa muricata*	3	Yes	OBL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	6	= Total Cover	
Woody Vine Stratum (Plot size: 30 ft radius)			
1.			
2.			
		= Total Cover	

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)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals (A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators

- [x] 1-Rapid Test for Hydrophytic Vegetation
- [ ] 2-Dominance Test is >50%
- [ ] 3-Prevalence Index is < or =3.0[1]
- [ ] 4-Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes**

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

SOIL

Sampling Point: 4A

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

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 6	N 4/	95	7.5YR 4/4	5	c	m	SICL	
6 - 12	N 4/	100					SICL	
12 - 20	N 4/	95	7.5YR 4/6	5	c	m	SICL	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2] Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ 5 cm Mucky Peat or Peat (S3)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☑ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ Coast Prairie Redox (A16)
- ☐ Dark Surface (S7)
- ☐ Iron-Manganese Masses (F12)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required: check all that apply)

- ☐ 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)
- ☑ Sparsely Vegetated Concave Surface (B8)
- ☑ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ True Aquatic Plants (B14)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☑ Gauge or Well Data (D9)
- ☑ Other (Explain in Remarks)

Secondary Indicators (minimum of two is required)

- ☐ 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)

Field Observations:

Surface Water Present? No Depth (inches): _____

Water Table Present? No Depth (inches): _____

Saturation Present? (includes capillary fringe) No Depth (inches): _____

Wetland Hydrology Present? Yes

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Adventious roots on willows (up to 6'). Well data reported by ISGS found that this area satisfied the wetland hydrology criteria for 14 or more consecutive days during the growing season (Miner et al 2012).

APPENDIX B

Wetland Plant Species Lists

Site 1, 2012

Scientific Name	Common Name	Strata	Wetland Indicator Status	Coefficient of Conservatism
Amaranthus tuberculatus	**tall waterhemp**	**H**	**OBL**	**1**
*Abutilon theophrasti**	buttonweed	H	FACU	-
Ambrosia trifida	giant ragweed	H	FAC	0
*Cardiospermum halicacabum**	love-in-a-puss	H	FAC	-
Carya illinoensis	pecan	S	FACW	6
Cyperus esculentus	field nut sedge	H	FACW	0
Desmanthus illinoensis	Illinois bundle flower	H	FACU	4
Dichanthelium dichotomum	forked panic grass	H	FAC	6
*Digitaria sanguinalis**	hairy crab grass	H	FACU	-
Diospyros virginiana	persimmon	S	FAC	2
Echinochloa muricata	spiny barnyard grass	H	OBL	0
Eclipta prostrata	yerba de tajo	H	FACW	2
Eragrostis hypnoides	creeping love grass	H	OBL	5
Erechtites hieracifolia	fireweed	H	FAC	2
Fraxinus lanceolata	green ash	S	FACW	2
*Ipomoea hederacea**	ivy-leaved morning glory	H	FAC	-
Ipomoea lacunosa	small morning glory	H	FACW	1
Ludwigia peploides var. glabrescens	creeping primrose willow	H	OBL	5
Persicaria bicornis	long-styled knotweed	H	FACW	2
Persicaria lapathifolia	curttop lady's thumb	H	FACW	0
Persicaria pensylvanica	pinkweed	H	FACW	1
Phyla lanceolata	fog fruit	H	OBL	1
Populus deltoides	eastern cottonwood	HS	FAC	2
Quercus bicolor	swamp white oak	S	FACW	7
*Rumex crispus**	curly dock	H	FAC	-
Salix interior	sandbar willow	HS	FACW	1
Salix nigra	black willow	HS	OBL	3
Sesbania exaltata	sesbania	H	FACW	3
*Setaria faberi**	giant foxtail	H	FACU	-
*Sida spinosa**	prickly sida	H	FACU	-
Taxodium distichum	bald cypress	S	OBL	7
Xanthium strumarium	cocklebur	H	FAC	0

*Non-native species Bolded species is dominant in the denoted stratum Mean C = 2.5

H = Herb, T = Tree, S = Sapling/Shrub, W = Woody Vine FQI = 12.6

Site 2, 2012

Scientific Name	Common Name	Strata	Wetland Indicator Status	Coefficient of Conservatism
Desmanthus illinoensis	**Illinois bundle flower**	**H**	**FACU**	**4**
Echinochloa muricata	**spiny barnyard grass**	**H**	**OBL**	**0**
Ipomoea lacunosa	**small morning glory**	**H**	**FACW**	**1**
Persicaria lapathifolia	**curttop lady's thumb**	**H**	**FACW**	**0**
*Abutilon theophrasti**	buttonweed	H	FACU	-
Acer negundo	box elder	H	FAC	1
Agrostis gigantea	red top	H	FACW	0
Amaranthus tuberculatus	tall waterhemp	H	OBL	1
Ambrosia trifida	giant ragweed	H	FAC	0
*Aster subulatus**	expressway aster	H	OBL	-
*Avena sativa**	oats	H	UPL	-
Bidens aristosa	swamp marigold	H	FACW	1
Bidens frondosa	common beggar's ticks	H	FACW	1
*Cardiospermum halicacabum**	love-in-a-puss	H	FAC	-
Carya illinoensis	pecan	S	FACW	6
Chamaesyce humistrata	spreading spurge	H	FACW	1
Conyza canadensis	horseweed	H	FACU	0
Cyperus esculentus	field nut sedge	H	FACW	0
Dichanthelium dichotomum	forked panic grass	H	FAC	6
*Digitaria ischaemum**	smooth crab grass	H	FACU	-
*Digitaria sanguinalis**	hairy crab grass	H	FACU	-
Diospyros virginiana	persimmon	S	FAC	2
Eclipta prostrata	yerba de tajo	H	FACW	2
Elymus canadensis	Canada wild rye	H	FACU	4
Elymus virginicus	Virginia wild rye	H	FACW	4
Erechtites hieracifolia	fireweed	H	FAC	2
*Festuca arundinacea**	tall fescue	H	FACU	-
Fraxinus lanceolata	green ash	S	FACW	2
*Ipomoea hederacea**	ivy-leaved morning glory	H	FAC	-
Iva annua	marsh elder	H	FAC	0
*Iva xanthifolia**	rag sumpweed	H	FAC	-
Leersia oryzoides	rice cut grass	H	OBL	3
Leptochloa panicoides	salt meadow grass	H	OBL	9
*Melilotus officinalis**	yellow sweet clover	H	FACU	-
Monarda fistulosa	wild bergamot	H	FACU	4
Persicaria bicornis	long-styled knotweed	H	FACW	2
Persicaria pensylvanica	pinkweed	H	FACW	1
Persicaria punctata	smartweed	H	OBL	3
*Persicaria vulgaris**	lady's thumb	H	FACW	-
Phyla lanceolata	fog fruit	H	OBL	1
Quercus bicolor	swamp white oak	S	FACW	7
Rorippa palustris	marsh yellow cress	H	OBL	4
*Rumex crispus**	curly dock	H	FAC	-
*Setaria glauca**	pigeon grass	H	FAC	-
*Sida spinosa**	prickly sida	H	FACU	-
Solidago canadensis	Canada goldenrod	H	FACU	1
*Sorghum halepense**	Johnson grass	H	FACU	-

(Species list continued on next page)

Site 2, 2012 continued

Scientific Name	Common Name	Strata	Wetland Indicator Status	Coefficient of Conservatism
Taxodium distichum	bald cypress	S	OBL	7
*Trifolium pratense**	red clover	H	FACU	-
Xanthium strumarium	cocklebur	H	FAC	0

*Non-native species Bolded species is dominant in the denoted stratum Mean C = 2.4
H = Herb, T = Tree, S = Sapling/Shrub, W = Woody Vine FQI = 13.7

Site 3, 2012

Scientific Name	Common Name	Strata	Wetland Indicator Status	Coefficient of Conservatism
Echinochloa muricata	**spiny barnyard grass**	**H**	**OBL**	**0**
Ipomoea lacunosa	**small morning glory**	**H**	**FACW**	**1**
Persicaria lapathifolia	**curttop lady's thumb**	**H**	**FACW**	**0**
Sesbania exaltata	**sesbania**	**H**	**FACW**	**3**
Acalypha rhomboidea	three-seeded mercury	H	FACU	0
Acer negundo	box elder	H	FAC	1
Amaranthus tuberculatus	tall waterhemp	H	OBL	1
Ambrosia artemisiifolia	common ragweed	H	FACU	0
Ambrosia trifida	giant ragweed	H	FAC	0
Ammannia coccinea	long-leaved ammannia	H	OBL	5
*Aster subulatus**	expressway aster	H	OBL	-
*Cardiospermum halicacabum**	love-in-a-puss	H	FAC	-
Carya illinoensis	pecan	H	FACW	6
Chamaesyce humistrata	spreading spurge	H	FACW	1
Desmodium illinoense	Illinois tick trefoil	H	UPL	5
*Digitaria ischaemum**	smooth crab grass	H	FACU	-
*Digitaria sanguinalis**	hairy crab grass	H	FACU	-
Eclipta prostrata	yerba de tajo	H	FACW	2
Iva annua	marsh elder	H	FAC	0
*Iva xanthifolia**	rag sumpweed	H	FAC	-
*Kummerowia striata**	Japanese lespedeza	H	FACU	-
Leersia oryzoides	rice cut grass	H	OBL	3
Leptochloa panicoides	salt meadow grass	H	OBL	9
*Lolium sp.**	rye grass	H		-
*Melilotus alba**	white sweet clover	H	FACU	-
Panicum dichotomiflorum	fall panicum	H	FACW	0
Penthorum sedoides	ditch stonecrop	H	OBL	2
Persicaria bicornis	long-styled knotweed	H	FACW	2
*Setaria glauca**	pigeon grass	H	FAC	-
*Setaria viridis**	green foxtail	H	UPL	-
*Sida spinosa**	prickly sida	H	FACU	-
Solidago canadensis	Canada goldenrod	H	FACU	1
*Sorghum halepense**	Johnson grass	H	FACU	-
Xanthium strumarium	cocklebur	H	FAC	0

*Non-native species Bolded species is dominant in the denoted stratum Mean C = 1.9
H = Herb, T = Tree, S = Sapling/Shrub, W = Woody Vine FQI = 9.0

APPENDIX C

Comprehensive Plant Species List

Comprehensive Plant Species List, 2012

Scientific Name	Common Name	Wetland Indicator Status	Coefficient of Conservatism
*Abutilon theophrasti**	buttonweed	FACU	-
Acalypha rhomboidea	three-seeded mercury	FACU	0
Acer negundo	box elder	FAC	1
Agrostis gigantea	red top	FACW	0
Amaranthus tuberculatus	tall waterhemp	OBL	1
Ambrosia artemisiifolia	common ragweed	FACU	0
Ambrosia trifida	giant ragweed	FAC	0
Ammannia coccinea	long-leaved ammannia	OBL	5
*Aster subulatus**	expressway aster	OBL	-
*Avena sativa**	oats	UPL	-
Bidens aristosa	swamp marigold	FACW	1
Bidens frondosa	common beggar's ticks	FACW	1
*Cardiospermum halicacabum**	love-in-a-puss	FAC	-
Carya illinoensis	pecan	FACW	6
Chamaesyce humistrata	spreading spurge	FACW	1
Conyza canadensis	horseweed	FACU	0
Cyperus esculentus	field nut sedge	FACW	0
Desmanthus illinoensis	Illinois bundle flower	FACU	4
Desmodium illinoense	Illinois tick trefoil	UPL	5
Dichanthelium dichotomum	forked panic grass	FAC	6
*Digitaria ischaemum**	smooth crab grass	FACU	-
*Digitaria sanguinalis**	hairy crab grass	FACU	-
Diospyros virginiana	persimmon	FAC	2
Echinochloa muricata	spiny barnyard grass	OBL	0
Eclipta prostrata	yerba de tajo	FACW	2
Elymus canadensis	Canada wild rye	FACU	4
Elymus virginicus	Virginia wild rye	FACW	4
Eragrostis hypnoides	creeping love grass	OBL	5
Erechtites hieracifolia	fireweed	FAC	2
*Festuca arundinacea**	tall fescue	FACU	-
Fraxinus lanceolata	green ash	FACW	2
*Ipomoea hederacea**	ivy-leaved morning glory	FAC	-
Ipomoea lacunosa	small morning glory	FACW	1
Iva annua	marsh elder	FAC	0
*Iva xanthifolia**	rag sumpweed	FAC	-
*Kummerowia striata**	Japanese lespedeza	FACU	-
Leersia oryzoides	rice cut grass	OBL	3
Leptochloa panicoides	salt meadow grass	OBL	9
*Lolium sp.**	rye grass		-
Ludwigia peploides var. glabrescens	creeping primrose willow	OBL	5
*Melilotus alba**	white sweet clover	FACU	-
*Melilotus officinalis**	yellow sweet clover	FACU	-
Monarda fistulosa	wild bergamot	FACU	4
Panicum dichotomiflorum	fall panicum	FACW	0

(Species list continued on next page)

Comprehensive Plant Species List, 2012 continued

Scientific Name	Common Name	Wetland Indicator Status	Coefficient of Conservatism
Penthorum sedoides	ditch stonecrop	OBL	2
Persicaria bicornis	long-styled knotweed	FACW	2
Persicaria lapathifolia	curttop lady's thumb	FACW	0
Persicaria pensylvanica	pinkweed	FACW	1
Persicaria punctata	smartweed	OBL	3
*Persicaria vulgaris**	lady's thumb	FACW	-
Phyla lanceolata	fog fruit	OBL	1
Populus deltoides	eastern cottonwood	FAC	2
Quercus bicolor	swamp white oak	FACW	7
Rorippa palustris	marsh yellow cress	OBL	4
*Rumex crispus**	curly dock	FAC	-
Salix interior	sandbar willow	FACW	1
Salix nigra	black willow	OBL	3
Sesbania exaltata	sesbania	FACW	3
*Setaria faberi**	giant foxtail	FACU	-
*Setaria glauca**	pigeon grass	FAC	-
*Setaria viridis**	green foxtail	UPL	-
*Sida spinosa**	prickly sida	FACU	-
Solidago canadensis	Canada goldenrod	FACU	1
*Sorghum halepense**	Johnson grass	FACU	-
Taxodium distichum	bald cypress	OBL	7
*Trifolium pratense**	red clover	FACU	-
Xanthium strumarium	cocklebur	FAC	0

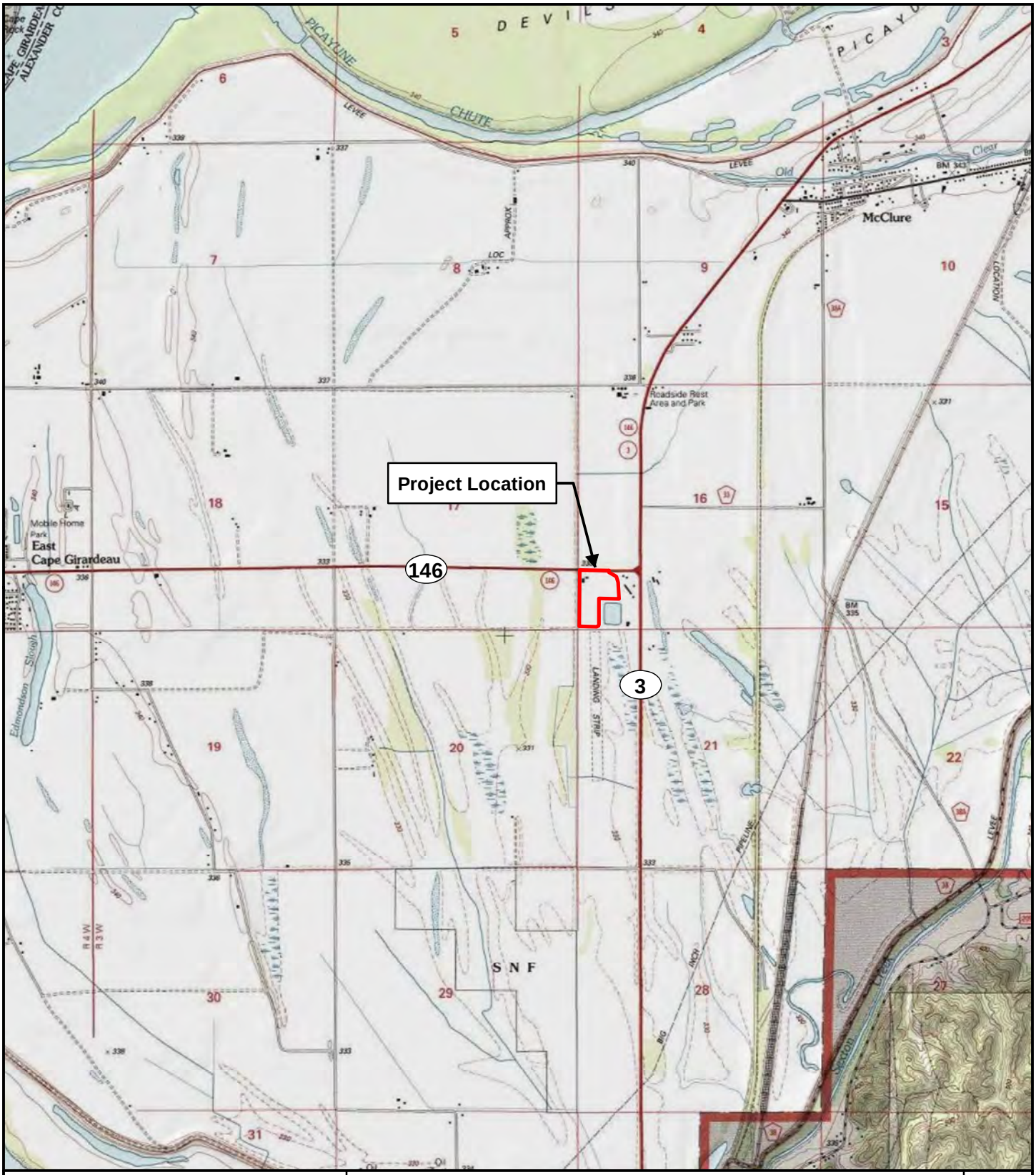
*Non-native species — Mean C = 2.7

H = Herb, T = Tree, S = Sapling/Shrub, W = Woody Vine — FQI = 19.1

APPENDIX D

Figures

Figure 1 – Project Location Map
Figure 2 – Mitigation Monitoring Map
Figure 3 – Tree Planting Map
Figure 4 – Photo Station Location Map
Figure 5 – ISGS 2012 Wetland Hydrology Map



University of Illinois at Urbana-Champaign

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PRAIRIE RESEARCH INSTITUTE

Wetland Science Program
1816 South Oak Street
Champaign, Illinois 61820

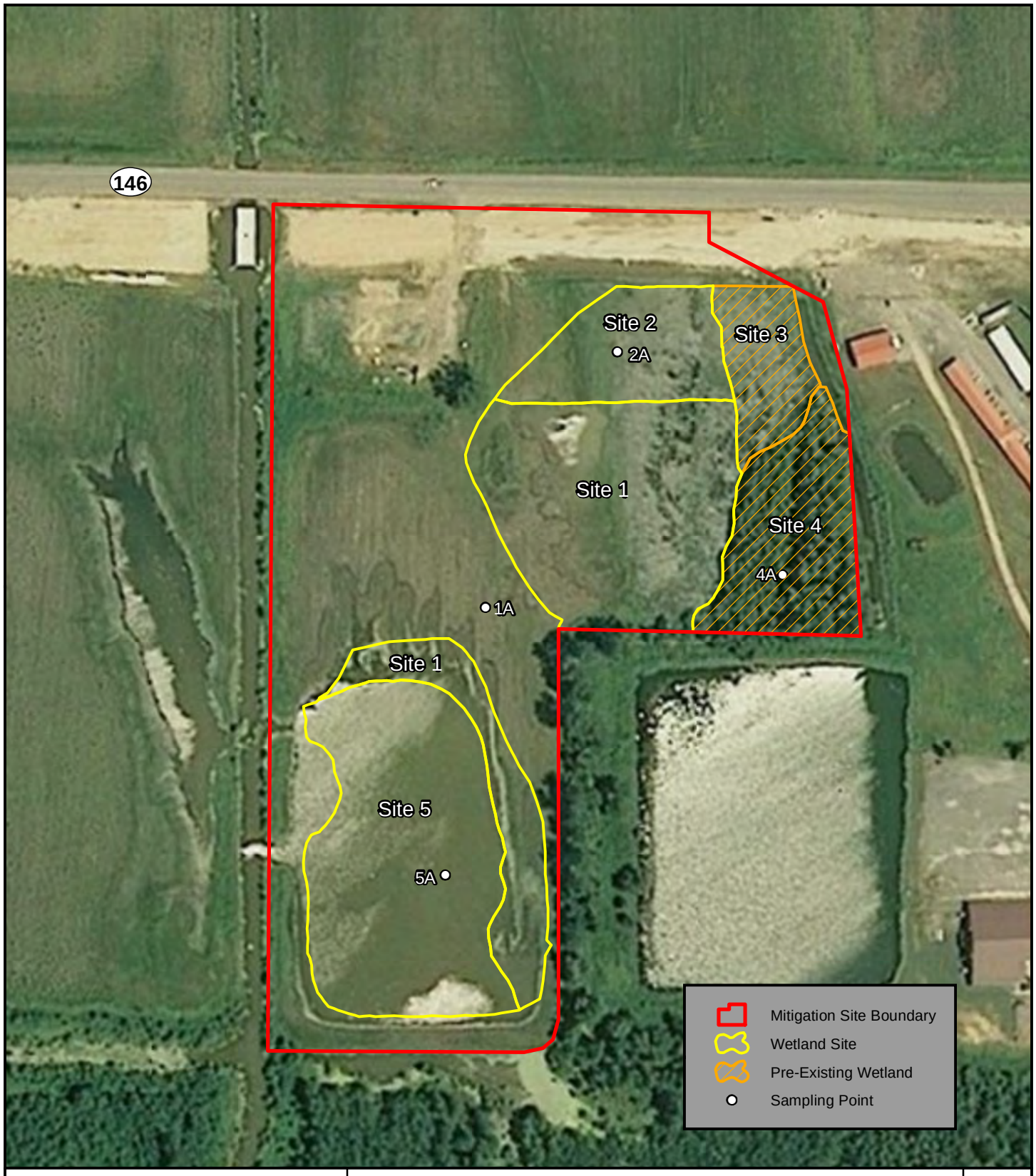
Figure 1
Project Location Map
East Cape Girardeau Wetland Mitigation
Alexander County

Seq. No: 633

0 Meters 1,000 0 Feet 3,000

February 2013

N



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Wetland Science Program
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Champaign, Illinois 61820

Figure 2
Mitigation Monitoring Map
East Cape Girardeau Wetland Mitigation
Alexander County

Seq. No: 633

0 Meters 50 0 Feet 200

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Figure 3
Tree Planting Map
East Cape Girardeau Wetland Mitigation
Alexander County

Seq. No: 633

Meters 0 50
Feet 0 200

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N

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Figure 4
Photo Station Location Map
East Cape Girardeau Wetland Mitigation
Alexander County

Seq. No: 633

Meters 0 50
Feet 0 200

February 2013

N

East Cape Girardeau Wetland Mitigation Site
(IL 146, FAP 312)
Estimated Areal Extent of 2012 Wetland Hydrology
September 1, 2011 through August 31, 2012

Map based on 2012 Farm Service Agency digital orthophotography, Alexander County, Illinois (USDA-FSA 2012)

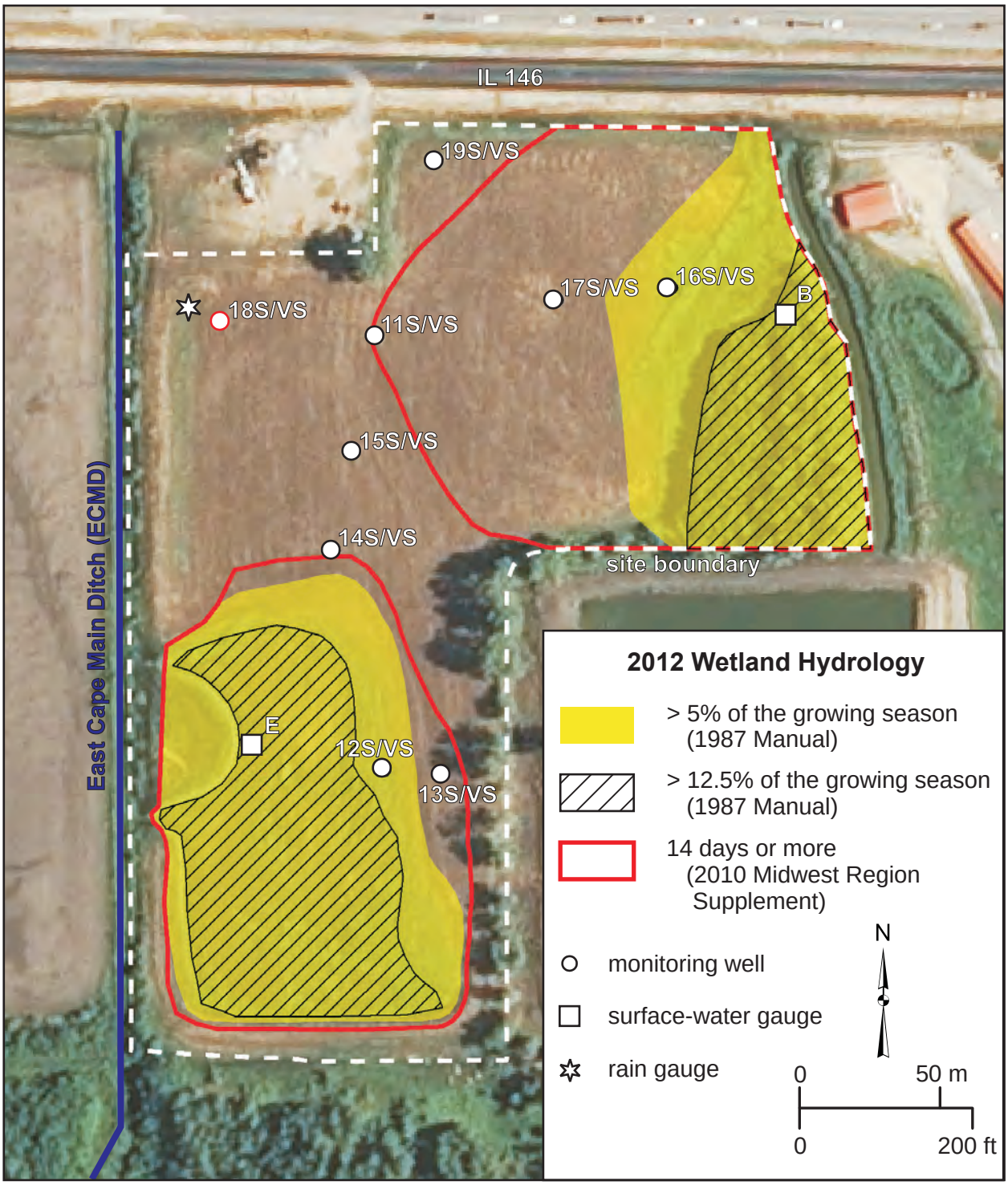

Figure 5: ISGS 2012 Wetland Hydrology Map

APPENDIX E

Photographs of Wetland Mitigation Site

Photo 1. Facing south from photo station1.

Photo 2. Facing south-southwest from photo station 2; overlooking the proposed forested wetland site.

Photo 3. Facing north from photo station 3; overlooking the emergent site.