TRANSMITTAL

To: Bureau of Design and Environment
Attention: Tom Brooks
From: Illinois Natural History Survey
Regarding: Mitigation Monitoring Project

Project Information

Requesting Agency: IDOT Springfield
County: Sangamon
Route: FAP 658 (IL 29)
Section: 102 (B-3, B-4)
At: West side of IL 29 approximately 975 m (3200 ft) north of the Sangamon River.
Quadrangle: Athens

Survey Conducted By: Paul Marcum and Jeff Matthews (vegetation and hydrology)
Jessica Kurylo (soils and hydrology)
Geoff Pociask and Eric Plankell (ISGS; hydrology)
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Date Conducted: 15 June and 30 August 2006

Project Summary:

Field monitoring of the wetland mitigation site along FAP 658 (IL 29) was conducted on 15 June and 30 August 2006. Monitoring is performed on two separate areas. Area A, a proposed emergent wetland, was monitored for the sixth year. Both wet meadow and upland forbland communities were assessed within this area. Seventh year monitoring was conducted for Area B. Both wet meadow and upland shrubland communities were assessed within this area. Summary information regarding the wetland delineation sites is presented in the project report. The wetland determination forms are contained in Appendix 1 and photos of the wetland creation sites are included in Appendix 2.

Signed:_____
Dr. Allen E. Plocher
INHS/IDOT Project Coordinator

Date:_____

Signed:_____
Dr. Edward J. Heske
INHS/IDOT Project Principal Investigator

Date:_____

Seventh Year Wetland Mitigation and Corridor Revegetation Site Monitoring for FAP 658 (IL 29), Sangamon County, Illinois – 2006

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Introduction

Wetland mitigation activity has been initiated along Illinois Route 29 (FAP 658) in Sangamon County, Illinois. The legal location of the site is SE/4 of NW/4 of Sec. 33, T. 17 N., R. 5 W. (Athens, IL Quad). The wetland replacement site is located in a former agricultural field classified as prior converted wetland by the NRCS. The mitigation site assessment for this area suggested that floodplain forest would be the most likely development for this site (Plocher and Tessene 1995).

Plocher and Tessene (1995) surveyed the mitigation area in August 1995 and found 0.93 ha (2.3 ac) of NRCS Prior Converted Wetland that still met the three criteria for a wetland. Since then, the site has been excavated to create more low depressional ground to support wetland vegetation. The site is divided into two areas. Area A, the south half of the mitigation site, initially was to be planted with woody hydrophytic species. In 2001, however, the wetland compensation plan was modified for this area and it was planted with herbaceous vegetation only (Brooks 2001). Emergent herbs planted in Area A were *Asclepias incarnata*, *Leersia oryzoides*, *Eupatorium maculatum*, *Spartina pectinata*, and *Calamagrostis canadensis*. Field monitoring of this area began during the 2001 growing season and will continue for the standard five-year monitoring period (2001-2005) or until no longer required by the Illinois Department of Transportation (IDOT). Area B, at the north end of the mitigation site, was planted with a wetland grass seeding (*Elymus canadensis*, *Elymus virginicus*, *Spartina pectinata* and *Calamagrostis canadensis*) and with woody hydrophytic species (*Quercus palustris*, *Quercus bicolor*, *Betula nigra*, *Fraxinus pennsylvanica*, and *Carya illinoensis*). Field monitoring of this area began during the 2000 growing season and will also continue for the standard five years (2000-2004) or until no longer requested by IDOT (Early in 2005, the IDOT requested two additional years of monitoring at this site). The Illinois State Geological Survey (ISGS) has been tasked to monitor the hydrology of this mitigation site. Project goals, objectives, and performance criteria are included in this report, as are monitoring methods, monitoring results, summary information, and recommendations.

Project Goals, Objectives, and Performance Criteria

Proposed goals and objectives for the wetland mitigation project are based on information contained in the original IDOT project request (Brooks 2000) and in the modified project request (Brooks 2001). Performance criteria are based on those specified in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) and *Guidelines for Developing*

Mitigation Proposals (USACOE 1993). Each goal should be attained by the end of the five-year monitoring period. Project goals, objectives and performance criteria are listed below.

Project Goal #1: At the end of the five-year monitoring period both created wetland communities should be jurisdictional wetlands as defined by current federal standards.

Objective: The created wetland should comprise 2.43 hectares (6.0 acres) of jurisdictional wetland.

Performance Criteria: The entire created wetland should satisfy the three criteria of the federal wetland definition: dominant hydrophytic vegetation, hydric soils, and wetland hydrology.

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 this site.

C. Presence of Wetland Hydrology – The compensation area must be either permanently or periodically inundated at average depths less than 2 m (6.6 ft) or have soils that are saturated to the surface for at least 12.5% of the growing season.*

Project Goal #2: In Area B, a floodplain forest wetland community will be created.

Objective: Planting the area with hydrophytic tree species should compensate for the loss of previously altered wetlands.

Performance Criteria: Seventy-five percent of the planted trees should be in a live and healthy condition each year for five years.

Project Goal #3: In Area A, a native, non-weedy, emergent wetland community will be created.

Objective: Planting the area with high quality native emergent vegetation should reduce the pressures from successional, non-native, weedy species.

Performance Criteria: In the Area A wetland site, at least 90% of the plant species present should be non-weedy, native, perennial and annual species, and none of the dominant plant species may be non-native or weedy species, such as cattails, sandbar willow or reed canary grass.

Methods

Monitoring is to be performed on two areas of the constructed wetland site. The monitoring for Area B, consisting of wetland determinations and tree survivorship surveys, began in 2000 and

* In some cases wetland hydrology can be met when a site is inundated or saturated for 5% to 12.5% of the growing season (Environmental Laboratory 1987).

will continue for a minimum of five years (2000-2004). Both the wet shrubland and upland shrubland communities will be assessed. Herbaceous vegetation in Area A (both wet meadow and forbland community) was monitored for the first time in 2001, after the area had been fully planted. Likewise, Area A will also be monitored for at least the standard five-year monitoring period (2001-2005). Illinois Natural History Survey (INHS) personnel will monitor the biological parameters while ISGS personnel will monitor hydrology. Yearly tree surveys in Area B and herbaceous sampling in Area A will be submitted in yearly monitoring reports submitted to IDOT on the status of the created wetland site. The likelihood of meeting the proposed goals and performance criteria will also be addressed. If, at any time during the monitoring period, it appears that the goals/performance criteria will not be met at the end of the five-year monitoring period, written management recommendations will be made to IDOT in an effort to correct any problems.

Floristic Quality Index (FQI)

For both Area A and Area B, a complete list of all plant species found in each plant community will be recorded and the FQI will be calculated (Taft *et al.* 1997). The FQI will be calculated both with and without planted species. This index provides a measure of the floristic integrity or level of disturbance of a site. Each native plant species is assigned a rating between 0 and 10 (the Coefficient of Conservatism) that is a subjective indicator of how likely a plant may be found on an undisturbed site in a natural plant community. A plant species that has a low Coefficient of Conservatism (C) is common and is likely to tolerate disturbed conditions; a species with a high C is relatively rare and is likely to require specific, undisturbed habitats. Species not identified to species level are not rated and are not included in the calculations.

To calculate the FQI, first compute the mean C value (also known as mean rated quality), $mCv = \sum C/N$, where $\sum C$ represents the sum of the numerical ratings (C) for all species recorded for a site, and N represents the number of plants on the site. The C value for each species is shown in the species list for the site (Appendix 2). Species that are not native to Illinois (indicated by * in the species list for each site) are not included in the calculations. The FQI for each site is determined by dividing the $\sum C$ value by the square root of N [$\sum C/(\sqrt{N})$]. An Index score below 10 suggests a site of low natural quality; below 5, a highly disturbed site. An FQI value of 20 ($mCv > 3$) or more suggests that a site has evidence of native character and may be considered an environmental asset.

Project Goal #1

Wetland delineations will be completed yearly for both wetland and upland community types at this creation site. Results of these determinations are summarized below and are described in more detail on the accompanying forms (Appendix 1). In addition, permanent photo stations have been established in each wetland restoration area and photos will be taken annually in order to help monitor changes in the vegetation.

A. Predominance of Hydrophytic Vegetation – The method for determining dominant hydrophytic vegetation is described in Environmental Laboratory (1987) and Federal Interagency Committee for Wetland Delineation (1989). This method is based on aerial coverage estimates for individual plant species. Each of the dominant plant species is assigned a wetland indicator status rating (Reed 1988). Any plant rated facultative or wetter (i.e., FAC, FAC+, FACW-, FACW, FACW+ and OBL) is considered hydrophytic. A predominance of hydrophytic

vegetation in the wetland plant community exists if greater than 50% of the dominant species present are hydrophytes. Planted species are not included in the percentage of dominant hydrophytic vegetation.

In Area A, dominant hydrophytic vegetation for all plant communities present will be determined each year based on results of systematic plant sampling. Area A will be monitored for at least the standard five-year monitoring period (2001 to 2005). Cover of all species in each plot is assigned a cover class (Table 1) (Daubenmire 1959). Frequency (proportion of quadrats in which a species occurred) and average cover (calculated using midpoints for each cover class) will be used to compute relative frequency (frequency of a species relative to total observations) and relative cover (cover relative to total observed cover), respectively. These two relative values are added to determine the importance value for each species sampled. Importance values will be used to determine dominant species. "Dominant species are the most abundant plant species (when ranked in descending order of abundance and cumulatively totaled) that immediately exceed 50% of the total dominance measure for the stratum, plus any additional species comprising 20% or more of the total dominance measure for the stratum" (FICWD 1989; Tiner 1999).

Table 1. Cover classes used in vegetation sampling at FAP 658 (IL 29), Sangamon County, Illinois.

Cover Class	Range of Cover (%)	Midpoint of Range (%)
1	0-5	3.0
2	5-25	15.0
3	25-50	37.5
4	50-75	62.5
5	75-95	85.0
6	95-100	97.5
		(Daubenmire 1959)

B. Presence of Hydric Soils – Soils, in each plant community, will be examined and described annually. A soil core collected from the same general area of the mitigation site will be examined for the presence of redoximorphic features. A detailed profile description of the soil using Munsell color charts to record soil colors will be included. Soil texture and structure will also be recorded. 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 that time, hydrologic data could be used as corroborative evidence that conditions favorable for hydric soil formation are present at the site.

C. Presence of Wetland Hydrology – The ISGS has been tasked to monitor hydrology at the proposed wetland site. To date they have installed two surface-water monitoring stations (RDS1 and RDS2), a rain gauge, five surface-water staff gauges (C, D, F, G, and H), and twelve shallow monitoring wells (1S – 12S) (Figure 1) (Pociask and Watson 2001; Pociask and Sabatini 2002; Pociask and Sabatini 2003; Pociask and Plankell 2004; Pociask and Plankell 2005; Pociask and Plankell 2006). ISGS began hydrologic monitoring at Area B in September 2000. Hydrologic

monitoring of Area A began in December 2001. ISGS personnel will measure water levels monthly. In addition, INHS scientists will survey the site annually for field indicators of wetland hydrology.

Project Goal #2

In Area B, tree survivorship will be assessed each year for a five-year monitoring period (2000 to 2004). Because of ice damage on the site, IDOT requested two additional years of tree monitoring (2005 to 2006). Initially the site was planted with a total of 544 trees. These trees included *Quercus palustris* (119), *Quercus bicolor* (106), *Betula nigra* (102), *Fraxinus pennsylvanica* (103) and *Carya illinoensis* (114). Some planting to replace dead trees has occurred since 2000. Annually, every tree will be located, identified to species, and determined to be alive or dead.

Project Goal #3

In the Area A wetland community, a complete species list will be compiled each year and species will be recorded as native or non-native and as weedy or non-weedy. Nativity of plants is determined by consulting Mohlenbrock (1986, 2002). Weedy species, for the purposes of this report, are defined as all non-native species and any native species assigned a Coefficient of Conservatism of 0 or 1 (Taft *et al*. 1997). Species given a C value of 0-1 correspond to Grime's ruderal species (Grime 1974; Grime *et al.* 1988), which include species adapted to frequent or severe disturbances (Taft *et al.* 1997).

Results

Floristic Quality Index (FQI): The FQI was calculated for this mitigation site using native species only. In Area B, the FQI was calculated in two ways. First the FQI was calculated using all species at the site, including the planted tree species. Then, the FQI was also calculated without planted species (spontaneous natives only). FQI for Area A was calculated using all native species in the species list.

Area A, comprised of both wet meadow and forbland communities, had an FQI of 16.9 and a mean C value of 2.1 for the wetland site. These values are indicative of fair natural quality. The upland forbland community of Area A had a FQI of 8.2 and a mean C value of 1.5. These values are indicative of an area with poor natural quality. There were 78 species found in the Area A wetland; 65 (83%) were native. Notable species in the Area A wet meadow community include *Ammania coccinea*, *Boltonia asteroides*, *Carex crus-corvi*, *Carex lupulina*, *Carex muskingumensis*, *Iris shrevei*, *Leersia lenticularis*, and *Ludwigia polycarpa*. Summary information for Area A is given in Tables 2 and 3.

Table 2. Summary table for Area A Wet Meadow (wetland) species list.

Total Species Richness	78
Native Species Richness	65
% Native	83% (65/78)
% Native and Non-weedy	46% (36/78)
Mean Conservatism	2.1
Floristic Quality Index (FQI)	16.9
% Wetland Species (FAC to OBL)	79% (62/78)

Table 3. Summary table for Area A Forbland (upland) species list.	
Total Species Richness	33
Native Species Richness	29
% Native	88% (29/33)
% Native and Non-weedy	36% (12/33)
Mean Conservatism	1.5
Floristic Quality Index (FQI)	8.2
% Wetland Species (FAC to OBL)	73% (24/33)

Area B, comprised of a wet meadow and an upland shrubland community, had an FQI of 12.1 and a mean C value of 2.5 for the wetland site when planted material was included. These values dropped to 8.9 for the FQI and 2.1 for the mean C when planted species were excluded. These values are indicative of an area with fair to poor natural quality. The Area B wetland site had a total of 27 species, 23 were native (85%) in 2006. Summary information for Area B is given in Tables 4 and 5.

Table 4. Summary table for Area B Wet Meadow (wetland) species list.	
Total Species Richness (with planted material)	27
Native Species Richness (with planted material)	23
% Native	85% (23/27)
Mean Conservatism (with planted material)	2.5
Mean Conservatism (spontaneous natives only)	2.1
Floristic Quality Index (FQI) (with planted material)	12.1
FQI (spontaneous natives only)	8.9
% Wetland Species (OBL, FACW, FAC) (with planted material)	81% (22/27)

Table 5. Summary table for Area B Shrubland (upland) species list.	
Total Species Richness	45
Native Species Richness	40
% Native	89% (40/45)
Mean Conservatism (with planted material)	2.1
Mean Conservatism (spontaneous natives only)	1.8
Floristic Quality Index (FQI) (with planted material)	13.4
FQI (spontaneous natives only)	10.5
% Wetland Species (OBL, FACW, FAC) (with planted material)	69% (31/45)

Project Goal #1 At the end of the five-year monitoring period the created wetland communities should be a jurisdictional wetlands as defined by current federal standards.

A. Predominance of Hydrophytic Vegetation – The performance criterion requires that greater than 50% of the dominant plant species be hydrophytic. In Area A, 2006 vegetation sampling results indicate that the dominant species in the wet meadow community are *Aster pilosus* (FACU+), *Aster simplex* (FACW), *Echinochloa muricata* (OBL), and *Iva annua* (FAC) (Table 6). Area B wetland site dominant species are *Echinochloa muricata* (OBL), *Eleocharis macrostachya* (OBL), and *Iva annua* (FAC). Greater than 50% (100%) of the dominant plant

species are hydrophytes; therefore, both sites meet the criterion for predominance of hydrophytic vegetation.

Table 6. FAP 658 (IL 29) Wetland Mitigation Site vegetation sampling data for Area A wet meadow community including frequency, cover, and importance value for all species sampled in 2006.

	Indicator	Frequency	Relative Frequency	Average Cover	Relative Cover	Importance Value
Aster simplex	**FACW**	**0.6500**	**11.4035**	**18.9250**	**31.1779**	**21.2907**
Aster pilosus	**FACU+**	**0.3500**	**6.1404**	**9.7500**	**16.0626**	**11.1015**
Iva annua	**FAC**	**0.5000**	**8.7719**	**7.9500**	**13.0972**	**10.9346**
Echinochloa muricata	**OBL**	**0.7000**	**12.2807**	**3.1500**	**5.1895**	**8.7351**
Ipomoea lacunosa	FACW	0.6500	11.4035	1.9500	3.2125	7.3080
Leersia oryzoides	OBL	0.2500	4.3860	3.6750	6.0544	5.2202
Rumex crispus	FAC+	0.4000	7.0175	1.8000	2.9654	4.9915
Bidens frondosa	FACW	0.2500	4.3860	1.3500	2.2241	3.3050
Solidago canadensis	FACU	0.1000	1.7544	2.6250	4.3245	3.0395
Cyperus acuminatus	OBL	0.2500	4.3860	0.7500	1.2356	2.8108
Chamaesyce maculata	FACU-	0.2000	3.5088	0.6000	0.9885	2.2486
Bidens tripartita	OBL	0.0500	0.8772	1.8750	3.0890	1.9831
Acer saccharinum	FACW	0.1500	2.6316	0.4500	0.7414	1.6865
Polygonum ramosissimum	FAC-	0.1500	2.6316	0.4500	0.7414	1.6865
Ambrosia trifida	FAC+	0.1000	1.7544	0.9000	1.4827	1.6185
Eupatorium serotinum	FAC+	0.1000	1.7544	0.9000	1.4827	1.6185
Rumex altissimus	FACW-	0.1000	1.7544	0.9000	1.4827	1.6185
Ascelpias incarnata	OBL	0.0500	0.8772	0.7500	1.2356	1.0564
Ammania coccinea	OBL	0.0500	0.8772	0.1500	0.2471	0.5622
Calystegia sepium	FAC	0.0500	0.8772	0.1500	0.2471	0.5622
Carex vulpinoidea	OBL	0.0500	0.8772	0.1500	0.2471	0.5622
Digitaria ischaemum	FACU	0.0500	0.8772	0.1500	0.2471	0.5622
Digitaria sanguinalis	FACU	0.0500	0.8772	0.1500	0.2471	0.5622
Ipomoea hederacea	FAC	0.0500	0.8772	0.1500	0.2471	0.5622
Oenothera biennis	FACU	0.0500	0.8772	0.1500	0.2471	0.5622
Oxalis stricta	FACU	0.0500	0.8772	0.1500	0.2471	0.5622
Populus deltoides	FAC+	0.0500	0.8772	0.1500	0.2471	0.5622
Ranunculus abortivus	FACW-	0.0500	0.8772	0.1500	0.2471	0.5622
Sida spinosa	FACU	0.0500	0.8772	0.1500	0.2471	0.5622
Veronica peregrina	FACW+	0.0500	0.8772	0.1500	0.2471	0.5622
Xanthium strumarium	FAC	0.0500	0.8772	0.1500	0.2471	0.5622
Iris shrevei	OBL	0.0500	0.8772	0.0000	0.0000	0.4386
		5.7000	100.0000	60.7000	100.0000	100.0000
bare ground				39.3000		

Dominant species are in bold

B. Presence of Hydric Soils – The performance criterion requires that hydric soil characteristics be present, or conditions favorable for hydric soil formation should persist. Hydric soil has developed at the Area A wet meadow site. The wet meadow site is situated at a lower elevation relative to the soils for the rest of Area A. These new soils should continue to

remain hydric so long as the hydrology continues. A typical pedon for the wet meadow community in Area A is described in Table 8.

Table 8. Description of the soils for Area A wet meadow community (wetland).

Depth(in)	Matrix Color	Concentrations	Depletions	Concretions	Texture	Structure
0-2	10YR 2/1				silt	granular
2-23	2.5Y 3/1	10YR 4/4		Large 5%	silty clay	subangular blocky
23-31	2.5Y 4/1	10YR 3/4			silty clay	subangular blocky

Also of note, the remaining portion of Area A (forbland community) satisfies the criterion for hydric soil development. Soil development is underway on the remaining portion of this excavated site. There is distinct soil development and horizonation noticeable within the strata. The colors observed, while minimally relic, have formed prominent hydric features. Based on field observations up to now, hydric soils have developed and should continue to remain hydric so long as the hydrology continues. A typical pedon for the forbland community in Area A is described in Table 9.

Table 9. Description of the soils for Area A forbland community (non-wetland).

Depth(in)	Matrix Color	Concentrations	Depletions	Concretions	Texture	Structure
0-1	10YR 2/1				silt	granular
1-6	10YR 3/1 & 10YR 5/6	7.5YR 5/8		Large, 5%	silty clay loam	granular to blocky
6 – 18	10YR 4/1	7.5YR 4/6		Large, 5-10%	silty clay loam	subangular blocky
18 – 24	2.5Y 5/2	7.5YR 5/8			silty clay loam	subangular blocky

The soils within the wet meadow portion of Area B (forested wetland restoration) are situated slightly lower than the rest of Area B. Due to a slight elevation difference these soils appear more hydric than the soil located relatively higher within the tree planted site. Concretions were evident. A typical pedon for the wet meadow community in Area B is described in Table 10.

Table 10. Description of the soils for Area B wet meadow community (wetland).

Depth(in)	Matrix Color	Concentrations	Depletions	Concretions	Texture	Structure
0-2	10YR 3/1				silt loam	subangular blocky
2-8	10YR 4/1	10YR 5/8 & N2.5/0		Small to large, 20%	silty clay loam	subangular blocky
8-12	10YR 4/2.5	10YR 5/8	10YR 4/1	Small to large, 20%	silty clay loam	subangular blocky

Soil in the upland shrubland community of Area B shows distinct soil development and horizonation is noticeable within the excavated strata. Prominent hydric features have formed. Based on this and previous years observations, hydric soils have developed and should continue to be hydric if hydrology is present. A typical pedon for the upland shrubland community of Area B is described in Table 11.

Table 11. Description of the soils for Area B shrubland community (upland).

Depth(in)	Matrix Color	Concentrations	Depletions	Texture	Structure
0-2	10YR 3/1			Silt Loam	granular
2-4	10YR 2/1	10YR 3/4	10YR 4/2	Silty Clay Loam	subangular blocky
4-24	10YR 2.5/1	10YR 4/4	10YR 4/2	Silty Clay Loam	subangular blocky

C. Presence of Wetland Hydrology – The performance criterion requires that the compensation area must be either permanently or periodically inundated at average depths less than 2m (6.6 ft) or have soils that are saturated to the surface for at least 12.5% of the growing season (Environmental Laboratory 1987)[*]. The ISGS initiated water level monitoring at Area A in December 2001 and at Area B in September 2000. Their findings for 2006 indicate that 0.8 ha (2.0 ac) of the mitigation area satisfied the wetland hydrology criterion for greater than 12.5% of the growing season (Pociask and Plankell 2006; Figure 1). Most of this area corresponds to the INHS Area A wet meadow community (Site 1; Figure 2). In addition, a small area corresponds to the small wetland centered on the RDS1 datalogger in Area B (Site 3; Figure 2). The area of satisfactory wetland hydrology increased somewhat from 2005 [~0.63 ha (1.6 ac)] and is slightly lower than 2004 [1.0 ha (2.4 ac)] (Pociask and Sabatini 2006; Pociask and Plankell 2005; Pociask and Plankell 2004). During visits to the site, the following indicators of wetland hydrology were observed: drift lines, sediment deposits, areas of inundation, and many areas of surface or near surface saturation.

Unusual circumstances affected the hydrology of the site during 2002. Floodwater from the Sangamon River overtopped the levee and drift was deposited as high as the access road to the east of Area A. A water control structure located in the south part of the levee surrounding the mitigation area was closed prior to this late spring flooding. Therefore, water was artificially trapped on the site for a very long duration of the 2002 growing season. The entire site satisfied the wetland hydrology criterion in 2002 (Pociask and Sabatini 2002). Apparently, the farmer who owns the adjacent property dug a hole through the levee wall allowing his field to drain for a late planting of soybeans. This hole in the levee still remains.

[*] In some cases wetland hydrology can be met when a site is inundated or saturated for 5% to 12.5% of the growing season (Environmental Laboratory 1987).

Figure 1. 2006 aerial extent of wetland hydrology for Area A (south end) and Area B (north end) (from ISGS, Pociask and Plankell 2006).

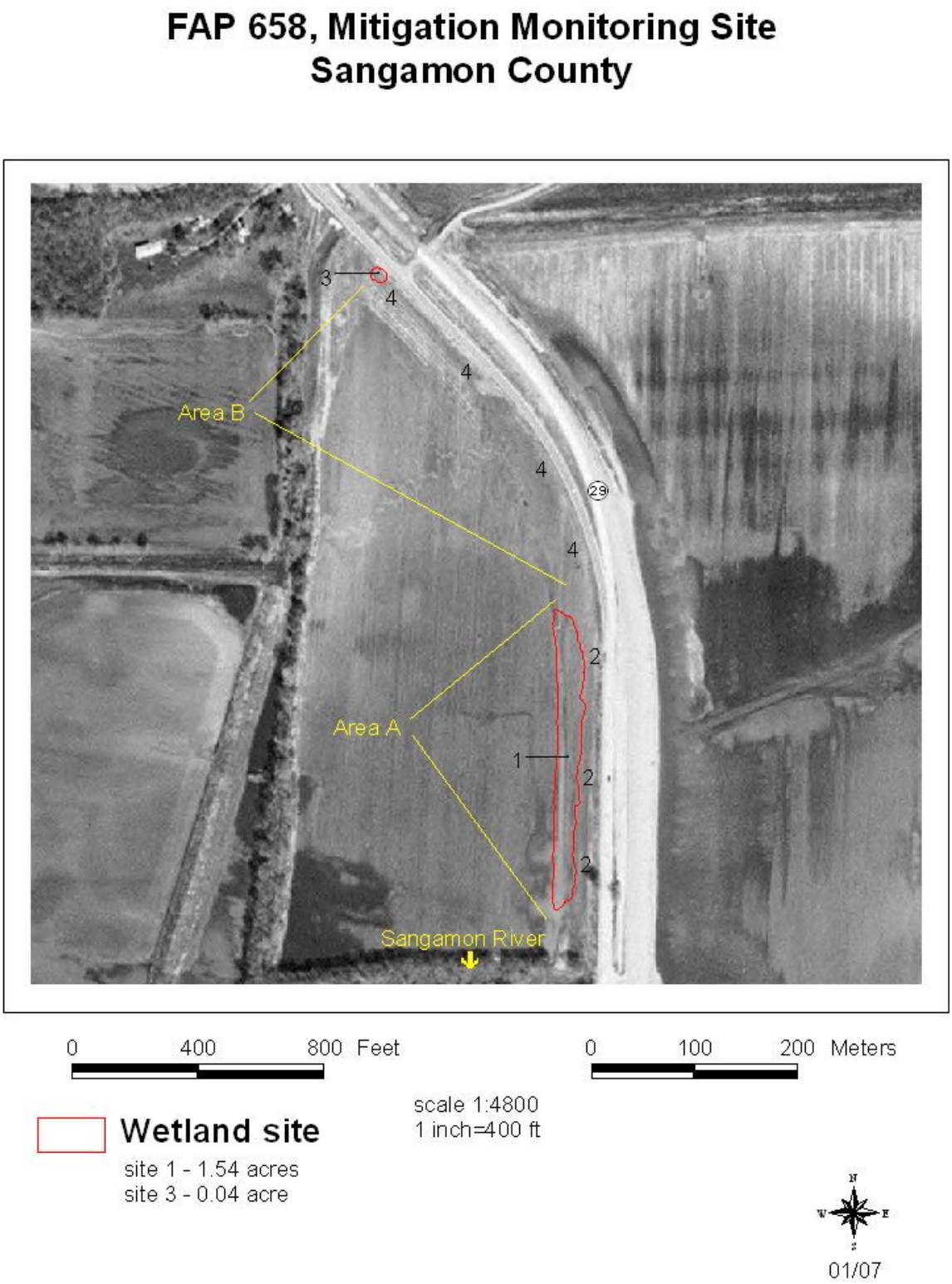

Figure 2. Estimated aerial extent of the created wetland sites at FAP 658 (IL 29), Sangamon County, Illinois (prepared by INHS, Brad Zercher).

Project Goal #2: In Area B, a floodplain forest wetland community will be created.

All planted trees within Area B were located, identified and their condition was assessed. Because of numerous replantings, it has become impossible to keep a cumulative total for trees planted at this site; however, it is apparent that at least 731 trees have been planted since this site was established in 2000. Many (135) trees died between the 2001 and 2002 tree monitoring, when an extended flood event occurred at this site. *Fraxinus pennsylvanica* was especially hard hit with 82 dead. In 2002, tree survival fell below the 75% survivorship requirement for the first time with 72.9% (416/571) alive (Marcum *et al*. 2002). After a massive replanting effort by IDOT in 2004, survival was up to 74% (538/726). A total of 518 trees, approximately 71% cumulative survival, were found alive in 2006. Many of these are resprouts from trees damaged by ice in late 2004/early 2005. Although cumulative survival at the mitigation site is 71%, 518 live trees on site represents 95% (518/544) of the total number of trees originally planted in 2000. Table 12 shows 2006 survival for each tree species planted in Area B.

Table 12. 2005 tree survival for FAP 658 (IL 29) Area B.

Species	Total Alive	Estimated Dead	Percentage
Betula nigra	106	16	87%
Carya illinoensis	121	21	85%
Fraxinus pennsylvanica	94	107	47%
Quercus bicolor	85	61	58%
Quercus palustris	112	8	93%
Totals	518	213	

Project Goal #3: In Area A, a native, non-weedy, emergent wetland community will be created.

The performance criteria for project goal #3 states that, in the wetland site at Area A, at least 90% of the plant species present should be non-weedy, native, perennial and annual species. In Area A, many weedy and non-native species were present during the first year of sampling (Marcum *et al.* 2001). Eighteen of the forty-one species (44%) found at this site in 2001 were native, non-weedy species. During the 2002 survey of Area A, very little vegetation was observed on the site and there were no dominant species present. Vegetation in Area A had been killed by an artificially prolonged flood event. The few plant species that were present consisted of early successional, native, weedy species. Only four of the sixteen species present in 2002 were native and non-weedy (25%) (Marcum *et al*.2002). The 2003 species list of 50 species included 41 natives (82%) (Marcum and Kurylo 2003). Native, non-weedy species, however, accounted for only 36% of the total (18/50). In 2004 the percentage of native, non-weedy species rose to 54% (14/26). Likewise, in 2005, the percentage of native, non-weedy species continued to rise (57%; 29/51). In 2006, the percentage of native (83%) and non-weedy species was down to only 46%. Once again this part of the performance criteria was not satisfied in 2006.

The performance criteria for project goal #3 also states that none of the dominant plant species may be non-native or weedy species, such as cattails, sandbar willow or reed canary grass. In 2006 the Area A wet meadow dominants were *Aster pilosus* (FACU+), *Aster simplex* (FACW), *Echinochloa muricata* (OBL), and *Iva annua* (FAC). All of these species are native; however,

Aster pilosus, *Echinochloa muricata*, and *Iva annua* (mean C values of 0) may be considered to be weedy. This part of the performance criteria was not satisfied in 2006.

Summary and Recommendations

Floristic Quality Index – Prolonged flooding in 2002 had a great impact on both Area A and B. Total species richness dropped (41 to 16 in Area A, 62 to 43 in Area B). Nonetheless, FQI and mean C scores have continued to show a gradual rise over the monitoring period. The FQI score for Area A in 2005 (16.9) was at its highest level in the six years of monitoring, and significantly higher than in 2002. Likewise, Area B's FQI scores have also risen since the initiation of monitoring activities. In 2006 the FQI for Area B was 12.1. While both sites have shown increases in natural quality, as measured by the FQI, the FQI scores remain relatively low. These values are indicative of fair natural quality.

Prolonged flooding, such as that which occurred in 2002, is not the normal circumstance. Under normal flooding regimes these sites should continue to develop into the predicted wetland communities with greater diversity than is now apparent. Planted emergent species have taken hold, especially in Area A. Furthermore, it appears that several new, desirable species have been introduced to the mitigation site as a result of recent flooding events.

Project Goal # 1 – The performance criterion requires that greater than 50% of the dominant plant species be hydrophytic, that hydric soil characteristics be present, or conditions favorable for hydric soil formation should persist, and that the compensation area must be either permanently or periodically inundated at average depths less than 2m (6.6 ft) or have soils that are saturated to the surface for at least 12.5% of the growing season[*].

Area A

In 2006, Area A contained both a wet meadow and a forbland community. The wet meadow community exhibited dominant hydrophytic vegetation, hydric soils, and wetland hydrology.

INHS personnel have been monitoring vegetation and soil development in Area A for the past six years. INHS and ISGS data from vegetation sampling, soil mapping, and hydrologic monitoring determine the aerial extent of the created wetland in Area A to be approximately 0.62 ha (1.54 ac) (Figure 2).

Area B

In 2006, Area B contained both a wet meadow (with trees planted) and an upland shrubland community. The wet meadow community exhibited dominant hydrophytic vegetation, hydric soils, and wetland hydrology.

INHS personnel have been monitoring vegetation and soil development in Area B for the past seven years. INHS and ISGS data from vegetation sampling, soil mapping, and hydrologic monitoring determine the aerial extent of the created wetland in Area B to be approximately 0.018 ha (0.044 ac) (Figure 2). This small area, centered on the RDS1 datalogger, continues to

[*]In some cases wetland hydrology can be met when a site is inundated or saturated for 5% to 12.5% of the growing season (Environmental Laboratory 1987).

satisfy the wetland hydrology criteria in most years. Additional area, in a narrow band south of the RDS1 datalogger, has satisfied wetland hydrology in past years (Pociask and Plankell 2004).

The stated objective for project goal #1 is to create 2.43 ha (6.0 ac) of jurisdictional wetland. Only 0.64 ha (1.58 ac) of wetland is present and, according to the ISGS, the total area of the excavation [2.2 ha (5.4 ac)] is less than the required area (Pociask and Sabatini 2002).

Project Goal # 2 – The performance criterion requires that seventy-five percent of the planted trees should be in a live and healthy condition each year for five years. The performance criterion for this project goal was easily attained during the first two years of monitoring. In 2000 over 97% of the planted trees survived. Some replanting was done in 2001 and tree survival remained very high at 96.5% overall. During 2002, however, a prolonged flood event occurred and many of the planted trees were killed. Survival fell to 72.9%, just below the performance criterion of 75%. *Quercus palustris* (95.0%), *Betula nigra* (89.1%), and *Carya illinoensis* (83.3%) fared best and remained at acceptable levels. *Quercus bicolor* (71.7%) and especially *Fraxinus pennsylvanica* (25.2%) showed significant decline. Considering the severity and length of flooding on this site in 2002, the overall percent survival is higher than might have been expected. The large, more mature size of the tree plantings is probably the reason for their greater success. In 2004, after a massive replanting in 2003-2004, the percent tree survival rose slightly to 74%. This value was just below 75%, the performance criterion set for this project goal. Although tree survival did not meet the proposed performance criterion for project goal #2 there were more live trees present within Area B in 2004 (538) than existed on the site in 2000 (530), when survival was well above the 75% threshold. Unfortunately, during the winter of 2004-2005 many trees were damaged by ice. Because of this unforeseen damage, monitoring was requested for an additional two years. In 2006, 518 trees were found in a live condition. Many of these trees were alive by resprouting (~240). Although cumulative tree survival at the mitigation site is 71%, 518 live trees on site represents 95% (518/544) of the total number of trees originally planted in 2000. This performance criterion should be considered satisfied.

Project Goal #3 – The performance criterion requires that, in the Area A wetland site, at least 90% of the plant species present should be non-weedy, native, perennial and annual species, and none of the dominant plant species may be non-native or weedy species, such as cattails, sandbar willow or reed canary grass.

The species list for the Area A wet meadow community (Table 2) is made up of mostly native species (83%). However, many of these native species are also considered weedy species. Only 46% of the plant species present in the Area A wet meadow are considered native and non-weedy. This is well below the stated performance criterion of 90%. This part of the performance criteria was not satisfied in 2006. It should be noted, however, that 90% native, non-weedy species may be an unrealistic goal.

As stated in the performance criterion, none of the dominant species may be non-native or weedy. Currently at Area A, the dominant species present are *Aster pilosus* (FACU+), *Aster simplex* (FACW), *Echinochloa muricata* (OBL), and *Iva annua* (FAC). All of the dominants are native; however, *Aster pilosus*, *Echinochloa muricata*, and *Iva annua* may be considered weedy (C value of 0). This part of the performance criterion was not satisfied in 2006.

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Appendix 1. Wetland Determination Forms

ROUTINE ON-SITE WETLAND DETERMINATION
Area A – Wetland (page 1 of 5)

Field Investigators: Marcum, Kurylo, and Matthews
Date: 15 June and 30 August 2006 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Wet Meadow
Legal Description: E1/2 of NE1/4 of SW1/4, Sect. 33, T.17 N., R.5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and begins approximately 488 m (1600 ft) north of the Sangamon River. This site continues north for approximately 427 m (1400 ft), where it meets Area B.

Do normal environmental conditions exist at this site? Yes: X No:
Has the vegetation, soils, or hydrology been significantly disturbed? Yes: No: X

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. *Aster pilosus*	FACU+	herb
2. *Aster simplex*	FACW	herb
3. *Echinochloa muricata*	OBL	herb
4. *Iva annua*	FAC	herb

based on quantitative vegatation sampling; Table 6

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 75%

Hydrophytic vegetation? Yes: X No:
Rationale: Greater than 50% of the dominants are OBL, FACW, FAC+, or FAC.

SOILS
Series and phase: NRCS mapped as Radford and Sawmill, revised to generic Mollic Endoaquent.

On county hydric soils list?	Yes:	No:	Undetermined: X
Is the soil a histosol?	Yes:	No: X	
Histic epipedon present?	Yes:	No: X	
Redox Concentrations?	Yes: X	No:	Color: 10YR 4/4
Redox Depletions?	Yes:	No: X	

Matrix color: 10YR 2/1 over 2.5Y 4/1
Other indicators: Concretions.
Hydric soils? Yes: X No:
Rationale: This site is an excavated depression built for the purpose of mitigation. Although the top layers were removed exposing a poorly drained substratum, pedogenic processes have taken hold and a new hydric soil has since developed. This is evidenced by a low chroma matrix, redox features, and concretions. This soil met the A12 – Thick Dark surface hydric soil indicator from NRCS.

ROUTINE ON-SITE WETLAND DETERMINATION
Area A- Wetland (page 2 of 5)

Field Investigators: Marcum, Kurylo, and Matthews
Date: 15 June and 30 August 2006 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Wet Meadow
Legal Description: E1/2 of NE1/4 of SW1/4, Sect. 33, T.17 N., R.5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and begins approximately 488 m (1600 ft) north of the Sangamon River. This site continues north for approximately 427 m (1400 ft), where it meets Area B.

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: NA
Depth to saturated soil: > 0.8 m (31 in)
Overview of hydrological flow through the system: This site receives water through precipitation, sheetflow from adjacent higher ground, and from flood events of the Sangamon River. In 2002, floodwater from the Sangamon River overtopped the levee surrounding this site. Water leaves the site via evapotranspiration, groundwater recharge, and normally through a water control structure in the levee at the south end of the site. Since 2002, a hole cut in the south levee wall allows floodwater to leave the site. This hole also allows water onto the site during less severe flood events.
Size of watershed: Approximately 3885 km^2 (1500 mi^2) (Wicker *et al.* 1997).
Other field evidence observed: This site has been excavated to hold water for longer periods. Drift lines, areas of inundation, sediment deposits and many areas of surface or near surface saturation have been observed at this site.
Wetland hydrology: Yes: X No:
Rationale: Field evidence suggests that this site is inundated or saturated for a sufficient duration to satisfy the wetland hydrology criterion. 2006 ISGS hydrological monitoring has determined that approximately 0.8 ha (2.0 ac) satisfied the wetland hydrology criterion for at least 12.5% of the growing season (Pociask and Plankell 2006).

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: X No:
Rationale for decision: Dominant hydrophytic vegetation, hydric soils and wetland hydrology are present; therefore, this site is a wetland.

Determined by: Paul Marcum (vegetation, hydrology, and GPS)
Jeff Matthews (vegetation)
Jessica Kurylo (soils and hydrology)
Brad Zercher (GIS)
Geoff Pociask and Eric Plankell (ISGS; hydrology)
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ROUTINE ON-SITE WETLAND DETERMINATION

Area A - Wetland (page 3 of 5)

Field Investigators: Marcum, Kurylo, and Matthews
Date: 15 June and 30 August 2006 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Wet Meadow
Legal Description: E1/2 of NE1/4 of SW1/4, Sect. 33, T.17 N., R.5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and begins approximately 488 m (1600 ft) north of the Sangamon River. This site continues north for approximately 427 m (1400 ft), where it meets Area B.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	C♦
Abutilon theophrasti	velvet-leaf	herb	FACU-	*
Acer saccharinum	silver maple	shrub, herb	FACW	1
Alisma plantago-aquatica	broad-leaf water-plantain	herb	OBL	2
Amaranthus tuberculatus	tall waterhemp	herb	OBL	1
Ambrosia trifida	giant ragweed	herb	FAC+	0
Ammannia coccinea	long-leaved ammannia	herb	OBL	5
Apocynum sibiricum	Indian hemp	herb	FAC+	2
Asclepias incarnata	swamp milkweed	herb	OBL	4
Aster pilosus	hairy aster	herb	FACU+	0
Aster simplex	panicled aster	herb	FACW	3
Bidens frondosa	common beggar's ticks	herb	FACW	1
Bidens tripartita	beggar's ticks	herb	OBL	2
Boltonia asteroides	false aster	herb	FACW	5
Calystegia sepium	American bindweed	herb	FAC	1
Carex annectens	yellow fox sedge	herb	FACW	3
Carex crus-corvi	crowfoot fox sedge	herb	OBL	6
Carex frankii	Frank's sedge	herb	OBL	4
Carex lupulina	common hop sedge	herb	OBL	5
Carex molesta	field oval sedge	herb	FAC	2
Carex muskingumensis	swamp oval sedge	herb	OBL	6
Carex tribuloides	awl-fruited oval sedge	herb	FACW+	3
Carex vulpinoidea	brown fox sedge	herb	OBL	3
Cassia fasciculata	partridge pea	herb	FACU-	1
Chamaesyce humistrata	milk spurge	herb	FACW	1
Chamaesyce maculata	nodding spurge	herb	FACU-	0
Conyza canadensis	horseweed	herb	FAC-	0
Cyperus acuminatus	taperleaf flat sedge	herb	OBL	2
Cyperus esculentus	yellow nut-sedge	herb	FACW	0
Cyperus strigosus	straw-colored flatsedge	herb	FACW	0
Digitaria ischaemum	smooth crab grass	herb	FACU	*
Digitaria sanguinalis	hairy crab grass	herb	FACU	*
Echinochloa muricata	barnyard grass	herb	OBL	0

Species list continued on following page.

ROUTINE ON-SITE WETLAND DETERMINATION

Area A - Wetland (page 4 of 5)

Field Investigators: Marcum, Kurylo, and Matthews
Date: 15 June and 30 August 2006 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Wet Meadow
Legal Description: E1/2 of NE1/4 of SW1/4, Sect. 33, T.17 N., R.5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and begins approximately 488 m (1600 ft) north of the Sangamon River. This site continues north for approximately 427 m (1400 ft), where it meets Area B.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	C♦
Eleocharis acicularis	needle spike rush	herb	OBL	3
Eleocharis erythropoda	red-rooted spike rush	herb	OBL	3
Eleocharis obtusa	blunt spike rush	herb	OBL	2
Elymus virginicus	Virginia wild rye	herb	FACW-	4
Eragrostis pectinacea	Carolina love grass	herb	FAC	0
Erechtites hieracifolia	fire weed	herb	FACU	2
Eupatorium serotinum	late boneset	herb	FAC+	1
Ipomoea hederacea	ivy-leaved morning glory	herb	FAC	*
Ipomoea lacunosa	small white morning-glory	herb	FACW	1
Iris shrevei	southern blue flag	herb	OBL	5
Iva annua	marsh elder	herb	FAC	0
Leersia lenticularis	catchfly grass	herb	OBL	5
Leersia oryzoides	rice cutgrass	herb	OBL	3
Leucospora multifida		herb	FACW+	3
Ludwigia polycarpa	false loosestrife	herb	OBL	5
Melilotus sp.	sweet clover	herb	FACU	*
Oenothera biennis	evening primrose	herb	FACU	1
Oxalis stricta	yellow wood sorrel	herb	FACU	0
Panicum capillare	witch grass	herb	FAC	0
Panicum dichotomiflorum	fall panicum	herb	FACW-	0
Panicum virgatum	prairie switchgrass	herb	FAC+	4
Penthorum sedoides	ditch stonecrop	herb	OBL	2
Phalaris arundinacea	reed canary grass	herb	FACW+	*
Polygonum amphibium	water smartweed	herb	OBL	3
Polygonum lapathifolium	curttop lady's thumb	herb	FACW+	0
Polygonum pensylvanicum	giant smartweed	herb	FACW+	1
Polygonum persicaria	spotted lady's thumb	herb	FACW	*
Polygonum ramosissimum	bushy knotweed	herb	FAC-	3
Populus deltoides	eastern cottonwood	shrub, herb	FAC+	2
Potentilla norvegica	rough cinquefoil	herb	FAC	0
Ranunculus abortivus	little-leaf buttercup	herb	FACW-	1
Rumex altissimus	pale dock	herb	FACW-	2

Species list continued on following page.

ROUTINE ON-SITE WETLAND DETERMINATION

Area A - Wetland (page 5 of 5)

Field Investigators: Marcum, Kurylo, and Matthews
Date: 15 June and 30 August 2006 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Wet Meadow
Legal Description: E1/2 of NE1/4 of SW1/4, Sect. 33, T.17 N., R.5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and begins approximately 488 m (1600 ft) north of the Sangamon River. This site continues north for approximately 427 m (1400 ft), where it meets Area B.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	C♦
Rumex crispus	curly dock	herb	FAC+	*
Sagittaria latifolia	arrowhead	herb	OBL	4
Salix amygdaloides	peach-leaved willow	shrub	FACW	4
Salix nigra	black willow	shrub	OBL	3
Setaria faberi	giant foxtail	herb	FACU+	*
Setaria glauca	pigeon grass	herb	FAC	*
Sida spinosa	prickly sida	herb	FACU	*
Solidago canadensis	Canada goldenrod	herb	FACU	1
Spartina pectinata	freshwater cord grass	herb	FACW+	4
Trifolium pratense	red clover	herb	FACU+	*
Typha angustifolia	narrow-leaved cattail	herb	OBL	*
Typha latifolia	cattail	herb	OBL	1
Veronica peregrina	purslane speedwell	herb	FACW+	0
Xanthium strumarium	cocklebur	herb	FAC	0

♦Coefficient of Conservatism (Taft *et al.* 1997)
*Non-native species

mean C value (mCv) = $\sum C/N = 136/65 = 2.1$
FQI = $\sum C/\sqrt{N} = 136/\sqrt{65} = 16.9$

ROUTINE ON-SITE WETLAND DETERMINATION
Area A – Non-wetland (page 1 of 4)

Field Investigators: Marcum, Kurylo, and Matthews
Date: 15 June and 30 August 2006 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Forbland
Legal Description: E1/2 of NE1/4 of SW1/4, Sect. 33, T.17 N., R.5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and begins approximately 488 m (1600 ft) north of the Sangamon River. This site continues north for approximately 427 m (1400 ft), where it meets Area B.

Do normal environmental conditions exist at this site? Yes: X No:
Has the vegetation, soils, or hydrology been significantly disturbed? Yes: No: X

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. *Aster pilosus*	FACU+	herb
2. *Eupatorium serotinum*	FAC+	herb
3. *Iva annua*	FAC	herb
4. *Solidago canadensis*	FACU	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 50%

Hydrophytic vegetation: Yes: No: X
Rationale: Only 50% of the dominants are OBL, FACW, FAC+, or FAC.

SOILS
Series and phase: NRCS mapped as Radford and Sawmill, revised to generic Mollic Endoaquent.
On county hydric soils list? Yes: No: Undetermined: X
Is the soil a histosol? Yes: No: X
Histic epipedon present? Yes: No: X
Redox Concentrations? Yes: X No: Color: 7.5YR 4/6 and 5/8
Redox Depletions? Yes: X No: Color: 10YR 4/2 and 2.5Y 4/1
Matrix color: 10YR 2/1 over 10YR 3/1 mixed with 10YR 5/6 over 10YR 4/1
Other indicators: Concretions.
Hydric soils? Yes: X No:
Rationale: This site is an excavated depression built for the purpose of mitigation. Although the top layers were removed exposing a poorly drained substratum, pedogenic processes have taken hold and a new hydric soil has since developed. This is evidenced by a low chroma matrix, redox features, and concretions within the soil profile. The F3 hydric soil indicator from NRCS is met by this soil.

ROUTINE ON-SITE WETLAND DETERMINATION
Area A – Non-wetland (page 2 of 4)

Field Investigators: Marcum, Kurylo, and Matthews
Date: 15 June and 30 August 2006 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Forbland
Legal Description: E1/2 of NE1/4 of SW1/4, Sect. 33, T.17 N., R.5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and begins approximately 488 m (1600 ft) north of the Sangamon River. This site continues north for approximately 427 m (1400 ft), where it meets Area B.

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: NA
Depth to saturated soil: > 0.6 m (24 in)
Overview of hydrological flow through the system: This site receives water through precipitation, sheetflow from adjacent higher ground, and from flood events of the Sangamon River. In 2002, floodwaters from the Sangamon River overtopped the levee surrounding this site. Water leaves the site via evapotranspiration, groundwater recharge, and normally through a water control structure in the levee at the south end of the site. Since 2002, a hole cut in the south levee wall allows floodwater to leave the site. This hole also allows water onto the site during less severe flood events.
Size of watershed: Approximately 3885 km^2 (1500 mi^2) (Wicker *et al.* 1997).
Other field evidence observed: This site has been excavated to hold water for longer periods.

Wetland hydrology: Yes: No: X
Rationale: This site is at a higher topographic position compared to the Area A wet meadow community. Furthermore, 2006 ISGS hydrological monitoring data determined that this site does not satisfy the wetland hydrology criterion.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: No: X
Rationale for decision: Although hydric soils are present, dominant hydrophytic vegetation wetland hydrology are both absent. This site is not a wetland.

Determined by: Paul Marcum and Jeff Matthews (vegetation and hydrology)
Jessica Kurylo (soils and hydrology)
Brad Zercher (GIS)
Geoff Pociask and Eric Plankell (ISGS; hydrology)
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ROUTINE ON-SITE WETLAND DETERMINATION

Area A – Non-wetland (page 3 of 4)

Field Investigators: Marcum, Kurylo, and Matthews
Date: 15 June and 30 August 2006 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Forbland
Legal Description: E1/2 of NE1/4 of SW1/4, Sect. 33, T.17 N., R.5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and begins approximately 488 m (1600 ft) north of the Sangamon River. This site continues north for approximately 427 m (1400 ft), where it meets Area B.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	C♦
Acer saccharinum	silver maple	shrub, herb	FACW	1
Ambrosia artemisiifolia	common ragweed	herb	FACU	0
Ambrosia trifida	giant ragweed	herb	FAC+	0
Aster pilosus	hairy aster	herb	FACU+	0
Aster simplex	panicled aster	herb	FACW	3
Bidens frondosa	common beggar's ticks	herb	FACW	1
Boltonia asteroides	false aster	herb	FACW	5
Campsis radicans	trumpet creeper	herb	FAC	2
Carex molesta	field oval sedge	herb	FAC	2
Cassia fasciculata	partridge pea	herb	FACU-	1
Chamaesyce humistrata	milk spurge	herb	FACW	1
Cirsium discolor	pasture thistle	herb	UPL	3
Conyza canadensis	horseweed	herb	FAC-	0
Cyperus acuminatus	taperleaf flat sedge	herb	OBL	2
Echinochloa muricata	barnyard grass	herb	OBL	0
Elymus virginicus	Virginia wild rye	herb	FACW-	4
Eupatorium serotinum	late boneset	herb	FAC+	1
Ipomoea lacunosa	small white morning-glory	herb	FACW	1
Iva annua	marsh elder	herb	FAC	0
Leersia oryzoides	rice cutgrass	herb	OBL	3
Leucospora multifida		herb	FACW+	3
Melilotus sp.	sweet clover	herb	FACU	*
Oenothera biennis	evening primrose	herb	FACU	1
Panicum capillare	witch grass	herb	FAC	0
Panicum dichotomiflorum	fall panicum	herb	FACW-	0
Panicum virgatum	prairie switchgrass	herb	FAC+	4
Polygonum pensylvanicum	giant smartweed	herb	FACW+	1
Polygonum ramosissimum	bushy knotweed	herb	FAC-	3
Populus deltoides	eastern cottonwood	herb	FAC+	2
Rumex crispus	curly dock	herb	FAC+	*
Setaria faberi	giant foxtail	herb	FACU+	*
Setaria glauca	pigeon grass	herb	FAC	*

Species list continued on following page.

ROUTINE ON-SITE WETLAND DETERMINATION

Area A – Non-wetland (page 5 of 5)

Field Investigators: Marcum, Kurylo, and Matthews
Date: 15 June and 30 August 2006 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Forbland
Legal Description: E1/2 of NE1/4 of SW1/4, Sect. 33, T.17 N., R.5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and begins approximately 488 m (1600 ft) north of the Sangamon River. This site continues north for approximately 427 m (1400 ft), where it meets Area B.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	C♦
Solidago canadensis	Canada goldenrod	herb	FACU	1

♦Coefficient of Conservatism (Taft *et al.* 1997)
*Non-native species

mean C value (mCv) = ∑C/N = 44/29 = 1.5
FQI = ∑C/√N = 44(√29) = 8.2

ROUTINE ON-SITE WETLAND DETERMINATION
Area B - Wetland (page 1 of 3)

Field Investigators: Marcum, Kurylo, and Matthews
Date: 15 June and 30 August 2006 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Wet Meadow (within tree planting)
Legal Description: S1/2 of SE1/4 of NW1/4, Sect. 33, T.17 N., R.5 W. and NW1/4 of SE1/4 of NW1/4, Sect. 33, T. 17 N., R. 5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and approximately 975 m (3200 ft) north of the Sangamon River.

Do normal environmental conditions exist at this site? Yes: X No:
Has the vegetation, soils, or hydrology been significantly disturbed? Yes: No: X

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. *Echinochloa muricata*	OBL	herb
2. *Eleocharis macrostachya*	OBL	herb
3. *Iva annua*	FAC	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 100%

Hydrophytic vegetation: Yes: X No:
Rationale: More than 50% of the dominants are OBL, FACW, FAC+, or FAC.

SOILS
Series and phase: NRCS mapped as Radford and Sawmill, revised to generic Mollic Endoaquent.

On county hydric soils list?	Yes:	No:	Undetermined: X
Is the soil a histosol?	Yes:	No: X	
Histic epipedon present?	Yes:	No: X	
Redox Concentrations?	Yes: X	No:	Color: 10YR 5/8
Redox Depletions?	Yes:	No: X	

Matrix color: 10YR 3/1 over 10YR 4/1 atop 10YR 4/2.5
Other indicators: Concretions.
Hydric soils? Yes: X No:
Rationale: This site is an excavated depression built for the purpose of mitigation. The top layers of soil had been removed leaving a poorly drained substratum with little or no soil development at the surface. Over the past five years though, new hydric soils have developed, as evidenced by a low chroma matrix and more redox features within the profile. This soil meets the F3 – Depleted Matrix hydric soil indicator from NRCS.

ROUTINE ON-SITE WETLAND DETERMINATION
Area B - Wetland (page 2 of 3)

Field Investigators: Marcum, Kurylo, and Matthews
Date: 15 June and 30 August 2006 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Wet Meadow (within tree planting)
Legal Description: S1/2 of SE1/4 of NW1/4, Sect. 33, T.17 N., R.5 W. and NW1/4 of SE1/4 of NW1/4, Sect. 33, T. 17 N., R. 5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and approximately 975 m (3200 ft) north of the Sangamon River.

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: NA
Depth to saturated soil: >30.5 cm (12 in)
Overview of hydrological flow through the system: This site receives water through precipitation, sheetflow from adjacent higher ground and flood events of the Sangamon River. Water leaves the site via evapotranspiration, groundwater recharge, and sheetflow from this site to Area A.
Size of watershed: Approximately 3885 km^2 (1500 mi^2) (Wicker *et al.* 1997).
Other field evidence observed: This site has been excavated to hold water for longer periods. Drift lines, sediment deposits, areas of surface or near surface saturation as well as a few areas of apparently prolonged inundation have been observed at the site. In 2006, this area satisfied wetland hydrology for greater than 12.5% of the growing season (Pociask and Plankell 2006; Figure 1).
Wetland hydrology: Yes: X No:
Rationale: Field evidence of wetland hydrology suggests that this site is inundated or saturated for a sufficient duration to satisfy the wetland hydrology criterion. Furthermore, 2006 ISGS hydrological monitoring data has determined that this area [0.018 ha (0.044 ac)] satisfies the wetland hydrology criterion for greater than 12.5% of the growing season.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: X No:
Rationale for decision: Dominant hydrophytic vegetation, hydric soils, and wetland hydrology are all present within the Area B wet meadow community; therefore, this site is a wetland.

Determined by: Paul Marcum (vegetation, hydrology, and GPS)
Jeff Matthews (vegetation)
Jesse Kurylo (soils and hydrology)
Brad Zercher (GIS)
Geoff Pociask and Eric Plankell (ISGS; hydrology)
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ROUTINE ON-SITE WETLAND DETERMINATION

Area B – Wetland (page 3 of 3)

Field Investigators: Marcum, Kurylo, and Matthews
Date: 15 June and 30 August 2006 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Wet Meadow (within tree planting)
Legal Description: S1/2 of SE1/4 of NW1/4, Sect. 33, T.17 N., R.5 W. and NW1/4 of SE1/4 of NW1/4, Sect. 33, T. 17 N., R. 5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and approximately 975 m (3200 ft) north of the Sangamon River.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	C♦
Amaranthus tuberculatus	tall waterhemp	herb	OBL	1
Aster pilosus	hairy aster	herb	FACU+	0
Aster simplex	panicled aster	herb	FACW	3
♣*Betula nigra*	river birch	shrub	FACW	4
Bidens frondosa	common beggar's ticks	herb	FACW	1
Carex vulpinoidea	brown fox sedge	herb	OBL	3
♣*Carya illinoensis*	pecan	shrub	FACW	6
Cyperus acuminatus	taperleaf flat sedge	herb	OBL	2
Echinochloa muricata	barnyard grass	herb	OBL	0
Eleocharis erythropoda	red-rooted spike rush	herb	OBL	3
Eleocharis macrostachya	spike rush	herb	OBL	5
Elymus virginicus	Virginia wild rye	herb	FACW-	4
Eupatorium serotinum	late boneset	herb	FAC+	1
♣*Fraxinus pennsylvanica*	green ash	shrub	FACW	2
Iva annua	marsh elder	herb	FAC	0
Leersia oryzoides	rice cutgrass	herb	OBL	3
Polygonum hydropiper	common smartweed	herb	OBL	*
Polygonum lapathifolium	curttop lady's thumb	herb	FACW+	0
Polygonum pensylvanicum	giant smartweed	herb	FACW+	1
Polygonum ramosissimum	bushy knotweed	herb	FAC-	3
♣*Quercus bicolor*	swamp white oak	shrub	FACW+	7
Salix nigra	black willow	tree	OBL	3
Setaria faberi	giant foxtail	herb	FACU+	*
Setaria glauca	pigeon grass	herb	FAC	*
Solidago canadensis	Canada goldenrod	herb	FACU	1
Trifolium hybridum	alsike clover	herb	FAC-	*
Ulmus americana	American elm	herb	FACW-	5

♦Coefficient of Conservatism (Taft *et al*. 1997)
*Non-native species
♣ planted

with planted material
mean C value (mCv) = ∑C/N = 58/23 = 2.5
FQI = ∑C /√N = 58/√23 = 12.1

without planted material
mean C value (mCv) = ∑C/N = 39/19 = 2.1
FQI = ∑C /√N = 39/√19 = 8.9

ROUTINE ON-SITE WETLAND DETERMINATION
Area B – Non-wetland (page 1 of 4)

Field Investigators: Marcum, Kurylo, and Matthews
Date: 15 June and 30 August 2006 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Shrubland
Legal Description: S1/2 of SE1/4 of NW1/4, Sect. 33, T.17 N., R.5 W. and NW1/4 of SE1/4 of NW1/4, Sect. 33, T. 17 N., R. 5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and approximately 975 m (3200 ft) north of the Sangamon River.

Do normal environmental conditions exist at this site? Yes: X No:
Has the vegetation, soils, or hydrology been significantly disturbed? Yes: No: X

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. *Betula nigra*	planted	shrub/sapling
2. *Carya illinoensis*	planted	shrub/sapling
3. *Fraxinus pennsylvanica*	planted	shrub/sapling
4. *Quercus bicolor*	planted	shrub/sapling
5. *Quercus palustris*	planted	shrub/sapling
6. *Aster pilosus*	FACU+	herb
7. *Solidago canadensis*	FACU	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 0%
Hydrophytic vegetation: Yes: No: X
Rationale: Less than 50% of the dominants are OBL, FACW, FAC+, or FAC.

SOILS
Series and phase: NRCS mapped as Radford and Sawmill, revised to generic Mollic Endoaquent.

On county hydric soils list?	Yes:	No:	Undetermined: X
Is the soil a histosol?	Yes:	No: X	
Histic epipedon present?	Yes:	No: X	
Redox Concentrations?	Yes: X	No:	Color: 10YR 3/4 & 10YR 4/4
Redox Depletions?	Yes: X	No:	Color: 10YR 4/2

Matrix color: 10YR 3/1 over 10YR 2/1 over 10YR 2.5/1
Other indicators: None.

Hydric soils? Yes: X No:
Rationale: This site is an excavated depression built for the purpose of mitigation. The top layers of soil had been removed leaving a poorly drained substratum with little or no soil development at the surface. Over the past five years though, new hydric soils have developed, as evidenced by a low chroma matrix and more redox features within the profile. This soil did not meet any of the current NRCS hydric soil indicators.

ROUTINE ON-SITE WETLAND DETERMINATION
Area B – Non-wetland (page 2 of 4)

Field Investigators: Marcum, Kurylo, and Matthews
Date: 15 June and 30 August 2006 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Shrubland
Legal Description: S1/2 of SE1/4 of NW1/4, Sect. 33, T.17 N., R.5 W. and NW1/4 of SE1/4 of NW1/4, Sect. 33, T. 17 N., R. 5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and approximately 975 m (3200 ft) north of the Sangamon River.

HYDROLOGY
Inundated: Yes: No: X Depth of standing water: NA
Depth to saturated soil: >0.6 m (24 in)
Overview of hydrological flow through the system: This site receives water through precipitation, sheetflow from adjacent higher ground and flood events of the Sangamon River. Water leaves the site via evapotranspiration, groundwater recharge, and sheetflow from this site to Area B wet meadow community and to Area A.
Size of watershed: Approximately 3885 km^2 (1500 mi^2) (Wicker *et al.* 1997).
Other field evidence observed: This site has been excavated to hold water for longer periods. This site is located at a higher topographic position when compared to the Area B wet meadow site.

Wetland hydrology: Yes: No: X
Rationale: This site is at a higher topographic position compared to the Area B wet meadow community. Furthermore, 2006 ISGS hydrological monitoring data determined that this site does not satisfy the wetland hydrology criterion for 12.5% of the growing season (Pociask and Plankell 2006)..

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: No: X
Rationale for decision: Hydric soils are present; however, dominant hydrophytic vegetation and wetland hydrology are both absent. This site is not a wetland.

Determined by: Paul Marcum and Jeff Matthews (vegetation and hydrology)
Jesse Kurylo (soils and hydrology)
Brad Zercher (GIS)
Geoff Pociask and Eric Plankell (ISGS; hydrology)
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ROUTINE ON-SITE WETLAND DETERMINATION

Area B – Non-wetland (page 3 of 4)

Field Investigators: Marcum, Kurylo, and Matthews
Date: 15 June and 30 August 2006 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Shrubland
Legal Description: S1/2 of SE1/4 of NW1/4, Sect. 33, T.17 N., R.5 W. and NW1/4 of SE1/4 of NW1/4, Sect. 33, T. 17 N., R. 5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and approximately 975 m (3200 ft) north of the Sangamon River.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	C♦
Acer saccharinum	silver maple	herb	FACW	1
Amaranthus tuberculatus	tall waterhemp	herb	OBL	1
Apocynum cannabinum	dogbane	herb	FAC	2
Aster ontarionis	Ontario aster	herb	FAC	4
Aster pilosus	hairy aster	herb	FACU+	0
Aster simplex	panicled aster	herb	FACW	3
♣*Betula nigra*	river birch	shrub	FACW	4
Bidens aristosa	swamp marigold	herb	FACW	1
Bidens frondosa	common beggar's ticks	herb	FACW	1
Carex grisea	sedge	herb	UPL	3
Carex molesta	field oval sedge	herb	FAC	2
Carex vulpinoidea	fox sedge	herb	OBL	3
♣*Carya illinoensis*	pecan	shrub	FACW	6
Cassia fasciculata	partridge pea	herb	FACU-	1
Chamaesyce humistrata	milk spurge	herb	FACW	1
Chamaesyce nutans	nodding spurge	herb	FACU-	0
Cyperus acuminatus	taperleaf flat sedge	herb	OBL	2
Elymus virginicus	Virginia wild rye	herb	FACW-	4
Erigeron annuus	annual fleabane	herb	FAC-	1
Eupatorium coelestinum	blue boneset	herb	FAC+	3
Eupatorium serotinum	late boneset	herb	FAC+	1
♣*Fraxinus pennsylvanica*	green ash	shrub	FACW	2
Ipomoea lacunosa	small white morning-glory	herb	FACW	1
Iva annua	marsh elder	herb	FAC	0
Juglans nigra	black walnut	herb	FACU	4
Medicago lupulina	black medic	herb	FAC-	*
Melilotus alba	white sweet clover	herb	FACU	*
Oenothera biennis	evening primrose	herb	FACU	1
Panicum virgatum	prairie switchgrass	herb	FAC+	4
Polygonum amphibium	water smartweed	herb	OBL	3
Polygonum arenastrum	knotweed	herb	UPL	*
Polygonum lapathifolium	curttop lady's thumb	herb	FACW+	0

Species list continued on following page.

ROUTINE ON-SITE WETLAND DETERMINATION

Area B – Non-wetland (page 4 of 4)

Field Investigators: Marcum, Kurylo, and Matthews
Date: 15 June and 30 August 2006 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Shrubland
Legal Description: S1/2 of SE1/4 of NW1/4, Sect. 33, T.17 N., R.5 W. and NW1/4 of SE1/4 of NW1/4, Sect. 33, T. 17 N., R. 5 W.
Location: The site is located immediately west of the new Illinois Route 29 embankment and approximately 975 m (3200 ft) north of the Sangamon River.

SPECIES LIST (continued)

Scientific name	Common name	Stratum	Wetland indicator status	C♦
Polygonum pensylvanicum	giant smartweed	herb	FACW+	1
Polygonum scandens	climbing buckwheat	herb	FAC	2
Populus deltoides	eastern cottonwood	shrub, herb	FAC+	2
♣*Quercus bicolor*	swamp white oak	tree	FACW+	7
♣*Quercus palustris*	pin oak	tree	FACW	4
Rumex crispus	curly dock	herb	FAC+	*
Salix exigua	sandbar willow	shrub, herb	OBL	1
Solanum carolinense	horse nettle	herb	FACU-	0
Solidago canadensis	Canada goldenrod	herb	FACU	1
Solidago gigantea	late goldenrod	herb	FACW	3
Sorghastrum nutans	Indian grass	herb	FACU+	4
Toxicodendron radicans	poison ivy	herb	FAC+	1
Trifolium hybridum	alsike clover	herb	FAC-	*

♦Coefficient of Conservatism (Taft *et al.* 1997)
*Non-native species
♣ planted

with planted material
mean C value (mCv) = ∑C/N = 85/40 = 2.1
FQI = ∑C /√N = 85/√40 = 13.4

without planted material
mean C value (mCv) = ∑C/N = 62/35 = 1.8
FQI = ∑C /√N = 62/(√35) = 10.5

Appendix 2. Photos of FAP 658 (IL 29) wetland creation sites.

Photo 1. View from south end of Area A, looking due north.

Photo 2. View from north end of Area A, looking due south.

Photo 3. View from the northeast corner of Area A, looking south.

Photo 4. View from the north end of Area B, looking due south.

Photo 5. View from the northeast corner of Area B, looking south.

Photo 6. View from the eastside center of Area B, looking south.