

Wetland Mitigation and Corridor Revegetation Site Monitoring for FAP 658 (IL 29), Sangamon County, Illinois – 2003

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Introduction

Wetland mitigation activity has been initiated along the recently constructed section of Illinois Route 29 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, at 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 in 2001 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). 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 five years (2000-2004). The Illinois State Geological Survey (ISGS) was 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 Area A, 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 will continue for five years (2000-2004). Herbaceous vegetation in Area A was monitored for the first time in 2001, after the area had been fully planted. This area will also be monitored for 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.

* 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).

Yearly tree surveys in Area B and herbaceous sampling in Area A will be submitted in yearly monitoring reports submitted to the Illinois Department of Transportation (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 the area will be recorded and the FQI will be calculated (Taft *et al.* 1997). The FQI will be calculated both with and without the inclusion of 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. 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 multiplying the mean C value times the square root of N [$mCv (\sqrt{N})$]. An Index score below 10 suggests a site of low natural quality; below 5, a highly disturbed site. An FQI value of 20 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 community types at this creation site. Since accurate boundaries may not be clear until several years of data have been gathered, wetlands will be marked on an aerial photograph only at the end of the five-year monitoring period. 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. Photo stations will be marked on the aerial photograph.

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 will be determined each year based on results of systematic plant sampling. Area A will be monitored for the standard five-year monitoring period (2001 to 2005). Transects have been established perpendicular to the long axis of the adjacent field beginning at 15 m from the north end of Area A and continuing every 30 m afterwards. Quadrats (0.25 m²) are to be placed at 4.5 m intervals along each transect so that each planting zone has equal opportunity to be sampled. A minimum of 30 quadrats will be sampled each year in Area A. 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

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 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). 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). 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 Area A, 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 was 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 including planted species (spontaneous natives only). FQI for Area A was calculated using all native species in the list since the planted material was presumed dead after the flood event of 2002.

Area A had a FQI of 9.4 and a mean C value of 1.5. These values are indicative of an area with poor natural quality. There were 50 species found in Area A; 41 were native (82%). Notable additions to Area A include *Eleocharis erythropoda*, *Elymus virginicus*, *Lindernia dubia* and *Polygonum amphibium*.

Area B had a FQI of 12.6 and a mean C value of 1.8 when planted material was included. These values dropped to 9.8 (FQI) and 1.5 (mean C) when planted species were excluded. These values are indicative of an area with poor to fair natural quality. Area B had a total of 65 species; 49 were native (75%) in 2003. Notable additions to Area B include *Desmanthus illinoensis*, *Eleocharis erythropoda*, *Elymus virginicus* and *Polygonum ramosissimum*. Summary information for Area A and B is given in Tables 2 and 3.

Total Species Richness	50
Native Species Richness	41
% Native	82% (41/50)
% Native and Non-weedy	36% (18/50)
Mean Conservatism	1.5
Floristic Quality Index (FQI)	9.4
% Wetland Species (FAC to OBL)	82% (41/50)

Total Species Richness	65
Native Species Richness	49
% Native	75% (49/65)
Mean Conservatism (with planted material)	1.8
Mean Conservatism (spontaneous natives only)	1.5
Floristic Quality Index (FQI) (with planted material)	12.6
FQI (spontaneous natives only)	9.8
% Wetland Species (OBL, FACW, FAC) (with planted material)	66% (43/65)
% Wetland Species (OBL, FACW, FAC) (w/o planted material)	63% (38/60)

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

Area A

A. Predominance of Hydrophytic Vegetation – The performance criterion requires that greater than 50% of the dominant plant species be hydrophytic. Results for 2003 indicate that the dominant species are *Echinochloa muricata* (OBL), *Polygonum lapathifolium* (FACW+), *Iva annua* (FAC), *Polygonum pensylvanicum* (FACW+) and *Amaranthus tuberculatus* (OBL) (Table 4). Greater than 50% (100%) of the dominant plant species are hydrophytes; therefore, this site meets the criterion for predominance of hydrophytic vegetation.

B. Presence of Hydric Soils – The performance criterion requires that hydric soil characteristics be present, or conditions favorable for hydric soil formation should persist. Soil development is underway on this excavated site. There is distinct soil development and horizonation noticeable within the stratum. The colors observed, while still partially relic, are forming prominent hydric features. Based on field observations up to now, hydric soils have developed and should continue to remain hydric.

Sedimentation is very apparent in Area A. There was between 0.01 to 0.05 m (0.5 to 2 in) of silty soil material atop the old surface. This is primarily the result of the flood event in 2002. While sedimentation is a natural occurrence in wetlands on floodplains, if this rate of sedimentation were to continue every year it could eventually fill in this lower excavated site. A typical pedon for Area A is described in Table 5.

Table 4. FAP 658 (IL 29) Wetland Mitigation Site vegetation sampling data including frequency, cover, and importance value for all species sampled in 2003.

Species	Indicator	Frequency	Relative Frequency	Cover	Relative Cover	Importance Value
<i>Echinochloa muricata</i>	OBL	0.96	12.20	30.14	21.98	17.09
<i>Polygonum lapathifolium</i>	FACW+	0.77	9.78	24.76	18.05	13.92
<i>Iva annua</i>	FAC	0.50	6.35	15.82	11.53	8.94
<i>Polygonum pensylvanicum</i>	FACW+	0.63	8.01	12.26	8.94	8.47
<i>Amaranthus tuberculatus</i>	OBL	0.85	10.80	6.20	4.52	7.66
<i>Panicum dichotomiflorum</i>	FACW-	0.33	4.19	9.33	6.80	5.50
<i>Ipomoea lacunosa</i>	FACW	0.52	6.61	4.66	3.40	5.00
<i>Sida spinosa</i>	FACU	0.56	7.12	1.88	1.37	4.24
<i>Xanthium strumarium</i>	FAC	0.37	4.70	4.42	3.22	3.96
<i>Rorippa islandica</i>	OBL	0.27	3.43	5.48	4.00	3.71
<i>Ammania coccinea</i>	OBL	0.25	3.18	4.38	3.19	3.19
<i>Aster simplex</i>	FACW	0.29	3.68	2.40	1.75	2.72
<i>Chamaesyce humistrata</i>	FACW	0.29	3.68	1.44	1.05	2.37
<i>Bidens vulgata</i>	FACW	0.19	2.41	3.03	2.21	2.31
<i>Polygonum ramosissimum</i>	FAC-	0.15	1.91	1.83	1.33	1.62
<i>Rumex crispus</i>	FAC+	0.12	1.52	1.01	0.74	1.13
<i>Cyperus esculentus</i>	FACW	0.08	1.02	1.59	1.16	1.09
<i>Ipomoea hederacea</i>	FAC	0.10	1.27	0.72	0.52	0.90
<i>Eupatorium serotinum</i>	FAC+	0.08	1.02	0.67	0.49	0.75
<i>Cyperus acuminatus</i>	OBL	0.06	0.76	0.63	0.46	0.61
<i>Solidago canadensis</i>	FACU	0.06	0.76	0.14	0.10	0.43
<i>Bidens comosa</i>	OBL	0.02	0.25	0.72	0.52	0.39
<i>Eleocharis obtusa</i>	OBL	0.02	0.25	0.72	0.52	0.39
<i>Aster pilosus</i>	FACU+	0.04	0.51	0.34	0.25	0.38
<i>Setaria faberi</i>	FACU+	0.04	0.51	0.34	0.25	0.38
<i>Setaria glauca</i>	FAC	0.04	0.51	0.34	0.25	0.38
<i>Acer saccharinum</i>	FACW	0.04	0.51	0.10	0.07	0.29
<i>Eclipta prostrata</i>	FACW	0.04	0.51	0.10	0.07	0.29
<i>Populus deltoides</i>	FAC+	0.04	0.51	0.10	0.07	0.29
<i>Ambrosia trifida</i>	FAC+	0.02	0.25	0.29	0.21	0.23
<i>Bidens cernua</i>	OBL	0.02	0.25	0.29	0.21	0.23
<i>Humulus japonicus</i>	FACU	0.02	0.25	0.29	0.21	0.23
<i>Eragrostis pectinacea</i>	FAC	0.02	0.25	0.29	0.21	0.23
<i>Panicum capillare</i>	FAC	0.02	0.25	0.29	0.21	0.23
<i>Asclepias incarnata</i>	OBL	0.02	0.25	0.05	0.04	0.15
<i>Campsis radicans</i>	FAC	0.02	0.25	0.05	0.04	0.15
other		0.02	0.25	0.05	0.04	0.15
bare ground				60.53		
		7.87	100.00	137.15	100.00	100.00

Dominant species are in bold

Table 5. Description of the soils at the created wetland Area A.

Depth(in)	Matrix Color	Concentrations	Depletions	Texture	Structure
+2-0	10YR 2/1			Silt	Granular
0-7	10YR 3/1	7.5YR 5/8		Silty Clay Loam	Granular
7-24	10YR 4/1	7.5YR 4/6		Silty Clay Loam	Sub-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. Their findings for 2003 indicate that 0.1 ha (0.3 ac) of Area A conclusively satisfied the wetland hydrology criterion (Figure 1) (Pociask and Sabatini 2003). This is down from 2002 when the entire area [approximately 1.0 ha (2.4 ac)] conclusively satisfied the wetland hydrology criterion (Pociask and Sabatini 2002). During visits to the site, the following indicators of wetland hydrology were present in Area A: areas of inundation, sediment deposits, 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 valve 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. 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 remained open in 2003. Since hydrologic input to the site has changed since its establishment, future ISGS monitoring well data will be needed to make a conclusive determination and to establish extent of wetland hydrology.

Area B

A. Predominance of Hydrophytic Vegetation – The performance criterion requires that greater than 50% of the dominant plant species be hydrophytic. Results for 2003 indicate that the dominant herbaceous species in Area B is *Echinochloa muricata* (OBL). The shrub layer dominants are four of the five planted tree species: *Betula nigra* (FACW), *Carya illinoensis* (FACW), *Quercus bicolor* (FACW+) and *Quercus palustris* (FACW). More than 50% (100%) of the dominant plant species are hydrophytes (planted species were not included in the calculation of percent hydrophytic vegetation). This site meets the criterion for predominance of hydrophytic vegetation.

B. Presence of Hydric Soils – The performance criterion requires that hydric soil characteristics be present, or conditions favorable for hydric soil formation should persist. Soil development is well underway on this excavated site. There is distinct soil development and horizonation noticeable within the stratum. The colors observed, while still partially relic, have

* 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. 2003 aerial extent of wetland hydrology for Area and Area B (from ISGS, Pociask and Sabatini 2003).

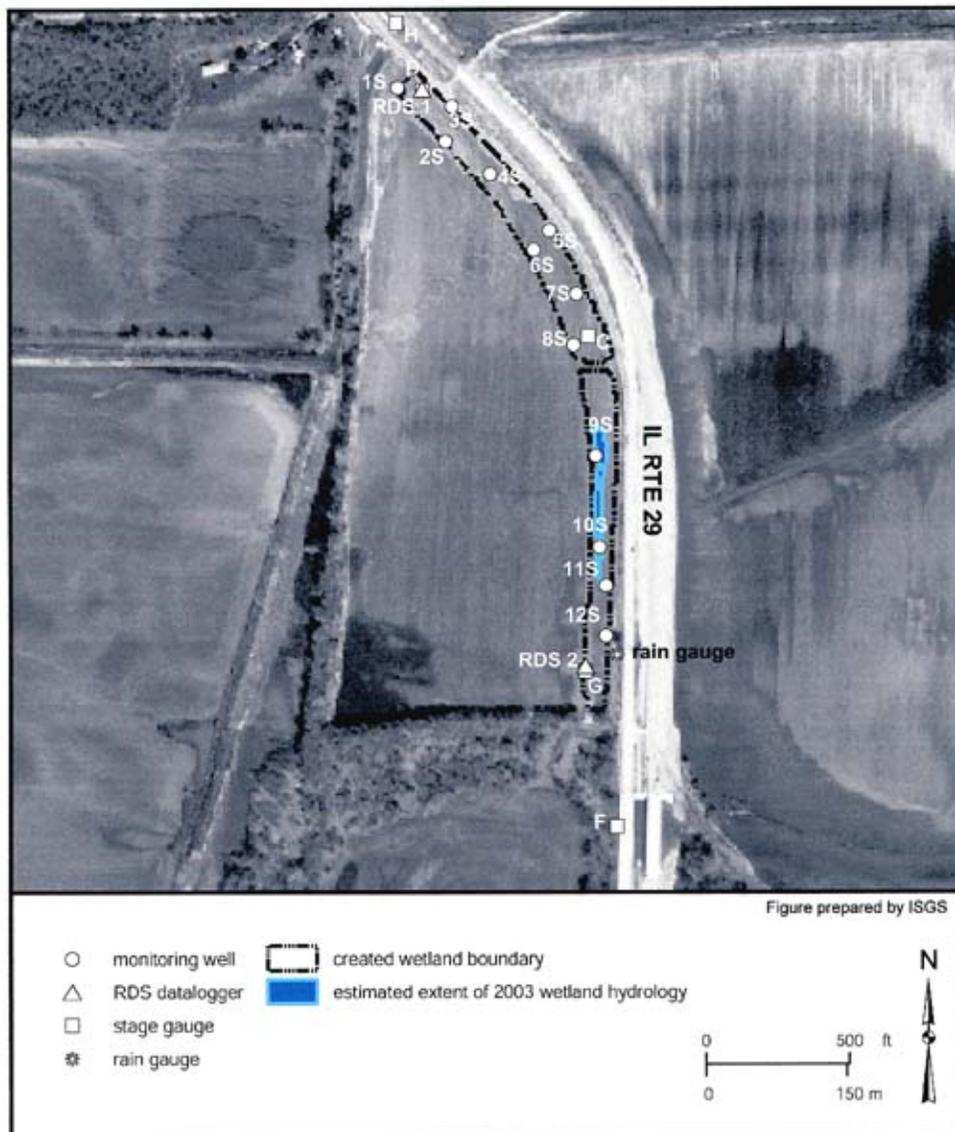


Figure prepared by ISGS.

formed prominent hydric features. Based on this and previous years observations, hydric soils have developed and should continue to be hydric if the hydrology continues. A typical pedon for Area B is described below (Table 6).

Table 6. Description of the soils at the created wetland Area B.

Depth(in)	Matrix Color	Concentrations	Depletions	Texture	Structure
0-2	10YR 3/1			Silt Loam	Granular
2-4	10YR 3/1	10YR 5/8 cfp		Silty Clay Loam	Subangular Blocky
4-18	10YR 3/1 & 2.5Y 6/2	5YR 3/4 & 7.5YR 5/8		Silty Clay Loam	Subangular Blocky
18-24	10YR 3/1	10YR 5/8		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 2 m (6.6 ft) or have soils that are saturated to the surface for at least 12.5% of the growing season*. The ISGS initiated water level monitoring at this site in September 2000. Their findings for 2003 indicate that no part of Area B conclusively satisfied the wetland hydrology criterion (Pociask and Sabatini 2003). This is down from 2002 when the entire area [approximately 1.2 ha (3.0 ac)] conclusively satisfied the wetland hydrology criterion (Pociask and Sabatini 2002). In 2001, 0.17 ha (0.41 ac) conclusively satisfied the wetland hydrology criterion (Pociask and Watson 2001).

During visits to the site, the following indicators of hydrology were present in Area B: areas of surface or near surface saturation as well as a few areas of apparently prolonged inundation. Algal mats and mud cracks were also observed in this area. Some areas within the site are at a higher landscape position and probably will not develop wetland characteristic. ISGS monitoring well data in the coming years will be needed to make a conclusive determination and to establish aerial extent of the wetland.

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. A total of 436 trees were found alive in 2003. A total of 156 of 592 trees planted at this site have died (73.6% overall survival). Most (135) died between the 2001 and 2002 tree monitoring. During this intervening period, 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). 2003 survival data shows a slight increase to 73.6% (436/592). *Quercus palustris* remained at its 2001 level with 95% survival. *Carya illinoensis*, *Fraxinus pennsylvanica*, and *Quercus bicolor* all showed a slight increase in survival during 2003 while *Betula nigra* showed a slight decrease. Table 7 shows the cumulative survivorship for each tree species planted in Area B.

* 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).

Table 7. Cumulative tree survival for Area B – 2000 to 2003.

Species	# Alive	# Dead	Total Planted	% Survival
<i>Betula nigra</i>	97	13	110	88.2
<i>Carya illinoensis</i>	108	19	127	85.0
<i>Fraxinus pennsylvanica</i>	31	86	117	26.5
<i>Quercus bicolor</i>	87	32	119	73.1
<i>Quercus palustris</i>	113	6	119	95.0
Totals	436	156	592	73.6

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

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. Much of the vegetation, including all the planted emergent hydrophytes, were killed by artificially prolonged flooding. The 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 includes 41 natives (82%). Native, non-weedy species, however, accounted for only 36% of the total (18/50). 2003 dominants were *Echinochloa muricata* (OBL), *Polygonum lapathifolium* (FACW+), *Iva annua* (FAC), *Polygonum pensylvanicum* (FACW+) and *Amaranthus tuberculatus* (OBL). While all five of these species are native they all could also be considered weedy (C = 0 or 1).

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) and some higher quality species were extirpated from the sites (*Leersia oryzoides*, *Sagittaria latifolia*, *Spartina pectinata*). Nonetheless, FQI and mean C scores have continued to show a gradual rise over the monitoring period. The FQI score for Area A (9.4) is the highest it has been in the three years of monitoring and significantly higher than in 2002. Likewise, Area B's FQI score (12.6) has risen gradually each year of monitoring. While both sites have shown increases in natural quality, as measured by the FQI, the FQI scores still remain at a relatively low level. These values are indicative of poor to fair quality. Tables 8 and 9 show summary statistics for both wetland sites from the onset of monitoring.

Prolonged flooding, such as was seen at these sites 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. However, because of the dramatic setback, we suggest replanting Area A with emergent hydrophytes to speed its recovery and to insure a higher quality wetland. The previously planted emergents, *Asclepias incarnata*, *Leersia oryzoides*, and *Spartina pectinata*, were doing well prior to 2002 and would be expected to do well at this site if replanted. Other emergents that could be planted in Area A include: *Iris shrevei*, and *Sagittaria latifolia*.

Table 8. Summary Table for Area A, 2000 to 2002.

	2000*	2001	2002♣	2003
Total Species Richness	-----	41	16	50
Native Species Richness	-----	34	14	41
% Native	-----	83	88	82
% Native and non-weedy	-----	44	25	36
Mean Conservatism (w/planted material)	-----	1.8	NA	NA
Mean Conservatism (w/o planted material)	-----	1.6	1.4	1.5
Floristic Quality Index (FQI) (w/planted material)	-----	10.5	NA	NA
FQI (w/o planted material)	-----	9.0	5.1	9.4
% Wetland Species (w/planted material)	-----	83	NA	NA
% Wetland Species (w/o planted material)	-----	82	88	82

*Area A was not monitored until 2001

♣all planted material was killed by prolonged flooding

Table 9. Summary Table for Area B, 2000 to 2002.

	2000*	2001♣	2002	2003
Total Species Richness	50	62	43	65
Native Species Richness	30	43	34	49
% Native	60	69	79	75
Mean Conservatism (w/planted material)	1.8	1.6	1.9	1.8
Mean Conservatism (w/o planted material)	1.1	1.2	1.5	1.5
Floristic Quality Index (FQI) (w/planted material)	9.7	10.4	11.3	12.6
FQI (w/o planted material)	5.3	7.3	8.0	9.8
% Wetland Species (w/planted material)	54	60	81	66
% Wetland Species (w/o planted material)	52	56	79	63

*Marcum et al. 2000, ♣ Marcum et al. 2001

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

INHS personnel have been monitoring vegetation and soil development in Area A for the past three years. Wetland vegetation has continued to develop at this site and currently meets the performance criteria set by the monitoring plan. Likewise, hydric soil formation appears evident or imminent in much of the study area. Hydrology, however, has been extremely variable at this site. The ISGS has been monitoring hydrology at this site for two years. During this time, the area of wetland hydrology has gone from 1.0 ha (2.4 ac) in 2002 to 0.1 ha (0.3 ac) in 2003.

Future data on vegetation, soil development and hydrology of this site is needed to accurately determine the extent of wetland hydrology and the aerial extent of wetland.

Area B

INHS personnel have been monitoring vegetation and soil development in Area B for the past four years. Wetland vegetation has continued to develop at this site and currently meets the performance criteria set by the monitoring plan. Likewise, hydric soil formation appears evident or imminent in much of the study area. Hydrology, however, has been extremely variable at this site. The ISGS has been monitoring hydrology at this site for three years. During this time, the area of wetland hydrology has gone from 0.17 ha (0.41 ac) in 2001 to 1.2 ha (3.0 ac) in 2002 to 0 ha (0 ac) in 2003. Future data on vegetation, soil development and hydrology of this site is needed to accurately determine the extent of wetland hydrology and the aerial extent of this created wetland.

Furthermore, the stated objective for project goal #1 is to create 2.43 ha (6.0 ac) of jurisdictional wetland. 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 be expected. The large, more mature size of the tree plantings is probably the reason for their greater success. In 2003, after some replanting, the percent tree survival rose slightly to 73.6%. This value is still below 75%, the performance criterion set for this project goal. Therefore, further plantings will be needed to increase the survival to above 75%. Replanting 31 trees in Area B would raise the survival rate to 75 as long as there is no mortality in 2004. We suggest replanting at least fifty trees to guarantee that this project goal is attained.

Project Goal #3 – The performance criterion requires that, in Area A, 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 Area A is made up of mostly native species (82%). However, many of these native species are also considered weedy species. A meager 36% of the plant species present in Area A are native and non-weedy. This is well below the stated performance criterion of 90%. Although very low, this value should rise as the site becomes more stable. To help ensure a higher quality plant community, the site should be replanted with more conservative emergent

species (*Asclepias incarnata*, *Iris shrevei*, *Leersia oryzoides*, *Sagittaria latifolia*, *Spartina pectinata*).

Also stated in the performance criterion, none of the dominant species may be non-native or weedy. Currently at Area A, the dominant species present in Area A were *Echinochloa muricata* (OBL), *Polygonum lapathifolium* (FACW+), *Iva annua* (FAC), *Polygonum pennsylvanicum* (FACW+) and *Amaranthus tuberculatus* (OBL). All five dominants are native, however, they all could also be considered weedy species (C values = 0 or 1). This part of the performance criterion also is not met in 2003. The vegetation at this site is just beginning to reestablish itself after the prolonged flooding in 2002. As is typical for recently disturbed areas, the naturally occurring vegetation is made up of weedy, early successional native and non-native species. Over time these species will likely be replaced by more conservative, perennial species that will form a more stable plant community.

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Appendix 1. Wetland Determination Forms

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

Field Investigators: Marcum & Kurylo

Date: 11 July and 23 August 2003

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: X* No:

* This site is a recently excavated depression, created for mitigation purposes.

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. <i>Amaranthus tuberculatus</i>	OBL	herb
2. <i>Echinochloa muricata</i>	OBL	herb
3. <i>Iva annua</i>	FAC	herb
4. <i>Polygonum lapathifolium</i>	FACW+	herb
5. <i>Polygonum pensylvanicum</i>	FACW+	herb

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

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: 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: No: X

Matrix color: 10YR 2/1 over 10YR 3/1 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 the soil is developing its own hydric characteristics. This soil meets the F3 and F6 indicators form NRCS.

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

Field Investigators: Marcum & Kurylo

Date: 11 July and 23 August 2003

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: X (in part) No: Depth of standing water: 0 – 0.10 m (0 – 4 in) on July visit
Depth to saturated soil: 0 – 0.6 m (0 – 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. 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 southern end of the site. Since 2002, a hole cut in the south levee wall allows floodwater to leave the site. However, this hole will also allow water onto the site during less severe flood events.

Size of watershed: Approximately 3885 km² (1500 mi²) (Wicker *et al.* 1997).

Other field evidence observed: This site has been excavated to hold water for longer periods. Areas of inundation, sediment deposits and many areas of surface or near surface saturation were observed at this site in 2003.

Wetland hydrology: Yes: X (at least in part) No:

Rationale: ISGS hydrological monitoring concludes 0.1 ha (0.3 ac) conclusively satisfies the wetland hydrology criterion in 2003. Field observations suggest that slightly more area could also meet the wetland hydrology criterion. At the end of the five-year monitoring period a conclusive area will be determined that exhibits wetland hydrology.

DETERMINATION AND RATIONALE:

Is the site a wetland?
Rationale for decision:

Yes: No: Undetermined: X
Dominant hydrophytic vegetation is present and hydric soils continue to develop at the site. However, the extent of wetland hydrology at this site has been too variable and artificial to make an accurate decision. It is our opinion, that under normal circumstance much of this site would exhibit wetland hydrology. The status of this site is undetermined until more data is collected to substantiate extent of wetland hydrology.

ROUTINE ON-SITE WETLAND DETERMINATION
Area A (page 3 of 4)

Field Investigators: Marcum & Kurylo

Date: 11 July and 23 August 2003

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♦
<i>Acer saccharinum</i>	silver maple	herb	FACW	1
<i>Alisma plantago-aquatica</i>	broad-leaf water-plantain	herb	OBL	2
<i>Amaranthus tuberculatus</i>	tall waterhemp	herb	OBL	1
<i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
<i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
<i>Ammannia coccinea</i>	long-leaved ammannia	herb	OBL	5
<i>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
<i>Aster pilosus</i>	hairy aster	herb	FACU+	0
<i>Aster simplex</i>	panicled aster	herb	FACW	3
<i>Bidens cernua</i>	nodding beggar's ticks	herb	OBL	2
<i>Bidens comosa</i>	beggar's ticks	herb	OBL	2
<i>Bidens vulgata</i>	tall beggar's ticks	herb	FACW	0
<i>Campsis radicans</i>	trumpet creeper	herb	FAC	2
<i>Chamaesyce humistrata</i>	milk spurge	herb	FACW	1
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
<i>Cyperus acuminatus</i>	taperleaf flat sedge	herb	OBL	2
<i>Cyperus esculentus</i>	yellow nut-sedge	herb	FACW	0
<i>Cyperus sp.</i>				
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Eclipta prostrata</i>	yerba de tajo	herb	FACW	2
<i>Eleocharis erythropoda</i>	red-rooted spikerush	herb	OBL	3
<i>Eleocharis obtusa</i>	blunt spike rush	herb	OBL	2
<i>Elymus virginicus</i>	Virginia wild rye	herb	FACW-	4
<i>Eragrostis pectinacea</i>	Carolina love grass	herb	FAC	0
<i>Eupatorium serotinum</i>	late boneset	herb	FAC+	1
<i>Humulus japonicus</i>	Japanese hops	herb	FACU	*
<i>Ipomoea hederacea</i>	ivy-leaved morning glory	herb	FAC	*
<i>Ipomoea lacunosa</i>	small white morning-glory	herb	FACW	1
<i>Iva annua</i>	marsh elder	herb	FAC	0
<i>Lindernia dubia</i>	false pimpinell	herb	OBL	5
<i>Panicum capillare</i>	witch grass	herb	FAC	0

Species list continued on following page.

ROUTINE ON-SITE WETLAND DETERMINATION
Area A (page 4 of 4)

Field Investigators: Marcum & Kurylo

Date: 11 July and 23 August 2003 **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♦
<i>Panicum dichotomiflorum</i>	fall panicum	herb	FACW-	0
<i>Polygonum amphibium</i>	water smartweed	herb	OBL	3
<i>Polygonum aviculare</i>	knotweed	herb	FAC-	*
<i>Polygonum hydropiper</i>	common smartweed	herb	OBL	*
<i>Polygonum lapathifolium</i>	curttop lady's thumb	herb	FACW+	0
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Polygonum ramosissimum</i>	bushy knotweed	herb	FAC-	3
<i>Populus deltoides</i>	eastern cottonwood	shrub, herb	FAC+	2
<i>Potentilla norvegica</i>	rough cinquefoil	herb	FAC	0
<i>Ranunculus abortivus</i>	little-leaf buttercup	herb	FACW-	1
<i>Rorippa islandica</i>	marsh yellow cress	herb	OBL	4
<i>Rumex altissimus</i>	pale dock	herb	FACW-	2
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
<i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
<i>Setaria glauca</i>	pigeon grass	herb	FAC	*
<i>Sida spinosa</i>	prickly sida	herb	FACU	*
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Typha angustifolia</i>	narrow-leaved cattail	herb	OBL	*
<i>Veronica peregrina</i>	purslane speedwell	herb	FACW+	0
<i>Xanthium strumarium</i>	cocklebur	herb	FAC	0

♦ Coefficient of Conservatism (Taft *et al.* 1997)

*Non-native species

$$\text{mean C value (mCv)} = \sum C/N = 60/41 = 1.5$$

$$\text{FQI} = \text{mCv} (\sqrt{N}) = 1.5(\sqrt{41}) = 9.4$$

Determined by: Paul Marcum (vegetation and hydrology)
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ROUTINE ON-SITE WETLAND DETERMINATION
Area B (page 1 of 5)

Field Investigators: Marcum & Kurylo

Date: 11 July and 23 August 2003

Project Name: FAP 658 (IL 29)

State: Illinois

County: Sangamon

Site Name: Wet 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: No:

Has the vegetation, soils, or hydrology been significantly disturbed? Yes: * No:

* This site is a recently excavated depression, created for mitigation purposes.

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. <i>Betula nigra</i>	planted	shrub
2. <i>Carya illinoensis</i>	planted	shrub
3. <i>Quercus bicolor</i>	planted	shrub
4. <i>Quercus palustris</i>	planted	shrub
5. <i>Echinochloa muricata</i>	OBL	herb

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

Hydrophytic vegetation: Yes: 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:

Is the soil a histosol? Yes: No:

Histic epipedon present? Yes: No:

Redox Concentrations? Yes: No: Color: 7.5YR 5/8 and 5YR 3/4

Redox Depletions? Yes: No:

Matrix color: 10YR 3/1 over 10YR 3/1 mixed with 2.5YR 6/2

Other indicators: None.

Hydric soils? Yes: 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 year though, new soils have begun to develop and hydric features (low chroma matrix and redox features) are now very evident within the profile. This soil also meets the NRCS hydric soil indicator of F3.

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

Field Investigators: Marcum & Kurylo
Date: 11 July and 23 August 2003 **Project Name:** FAP 658 (IL 29)
State: Illinois **County:** Sangamon
Site Name: Wet 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: X (in part) No: Depth of standing water: 0-0.2 m (0 – 7 in) on July visit
Depth to saturated soil: 0 to >0.66 m (0 to >26 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 between this site and Area A.
Size of watershed: Approximately 3885 km² (1500 mi²) (Wicker *et al.* 1997).
Other field evidence observed: This site has been excavated to hold water for longer periods. Areas of surface or near surface saturation as well as a few areas of apparently prolonged inundation were observed at the site. The ISGS hydrology data for 2003 suggests that 0 ha (0 ac) conclusively satisfied the wetland hydrology criterion (Pociask and Sabatini 2003). This is down from 1.2 ha (3.0 ac) in 2002 (Pociask and Sabatini 2002).
Wetland hydrology: Yes: No: Undetermined: X
Rationale: ISGS hydrological monitoring concludes 0 ha (0 ac) conclusively satisfies the wetland hydrology criterion in 2003. Field observations suggest that some area (at least around surface-water monitoring station RDS1) probably does satisfy the wetland hydrology criterion. At the end of the five-year monitoring period a conclusive area will be determined that exhibits wetland hydrology.

DETERMINATION AND RATIONALE:

Is the site a wetland?	Yes:	No:	Undetermined: X
Rationale for decision:	Hydric soils are developing at the site and dominant hydrophytic vegetation is present. However, the extent of wetland hydrology at this site has been too variable and artificial to make an accurate decision. It is our opinion, that under normal circumstance much of this site would exhibit wetland hydrology. The status of this site is undetermined until more data is collected to substantiate extent of wetland hydrology.		

ROUTINE ON-SITE WETLAND DETERMINATION

Area B (page 3 of 5)

Field Investigators: Marcum & Kurylo

Date: 11 July and 23 August 2003 **Project Name:** FAP 658 (IL 29)

State: Illinois

County: Sangamon

Site Name: Wet 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♦
<i>Acer saccharinum</i>	silver maple	herb	FACW	1
<i>Amaranthus tuberculatus</i>	tall waterhemp	herb	OBL	1
<i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
<i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
<i>Ammannia coccinea</i>	long-leaved ammannia	herb	OBL	5
<i>Apocynum cannabinum</i>	dogbane	herb	FAC	2
<i>Apocynum sibiricum</i>	Indian hemp	herb	FAC+	2
<i>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
<i>Aster pilosus</i>	hairy aster	herb	FACU+	0
<i>Aster simplex</i>	panicled aster	herb	FACW	3
♣ <i>Betula nigra</i>	river birch	shrub	FACW	4
<i>Bidens vulgata</i>	tall beggar's ticks	herb	FACW	0
<i>Campsis radicans</i>	trumpet creeper	herb	FAC	2
♣ <i>Carya illinoensis</i>	pecan	shrub	FACW	6
<i>Chenopodium album</i>	lamb's quarters	herb	FAC-	*
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
<i>Cynanchum laeve</i>	blue vine	herb	FAC	1
<i>Cyperus acuminatus</i>	taperleaf flat sedge	herb	OBL	2
<i>Cyperus esculentus</i>	yellow nut-sedge	herb	FACW	0
<i>Desmanthus illinoensis</i>	Illinois bundleflower	herb	FAC-	4
<i>Digitaria ischaemum</i>	smooth crab grass	herb	FACU	*
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Eleocharis erythropoda</i>	red-rooted spikerush	herb	OBL	3
<i>Elymus virginicus</i>	Virginia wild rye	herb	FACW-	4
<i>Erigeron annuus</i>	annual fleabane	herb	FAC-	1
<i>Eupatorium serotinum</i>	late boneset	herb	FAC+	1
♣ <i>Fraxinus pennsylvanica</i>	green ash	shrub	FACW	2
<i>Geranium carolinianum</i>	wild cranesbill	herb	UPL	2
<i>Humulus japonicus</i>	Japanese hops	herb	FACU	*
<i>Ipomoea lacunosa</i>	small white morning-glory	herb	FACW	1
<i>Ipomoea pandurata</i>	wild sweet potato vine	herb	FACU	2

Species list continued on following page.

ROUTINE ON-SITE WETLAND DETERMINATION
Area B (page 4 of 5)

Field Investigators: Marcum & Kurylo

Date: 11 July and 23 August 2003

Project Name: FAP 658 (IL 29)

State: Illinois

County: Sangamon

Site Name: Wet 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♦
<i>Iva annua</i>	marsh elder	herb	FAC	0
<i>Lolium perenne</i>	crested rye grass	herb	FACU	*
<i>Melilotus alba</i>	white sweet clover	herb	FACU	*
<i>Oenothera biennis</i>	evening primrose	herb	FACU	1
<i>Panicum dichotomiflorum</i>	fall panicum	herb	FACW-	0
<i>Panicum virgatum</i>	prairie switchgrass	herb	FAC+	4
<i>Plantago rugelii</i>	red-stalked plantain	herb	FAC	0
<i>Polygonum amphibium</i>	water smartweed	herb	OBL	3
<i>Polygonum aviculare</i>	knotweed	herb	FAC-	*
<i>Polygonum hydropiper</i>	common smartweed	herb	OBL	*
<i>Polygonum lapathifolium</i>	curttop lady's thumb	herb	FACW+	0
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Polygonum ramosissimum</i>	bushy knotweed	herb	FAC-	3
<i>Populus deltoides</i>	eastern cottonwood	shrub, herb	FAC+	2
<i>Potentilla norvegica</i>	rough cinquefoil	herb	FAC	0
♣ <i>Quercus bicolor</i>	swamp white oak	shrub	FACW+	7
♣ <i>Quercus palustris</i>	pin oak	shrub	FACW	4
<i>Ranunculus abortivus</i>	little-leaf buttercup	herb	FACW-	1
<i>Rorippa islandica</i>	marsh yellow cress	herb	OBL	4
<i>Rudbeckia amplexicaulis</i>	Clasping coneflower	herb	FACU-	*
<i>Rumex altissimus</i>	pale dock	herb	FACW-	2
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
<i>Salix exigua</i>	sandbar willow	shrub	OBL	1
<i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
<i>Sida spinosa</i>	prickly sida	herb	FACU	*
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Sonchus asper</i>	prickly sowthistle	herb	FAC	*
<i>Toxicodendron radicans</i>	poison ivy	herb	FAC+	1
<i>Trifolium hybridum</i>	alsike clover	herb	FAC-	*
<i>Trifolium pratense</i>	red clover	herb	FACU+	*
<i>Trifolium repens</i>	white clover	herb	FACU+	*

Species list continued on following page.

ROUTINE ON-SITE WETLAND DETERMINATION
Area B (page 5 of 5)

Field Investigators: Marcum & Kurylo

Date: 11 July and 23 August 2003

Project Name: FAP 658 (IL 29)

State: Illinois

County: Sangamon

Site Name: Wet 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 ♦
<i>Typha angustifolia</i>	narrow-leaved cattail	herb	OBL	*
<i>Veronica peregrina</i>	purslane speedwell	herb	FACW+	0
<i>Xanthium strumarium</i>	cocklebur	herb	FAC	0

♦ Coefficient of Conservatism (Taft *et al.* 1997)

*Non-native species

♣ planted

with planted material
mean C value (mCv) = $\sum C/N = 88/49 = 1.8$
FQI = mCv (\sqrt{N}) = $1.8(\sqrt{49}) = 12.6$

without planted material
mean C value (mCv) = $\sum C/N = 65/44 = 1.5$
FQI = mCv (\sqrt{N}) = $1.5(\sqrt{44}) = 9.8$

Determined by: Paul Marcum (vegetation and hydrology)
Jesse Kurylo (soils and hydrology)
Illinois Natural History Survey
Center for Wildlife Ecology
607 East Peabody Drive
Champaign, Illinois 61820
(217) 333-8459 (Marcum)

Appendix 2. Photos of 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.