

TIB

WETLAND MITIGATION SITE MONITORING REPORT - 2000
FA 662 (IL 4) Sangamon County

Introduction

This report details monitoring of the wetland mitigation site created to compensate for FA 662 (IL 4) in Sangamon County. The site consists of approximately 2.8 ha (6.8 ac) of wetland creation. The wetland creation site is located north of Springfield, IL, at the southwest corner of the intersection of IL 4 and Spring Creek. The legal location is NW/4, SW/4, Section 15, T. 16 N., R. 5 W. The Illinois Department of Transportation (IDOT) completed construction of the site in 1996/7. Sapling trees and small shrubs were planted during the autumn of 1997 and the spring of 1998 respectively (T. Brooks, IDOT Wetlands Unit, memo to Allen Plocher, 30 March 1999). Additional shrubs and sapling trees were planted in the spring of 2000 to compensate for the excessive mortality observed in 1999. On-site monitoring was conducted on August 29, 2000.

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

Goals, Objectives, and Performance Standards

Goals, objectives, and performance standards follow those specified in the monitoring plan (T. Brooks, IDOT Wetlands Unit, 1999) and the wetland compensation plan (C. Perino, IDOT Wetlands Unit, 1995) developed for this site. Performance criteria are based on those specified in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and in *Guidelines for Developing Mitigation Proposals* (USACE 1993). Each goal should be attained by the end of the 5-year monitoring period. Goals, objectives, and performance criteria are listed below.

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

Objective: The created wetland should compensate for the loss of 2.8 ha (6.8 ac) of scrub-shrub wetland at a 1:1 ratio.

Performance criteria:

- a. Predominance of hydrophytic vegetation: More than 50% of the dominant plant species must be hydrophytic.
- b. Presence of wetland hydrology: The 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.
- c. Occurrence of hydric soils: Hydric soil characteristics should be present, or conditions favorable for hydric soil formation should persist at the site.

Project goal 2: The created wetland plant community should meet standards for floristic composition and vegetation cover.

Objectives: Planting native shrubs and tree sapling species will create a scrub-shrub wetland. Herbaceous vegetation will be allowed to colonize the site naturally.

Performance criteria:

- a. Establishment of planted shrubs and trees: Planted shrubs and tree seedlings should have a survival rate of 80% each year for five years.
- b. Floristic Quality Assessment: At least 50% of the plant species present should be non-weedy, native perennial species.
- c. Dominance of vegetation: None of the three most dominant plant species in either site may be non-native or weedy species.

Methods

Project goal 1

a. Predominance of hydrophytic vegetation

The method for determining dominant vegetation at a wetland site is described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and further explained in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (Federal Interagency Committee for Wetland Delineation 1989). It is based on aerial coverage estimates for individual plant species. Each of the dominant plant species is then assigned its wetland indicator status rating (Reed 1988). Any plant rated facultative or wetter, *i.e.*, FAC, FAC+, FACW, and OBL, is considered a hydrophyte. A predominance of vegetation in the wetland plant community exists if more than 50% of the dominant species present are hydrophytic. Since the survival of planted hydrophytic trees and shrubs on non-wetlands (*i.e.* yards) is well documented, these species were excluded from calculations of percentage of dominant hydrophytic species.

b. Presence of wetland hydrology

Illinois State Geological Survey (ISGS) personnel installed three ground water monitoring wells and one surface-water monitoring device at the site in 1999. Locations for these sites can be found in the ISGS report *Veteran's Parkway, Springfield Wetland Compensation Site* (Miner 1999). Water-level data was collected beginning in July. Methods are further described in the ISGS document *Annual Water-level Report for Active IDOT Sites* (Fucciolo et al. 1999).

c. Occurrence of hydric soils

The soil was sampled in order to monitor hydric soil development. Soil profile morphology including horizon color, texture, and structure was described at various points throughout the site. Additionally, the presence, type, size, and abundance of redoximorphic features were noted.

Hydric soils probably develop slowly, and characteristics may not be apparent during the first several years after project construction. In the absence of hydric soil indicators at the end of the five-year monitoring period, hydrologic data could be used as corroborative evidence that conditions favorable for hydric soil formation persist at the site.

Project goal 2

a. Establishment of planted shrubs and tree saplings

In order to create and restore floodplain forest, small shrubs and tree saplings were planted at the compensation site. According to the tasking order for this project (T. Brooks, IDOT Wetlands Unit, memo to Allen Plocher, March 30, 1999), the following number of shrubs and trees were planted at the site:

Table 1. Shrub species planted in the created wetland (Spring 1998).

Species	Common Name	Number
<i>Cephalanthus occidentalis</i>	Buttonbush	570
<i>Cornus stolonifera</i>	Red osier dogwood	570
<i>Ilex decidua</i>	Swamp holly	570
<i>Lindera benzoin</i>	Spicebush	570
<i>Viburnum lentago</i>	Nannyberry	570
TOTAL		2850

Table 2. Tree species planted in the created wetland (Autumn 1997).

Species	Common Name	Number
<i>Betula nigra</i>	River birch	205
<i>Carya laciniosa</i>	Kingnut hickory	205
<i>Fraxinus pennsylvanica</i>	Green ash	205
<i>Quercus bicolor</i>	Swamp white oak	205
<i>Quercus palustris</i>	Pin oak	205
TOTAL		1025

Table 3. Additional shrub and tree plantings in the created wetland (Spring 2000).

Species	Common Name	Number
<i>Cornus stolonifera</i>	Red osier dogwood	750
<i>Quercus bicolor</i>	Swamp white oak	200
<i>Quercus macrocarpa</i>	Burr oak	100
<i>Quercus pagoda</i>	Cherrybark oak	250
<i>Quercus palustris</i>	Pin oak	250
<i>Quercus rubra</i>	Red oak	150
TOTAL		1700

Survivorship and density of planted trees and shrubs was determined through a census of the created wetland. All live trees and shrubs were counted. Dead or cut-off trees were also counted, and identified by species whenever possible. Dead shrub identification was made where possible.

Tree and shrub survival was calculated as a percentage of the number of stems reported to have been planted: (Total number of live planted stems counted/total number of planted stems reported) x 100.

b. Floristic Quality Assessment

The Floristic Quality Assessment (Taft et al. 1997) was applied to the plant community at the site to evaluate floristic quality and nativity. The assessment methodology is used to identify natural areas and facilitate floristic comparisons among sites. This technique is part of the procedure for the long-term monitoring of natural areas and the monitoring of restored or created wetlands (Swink and Wilhelm 1994). The basis of the method is that each native plant species is assigned a conservatism coefficient (C) ranging from 0 to 10. Individual conservatism coefficients are ranks of species behavior and reflect the committee's (Taft et al. 1997) confidence level for a taxon's correspondence to anthropogenic disturbances. Coefficient values range from 0 to 10, with all adventive species given a coefficient of 0. Plant species assigned 0 have low affinities for natural areas, whereas those assigned 10 have very high affinities. When a complete species list is assembled for a wetland site, the overall average conservatism coefficient (\bar{c}) and a site floristic quality index (FQI) can be calculated. These values provide a measure of site floristic quality. Floristic quality index (FQI) values less than 5 indicate that the area is extremely weedy or in an early successional stage (Swink and Wilhelm 1994). FQI values between 20 and 35 ($\bar{c} = 3.0$) indicate that the area has evidence of native character and can be considered a botanical asset. FQI values between 35 and 50 ($\bar{c} = 3.5$) indicate that the area has significant native character.

c. Dominance of vegetation

Plant species dominance was determined as in project goal 1, a. Predominance of hydrophytic vegetation. The method for determining dominant vegetation at a wetland site is described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and further explained in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*.

In addition, photographs were taken from the three permanent photography stations established last year to document changes in plant community size and composition. The locations of the photo stations are indicated on the enclosed aerial photograph. Arrows indicate the direction in which the photos were taken.

Results

Project goal 1

a. Predominance of hydrophytic vegetation

Dominant plant species for the mitigation site in 1999 are shown in Table 3 and Table 4. There were two distinctly different groups of vegetation at this site that we divided into areas 1 and 2 (see attached aerial photo). All of the dominant species for area 1 are rated OBL, FACW, FAC+, or FAC and are hydrophytic. Based on naturally occurring dominant species, area 2 did not have dominant hydrophytic vegetation.

Table 4. Dominant plant species by stratum and wetland indicator status for area 1.

Dominant Plant Species	Stratum	Indicator Status
1. <i>Bidens tripartita</i>	herb	OBL
2. <i>Echinochloa muricata</i>	herb	OBL
3. <i>Panicum dichotomiflorum</i>	herb	FACW-
4. <i>Polygonum lapathifolium</i>	herb	FACW+
5. <i>Populus deltoides</i>	herb	FAC+

Table 5. Dominant plant species by stratum and wetland indicator status for area 2.

Dominant Plant Species	Stratum	Indicator Status
1. <i>Aster pilosus</i>	herb	FACU-
2. <i>Bidens tripartita</i>	herb	OBL
3. <i>Poa pratensis</i>	herb	FAC-
4. <i>Solidago canadensis</i>	herb	FACU
5. <i>Betula nigra</i>	shrub	FACW*
6. <i>Carya illinoensis</i>	shrub	FACW*
7. <i>Fraxinus pennsylvanica</i>	shrub	FACW*
8. <i>Quercus bicolor</i>	shrub	FACW+*
9. <i>Quercus palustris</i>	shrub	FACW*

* Planted species.

b. Presence of wetland hydrology

Insufficient data were available to determine the area of the wetland creation site that meets the wetland hydrology criteria. More information is available in the *Veteran's Parkway, Springfield Wetland Compensation Site* report (Miner 1999).

Based on field evidence observed during an on-site visit, area 1 exhibits wetland drainage patterns, water stained leaves, algal mats, and soil saturation near the surface, and therefore possesses wetland hydrology. No field evidence of wetland hydrology was observed at area 2, which is topographically higher than area 1.

c. Occurrence of hydric soils

Soils examined at the site were found to be highly disturbed. Much excavation has been done and the sites lack an undisturbed A horizon. The existing soil at much of the site is the old subsoil layer. Topsoil was not replaced after excavation as was recommended in the wetland compensation plan (C. Perino, IDOT Wetlands Unit, 1995) developed for this site.

Even though the soils are disturbed, hydric soil indicators are present in area 1.

Following is a soil description of a typical pedon located within area 1:

Table 6. Description of the soils at the created wetland (Area 1).

Depth	Matrix Color	Concentrations	Depletions	Texture	Structure
0-4 in	5Y 4/1 and 4/2	2.5Y 5/6	None	Silt loam	Granular
4-7 in	10YR 5/4	None	10YR 6/1	Silt loam	Massive
7-13 in	5Y 4/1 and 4/2, and 10YR 5/4	10YR 4/6 and 2.5Y 5/6	None	Silt loam	Massive
13-22+ in	10YR 5/1, 6/1, and 5/4	10YR 5/8	None	Silt loam	Massive

The soils in area 2 did not possess any hydric soil indicators. In addition to being disturbed, soils at the restoration site are also compacted. It appears at this time that area 1 and a portion of area 2 will continue hydric soil development, while most of area 2 will not.

Therefore, area 1 satisfies the three criteria of wetlands, while most of area 2 does not. Area 1 includes that portion of the pond that, while shallower than the required 2 m (6.6 ft) depth, does not support hydrophytic vegetation. Current wetland acreage at this site is estimated at 0.5 ha (1.3 ac). This falls short of the project goal of 2.8 ha (6.8 ac).

Project goal 2

a. Establishment of shrubs and tree saplings

Tables 7 and 8 show the results of the census. The shrubs counted were fewer than 12% of what was reported to have been planted at this site. It appeared that the shrubs were planted at an elevation that was too low, causing them to be washed away when the site flooded in the spring. Nearly all of the trees reported as planted at the site were accounted for. There were some different species planted than what were reported, however. *Carya laciniosa* was reported to have been planted but was not found at this site, while *Carya illinoensis* and *Platinus occidentalis* were found but not reported as planted.

Tables 9 and 10 show the percent survival for shrubs and trees respectively. These figures were calculated both by species and overall for all species of each in the entire site. The additional oak species reported to have been planted in spring of 2000 were not found.

Table 7. Number of shrubs (by species) counted at the created wetland.

Species	Common Name	Number live	Number dead
<i>Cephalanthus occidentalis</i>	Buttonbush	32	0
<i>Cornus stolonifera</i>	Red osier dogwood	399	8
<i>Ilex decidua</i>	Swamp holly	0	0
<i>Lindera benzoin</i>	Spicebush	0	0
<i>Viburnum lentago</i>	Nannyberry	0	0
TOTAL		431	8

Table 8. Number of trees (by species) counted at the created wetland.

Species	Common Name	Number live	Number dead
<i>Betula nigra</i>	River birch	185	1
<i>Carya laciniosa</i>	Kingnut hickory	-	-
<i>Carya illinoensis</i>	Pecan	162	2
<i>Fraxinus pennsylvanica</i>	Green ash	232	1
<i>Platanus occidentalis</i>	Sycamore	54	0
<i>Quercus bicolor</i>	Swamp white oak	227	0
<i>Quercus palustris</i>	Pin oak	197	1
TOTAL		1057	5

Table 9. Percent shrub survival (by species).

Species	Common Name	% of reported
<i>Cephalanthus occidentalis</i> ^a	Buttonbush	0.06
<i>Cornus stolonifera</i>	Red osier dogwood	30.2
<i>Ilex decidua</i>	Swamp holly	0.0
<i>Lindera benzoin</i>	Spicebush	0.0
<i>Viburnum lentago</i>	Nannyberry	0.0
OVERALL		8.1

Table 10. Percent tree survival (by species).

Species	Common Name	% of reported
<i>Betula nigra</i>	River birch	90.2
<i>Carya laciniosa</i>	Kingnut hickory	*
<i>Carya illinoensis</i>	Pecan	79.0
<i>Fraxinus pennsylvanica</i>	Green ash	113.1
<i>Platanus occidentalis</i>	Sycamore	-
<i>Quercus bicolor</i>	Swamp white oak	56.0
<i>Quercus macrocarpa</i>	Burr oak	-
<i>Quercus pagoda</i>	Cherrybark oak	-
<i>Quercus palustris</i>	Pin oak	43.3
<i>Quercus rubra</i>	Red oak	-
OVERALL		86.9

* - Species probably not planted

b. Floristic Quality Assessment

Two FQI values were calculated for each area from the species lists included in Appendix A. The first FQI value is calculated from only species that became established on the site naturally; the second FQI value includes the planted trees. Area 1 has an FQI value of 9.6 and a \bar{C} of 1.9 when only natural vegetation is included. When the planted species are added, the FQI value is raised to 12.1 with a \bar{C} value of 2.2. The FQI value for area 2 is 7.9 with a \bar{C} value of 1.4 when only naturally established vegetation is considered, and 14.1 and 2.2 when the planted species are included. Therefore, both areas are of fair natural quality. Area 1 has 59% non-weedy, native perennial species, however, area 2 has only 25% (Taft et al. 1997).

d. Dominance of vegetation

Neither area meets the performance criteria for dominance of vegetation. At least one of the three most dominant species at either area is a non-native or weedy species. All of the dominant species (Table 3 and Table 4) for both areas are native except *Poa pratensis*. This species, although common, is not one of the three most dominant species at area 2. At area 1, *Amaranthus tuberculatus* and *Polygonum lapathifolium* are weedy, while *Populus deltoides* is not. At area 2, *Aster pilosus* and *Solidago canadensis* are weedy and not hydrophytic, while *Bidens tripartita* is not.

Photographs were taken from the permanent photography stations and are in Appendix B of this report.

Discussion

After two monitoring seasons, these sites show progress towards scrub/shrub wetland establishment. As the vegetative succession proceeds, area 1 will most likely comply with project goals, objectives, and performance standards by the end of the monitoring period, but most of area 2 will likely not.

The vegetation at area 1 is hydrophytic and meets the dominance criteria for native non-invasive species. The naturally occurring dominant vegetation in area 2 is not hydrophytic and is weedy. Both planted tree seedlings and planted shrubs are becoming established on the sites. A large number of species at each site have very low coefficients of conservatism (C). This is common on disturbed and early successional sites and is not a cause for concern at this time. It is likely that as succession progresses, more conservative species will become established on the site.

Currently, the primary concern for this site is finding evidence of wetland hydrology within area 2. Area 1 already has some hydric soil characteristics and probably wetland hydrology, but area 2 does not. It is doubtful whether area 2 will ever develop either wetland hydrology or hydric soils due to the slope at which it was built. An estimate of current wetland acreage at the site (area 1) is 0.5 ha (1.3 ac). This estimated area is the area between the red and white lines on the previously submitted (1999) aerial photograph.

Literature Cited

- Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi. Technical Report Y-87-1.
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- Taft, J. B., G.S. Wilhelm, D. M. Ladd, and L.A. Masters. 1997. Floristic quality assessment for vegetation in Illinois - a method for assessing vegetation integrity. *Erigenia* 15:3-95.
- US Army Corps of Engineers. 1993. Guidelines for developing mitigation proposals. Chicago District. September 1.

Appendix A

Wetland Determination Forms

ROUTINE ONSITE WETLAND DETERMINATION

Area 1 (page 1 of 4)

Field Investigators: Wiesbrook, Wilm, Marcum, Kurylo **Date:** Aug. 29, 2000
Project Name: FA 662 (IL 4) **Section No.:** 1-ILS
State: Illinois **County:** Sangamon **Applicant:** IDOT District 6
Area Name: Scrub/shrub wetland
Legal Description: NW/4, SW/4, Sec. 15, T. 16 N., R. 5 W.
Location: This wetland begins approximately 70 m (230 ft) south of where IL 4 crosses Spring Creek.

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

VEGETATION

<u>Dominant Plant Species</u>	<u>Stratum</u>	<u>Indicator Status</u>
1. <i>Bidens tripartita</i>	herb	OBL
2. <i>Echinochloa muricata</i>	herb	OBL
3. <i>Panicum dichotomiflorum</i>	herb	FACW-
4. <i>Polygonum lapathifolium</i>	herb	FACW+
5. <i>Populus deltoides</i>	herb	FAC+

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: Undetermined

On Sangamon County hydric soils list? Yes: No:

Is the soil a histosol? Yes: No:

Histic epipedon present? Yes: No:

Redox Concentrations? Yes: No: Color: 2.5YR 5/6

Redox Depletions? Yes: No: Color: 10YR 6/1

Matrix color: 5Y 4/1 and 4/2 over mixture of 10YR 5/4 and 10YR 5/1 and 6/1

Other indicators: None.

Hydric soils? Yes: No:

Rationale: This soil possesses a reduced matrix, redox concentrations, and redox depletions, all of which indicate saturated or reduced conditions. Therefore, the soil at this area meets the hydric soil criterion.

ROUTINE ONSITE WETLAND DETERMINATION

Area 1 (page 2 of 4)

Field Investigators: Wiesbrook, Wilm, Marcum, Kurylo **Date:** Aug. 29, 2000
Project Name: FA 662 (IL 4) **Section No.:** 1-ILS
State: Illinois **County:** Sangamon **Applicant:** IDOT District 6
Area Name: Scrub/shrub wetland
Legal Description: NW/4, SW/4, Sec. 15, T. 16 N., R. 5 W.
Location: This wetland begins approximately 70 m (230 ft) south of where IL 4 crosses Spring Creek.

HYDROLOGY

Inundated: Yes: No: X **Depth of standing water:** N/A

Depth to saturated soil: 0.33 m (13 in)

Overview of hydrological flow through the system: This area is hydrologically influenced by overflow and culvert flow from Spring Creek and by precipitation. Water leaves the area via evapotranspiration and culvert flow into Spring Creek.

Size of Watershed: 277 km² (107 mi²) near the intersection of IL 4 with IL 125 and IL 97

Other field evidence observed: ISGS is monitoring this area, but has inconclusive data for this year. We observed water-stained leaves, algal surface, and wetland drainage patterns.

Wetland hydrology: Yes: X No:

Rationale: Although ISGS water level data collected from the area is inconclusive, field evidence cited above indicates that this area is inundated or saturated for a sufficient duration to satisfy the wetland hydrology criterion.

DETERMINATION AND RATIONALE:

Is the area a wetland? Yes: X No:

Rationale: Dominant hydrophytic vegetation, hydric soils, and wetland hydrology are all present at this area; therefore, we determined that this area is a wetland.

ROUTINE ONSITE WETLAND DETERMINATION

Area 1 (page 3 of 4)

Field Investigators: Wiesbrook, Wilm, Marcum, Kurylo **Date:** Aug. 29, 2000
Project Name: FA 662 (IL 4) **Section No.:** 1-ILS
State: Illinois **County:** Sangamon **Applicant:** IDOT District 6
Area Name: Scrub/shrub wetland
Legal Description: NW/4, SW/4, Sec. 15, T. 16 N., R. 5 W.
Location: This wetland begins approximately 70 m (230 ft) south of where IL 4 crosses Spring Creek.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	Coefficient of conservatism
++ <i>Acer saccharinum</i>	silver maple	herb	FACW	1
+ <i>Amaranthus tuberculatus</i>	tall waterhemp	herb	OBL	1
<i>Ammannia coccinea</i>	long-leaved ammannia	herb	OBL	5
<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>Bidens frondosa</i>	common beggar-ticks	herb	FACW	1
<i>Bidens tripartita</i>	beggartick	herb	OBL	2
<i>Cyperus acuminatus</i>	taperleaf flat sedge	herb	OBL	2
<i>Cyperus</i> sp.	flat sedge	herb	----	--
+ <i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Eclipta prostrata</i>	yerba de tajo	herb	FACW	2
<i>Elymus virginicus</i>	Virginia rye	herb	FACW-	4
<i>Eragrostis hypnoides</i>	creeping love grass	herb	OBL	5
+ <i>Eupatorium serotinum</i>	late boneset	herb	FAC+	1
<i>Lycopus americanus</i>	common water horehound	herb	OBL	3
+ <i>Morus alba</i>	white mulberry	shrub	FAC	*
+ <i>Panicum dichotomiflorum</i>	fall panicum	herb	FACW-	0
+ <i>Phyla lanceolata</i>	fog-fruit	herb	OBL	1
+ <i>Polygonum lapathifolium</i>	curttop lady's thumb	herb	FACW+	0
++ <i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Populus deltoides</i>	eastern cottonwood	shrub, herb	FAC+	2
<i>Rorippa islandica</i>	marsh yellow cress	herb	OBL	4
+ <i>Rumex crispus</i>	curly dock	herb	FAC+	*
+ <i>Salix exigua</i>	sandbar willow	shrub, herb	OBL	1
<i>Salix nigra</i>	black willow	shrub, herb	OBL	3
+ <i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
+ <i>Setaria glauca</i>	pigeon grass	herb	FAC	*
+ <i>Xanthium strumarium</i>	cockle bur	herb	FAC	0
*non-native species	$FQI = \sum C/N = 48/25 = 9.6$		$\bar{C} = \sum C/N = 48/25 = 1.9$	
+weedy or non-native species	++early successional but typical of native wetlands			

ROUTINE ONSITE WETLAND DETERMINATION

Area 2 (page 1 of 5)

Field Investigators: Wiesbrook, Wilm, Marcum, Kurylo **Date:** Aug. 29, 2000

Project Name: FA 662 (IL 4) **Section No.:** 1-ILS

State: Illinois **County:** Sangamon **Applicant:** IDOT District 6

Area Name: Berm

Legal Description: NW/4, SW/4, Sec. 15, T. 16 N., R. 5 W.

Location: This berm begins approximately 40 m (131 ft) south of where IL 4 crosses Spring Creek.

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

VEGETATION

<u>Dominant Plant Species</u>	<u>Stratum</u>	<u>Indicator Status</u>
1. <i>Aster pilosus</i>	herb	FACU-
2. <i>Bidens tripartita</i>	herb	OBL
3. <i>Poa pratensis</i>	herb	FAC-
4. <i>Solidago canadensis</i>	herb	FACU
5. <i>Betula nigra</i>	shrub	FACW*
6. <i>Carya illinoensis</i>	shrub	FACW*
7. <i>Fraxinus pennsylvanica</i>	shrub	FACW*
8. <i>Quercus bicolor</i>	shrub	FACW+*
9. <i>Quercus palustris</i>	shrub	FACW*

* Planted species.

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 25%

Hydrophytic vegetation: Yes: No:

Rationale: Less than 50% of the dominants are OBL, FACW, FAC+, or FAC.

SOILS

Series and phase: Undetermined

On Sangamon County hydric soils list? Yes: No:

Is the soil a histosol? Yes: No:

Histic epipedon present? Yes: No:

Redox Concentrations? Yes: No: Color: 10YR 4/6

Redox Depletions? Yes: No: Color: N/A

Matrix color: 10YR 4/2 over 2.5Y 5/3

Other indicators: This area is a constructed berm with compacted soils.

Hydric soils? Yes: No:

Rationale: This soil possesses a high chroma matrix and very few redoximorphic features, which indicates saturated or reduced conditions for extremely short duration during the growing season. Therefore, the soil at this area does not meet the hydric soil criterion. Due to extreme disturbance, the colors of this soil material may not reflect the true soil genesis at this area.

ROUTINE ONSITE WETLAND DETERMINATION

Area 2 (page 2 of 5)

Field Investigators: Wiesbrook, Wilm, Marcum, Kurylo **Date:** Aug. 29, 2000
Project Name: FA 662 (IL 4) **Section No.:** 1-ILS
State: Illinois **County:** Sangamon **Applicant:** IDOT District 6
Area Name: Berm
Legal Description: NW/4, SW/4, Sec. 15, T. 16 N., R. 5 W.
Location: This berm begins approximately 40 m (131 ft) south of where IL 4 crosses Spring Creek.

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: N/A

Depth to saturated soil: >0.66 m (26 in)

Overview of hydrological flow through the system: This area is hydrologically influenced by overflow from Spring Creek and by precipitation. Water leaves the area via evapotranspiration and runoff into area 1.

Size of Watershed: 277 km² (107 mi²) near the intersection of IL 4 with IL 125 and IL 97

Other field evidence observed: ISGS is monitoring this area, but had inconclusive data for this year.

Wetland hydrology: Yes: No: Undetermined: X

Rationale: No indicators of wetland hydrology were observed. The relatively high landscape position and slope of this area make it unlikely that this area will be inundated or saturated for a sufficient duration to satisfy the wetland hydrology criterion.

DETERMINATION AND RATIONALE:

Is the area a wetland? Yes: No: X

Rationale: Although dominant hydrophytic vegetation is present at the area, hydric soils and wetland hydrology are lacking or undetermined at this time; therefore, we determined that this area is currently not a wetland.

ROUTINE ONSITE WETLAND DETERMINATION

Area 2 (page 3 of 5)

Field Investigators: Wiesbrook, Wilm, Marcum, Kurylo **Date:** Aug. 29, 2000

Project Name: FA 662 (IL 4) **Section No.:** 1-ILS

State: Illinois **County:** Sangamon **Applicant:** IDOT District 6

Area Name: Berm

Legal Description: NW/4, SW/4, Sec. 15, T. 16 N., R. 5 W.

Location: This berm begins approximately 40 m (131 ft) south of where IL 4 crosses Spring Creek.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	Coefficient of conservatism
+ <i>Abutilon theophrasti</i>	buttonweed	herb	FACU-	*
<i>Acer saccharinum</i>	silver maple	herb	FACW	1
+ <i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
+ <i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
<i>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
+ <i>Aster pilosus</i>	hairy aster	herb	FACU-	0
<i>Aster simplex</i>	panicked aster	herb	FACW	3
++ <i>Bidens frondosa</i>	common beggar-ticks	herb	FACW	1
<i>Bidens tripartita</i>	beggartick	herb	OBL	2
<i>Carex</i> sp.	sedge	herb	----	--
+ <i>Cirsium discolor</i>	field thistle	herb	UPL	2
+ <i>Coryza canadensis</i>	horseweed	herb	FAC-	0
+ <i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Elymus virginicus</i>	Virginia rye	herb	FACW-	4
+ <i>Erigeron annuus</i>	annual fleabane	herb	FAC-	1
+ <i>Eupatorium serotinum</i>	late boneset	herb	FAC+	1
+ <i>Lonicera tatarica</i>	tartarian honeysuckle	shrub	FACU	*
<i>Lycopus americanus</i>	common water horehound	herb	OBL	3
+ <i>Melilotus</i> sp.	sweet clover	herb	FACU	*
+ <i>Morus alba</i>	white mulberry	shrub, herb	FAC	*
+ <i>Oenothera biennis</i>	evening primrose	herb	FACU	1
+ <i>Panicum dichotomiflorum</i>	fall panicum	herb	FACW-	0
+ <i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
+ <i>Plantago lanceolata</i>	buckhorn	herb	FAC	*
+ <i>Plantago rugelii</i>	red-stalked plantain	herb	FAC	0
+ <i>Poa pratensis</i>	Kentucky bluegrass	herb	FAC-	*
+ <i>Polygonum lapathifolium</i>	curttop lady's thumb	herb	FACW+	0
++ <i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
+ <i>Polygonum persicaria</i>	spotted lady's thumb	herb	FACW	*
<i>Populus deltoides</i>	eastern cottonwood	shrub, herb	FAC+	2
+ <i>Potentilla norvegica</i>	rough cinquefoil	herb	FAC	0
<i>Rorippa islandica</i>	marsh yellow cress	herb	OBL	4
+ <i>Rumex crispus</i>	curly dock	herb	FAC+	*
<i>Salix amygdaloides</i>	peach-leaved willow	herb	FACW	4
+ <i>Salix exigua</i>	sandbar willow	shrub, herb	OBL	1

Species list continued on the next page.

ROUTINE ONSITE WETLAND DETERMINATION

Area 2 (page 4 of 5)

Field Investigators: Wiesbrook, Wilm, Marcum, Kurylo **Date:** Aug. 29, 2000

Project Name: FA 662 (IL 4) **Section No.:** 1-ILS

State: Illinois **County:** Sangamon **Applicant:** IDOT District 6

Area Name: Berm

Legal Description: NW/4, SW/4, Sec. 15, T. 16 N., R. 5 W.

Location: This berm begins approximately 40 m (131 ft) south of where IL 4 crosses Spring Creek.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	Coefficient of conservatism
<i>Salix nigra</i>	black willow	shrub, herb	OBL	3
+ <i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
+ <i>Setaria glauca</i>	pigeon grass	herb	FAC	*
+ <i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
+ <i>Sonchus arvensis</i>	field sowthistle	herb	FAC-	*
+ <i>Taraxacum officinale</i>	common dandelion	herb	FACU	*
++ <i>Toxicodendron radicans</i>	poison ivy	herb	FAC+	1
+ <i>Trifolium pratense</i>	red clover	herb	FACU+	*
<i>Verbena urticifolia</i>	white vervian	herb	FAC+	3
+ <i>Xanthium strumarium</i>	cockle bur	herb	FAC	0
*non-native species	$FQI = \sum C/N = 43/\sqrt{30} = 7.9$		$\bar{C} = \sum C/N = 43/30 = 1.4$	
+weedy or non-native species	++early successional but typical of native wetlands			

Planted species SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	Coefficient of conservatism
<i>Andropogon gerardii</i>	big bluestem	herb	FAC-	5
<i>Betula nigra</i>	river birch	shrub	FACW	4
<i>Carya illinoensis</i>	pecan	shrub	FACW	6
<i>Cephalanthus occidentalis</i>	buttonbush	shrub, herb	OBL	4
<i>Cornus stolonifera</i>	red osier dogwood	shrub, herb	FACW	4
<i>Fraxinus pennsylvanica</i>	green ash	shrub	FACW	5
<i>Platanus occidentalis</i>	sycamore	shrub	FACW	3
<i>Sorghastrum nutans</i>	Indian grass	herb	FACU+	4
<i>Quercus bicolor</i>	swamp white oak	shrub	FACW+	7
<i>Quercus palustris</i>	pin oak	shrub	FACW	4

$$FQI = \sum C/N = 89/\sqrt{40} = 14.1 \quad \bar{C} = \sum C/N = 89/40 = 2.2$$

*These calculations include the complete species list above, as well as the planted species.

ROUTINE ONSITE WETLAND DETERMINATION

Area 2 (page 5 of 5)

Field Investigators: Wiesbrook, Wilm, Marcum, Kurylo **Date:** Aug. 29, 2000

Project Name: FA 662 (IL 4) **Section No.:** 1-ILS

State: Illinois **County:** Sangamon **Applicant:** IDOT District 6

Area Name: Berm

Legal Description: NW/4, SW/4, Sec. 15, T. 16 N., R. 5 W.

Location: This berm begins approximately 40 m (131 ft) south of where IL 4 crosses Spring Creek.

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Appendix B

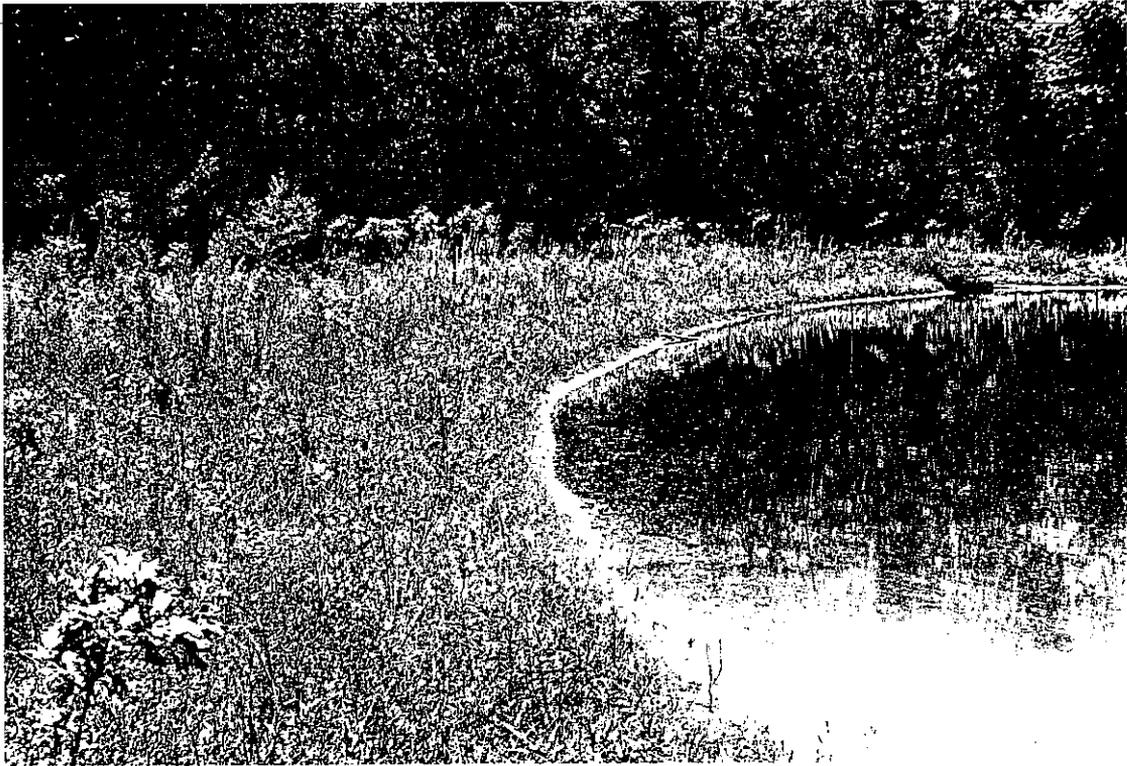
Photographs of Wetland Mitigation Sites



Picture 1A. Facing northeast from photostation 1.



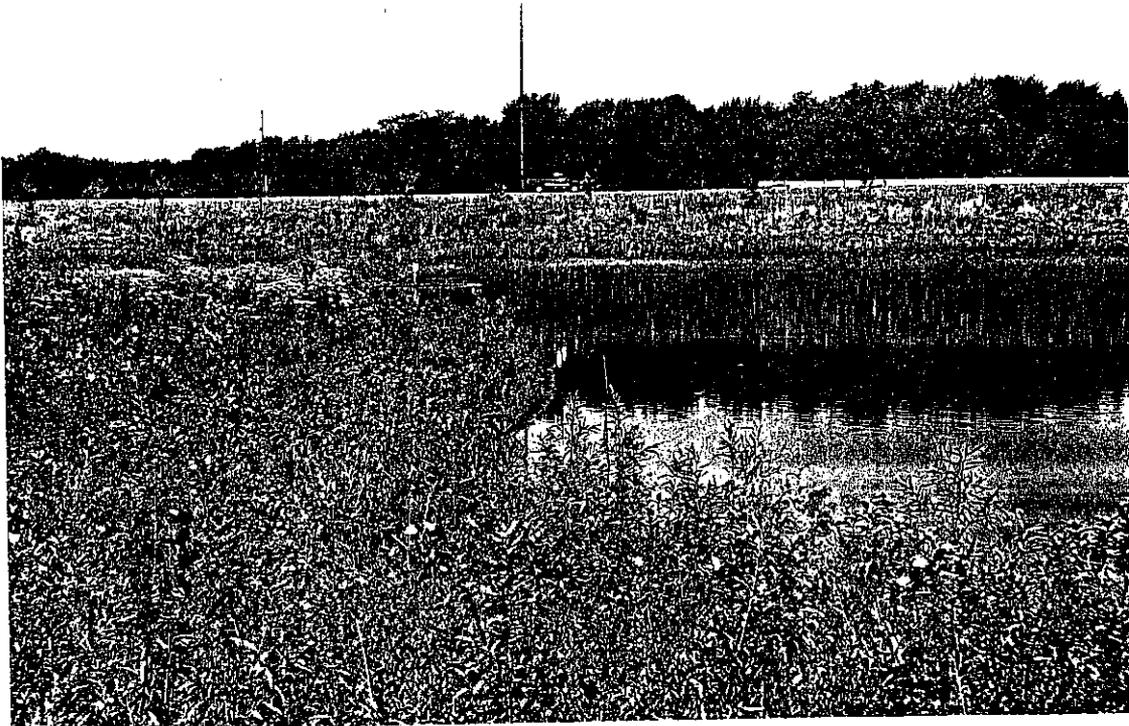
Picture 1B. Facing east from photostation 1.



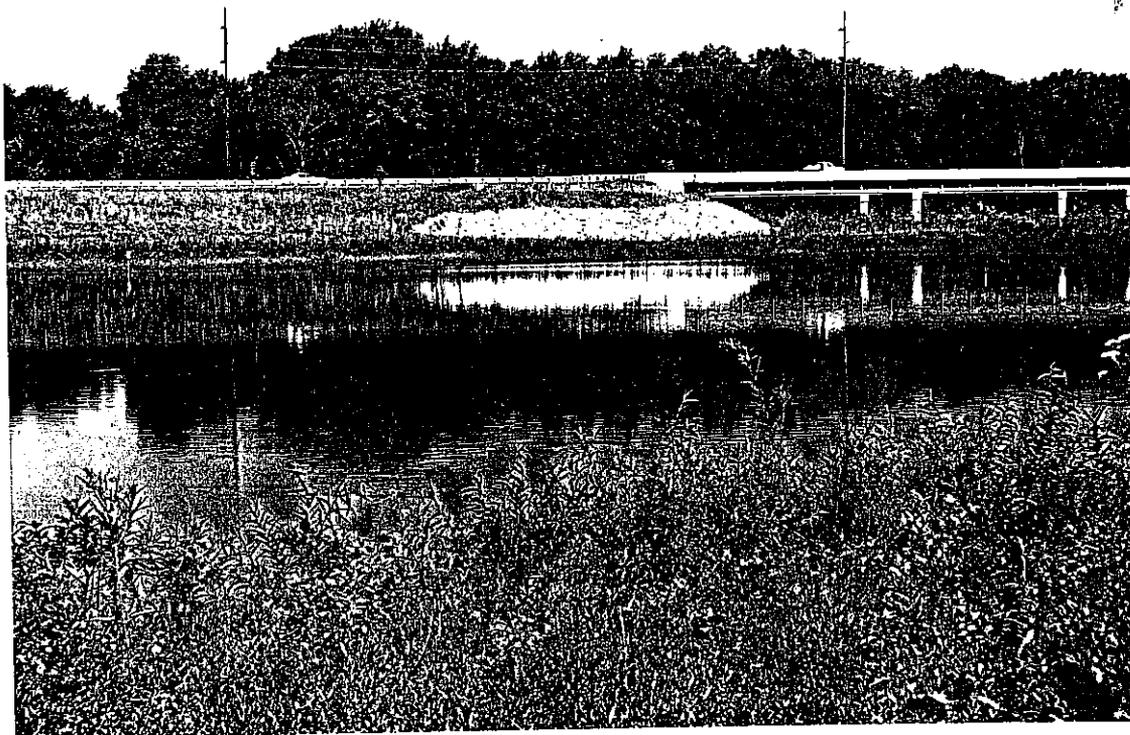
Picture 2A. Facing south from photostation 2.



Picture 2B. Facing west from photostation 2.



Picture 3A. Facing north from photostation 3.



Picture 3B. Facing northwest from photostation 3.



Picture 3C. Facing west from photostation 3.

WETLAND MITIGATION SITE MONITORING REPORT FA 662 (IL 4) Sangamon County

Introduction

This report details monitoring of the wetland mitigation site created to compensate for FA 662 (IL 4) in Sangamon County. The site consists of approximately 2.8 ha (6.8 ac) of wetland creation. The wetland creation site is located north of Springfield, IL, at the southwest corner of the intersection of IL 4 and Spring Creek. The legal location is NW/4, SW/4, Section 15, T. 16 N., R. 5 W. The Illinois Department of Transportation (IDOT) completed construction of the site in 1996/7. Sapling trees and small shrubs were planted during the autumn of 1997 and the spring of 1998 respectively (T. Brooks, IDOT Wetlands Unit, memo to Allen Plocher, 30 March 1999). On-site monitoring was conducted on September 22, 1999.

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

Goals, Objectives, and Performance Standards

Goals, objectives, and performance standards follow those specified in the monitoring plan (T. Brooks, IDOT Wetlands Unit, 1999) and the wetland compensation plan (C. Perino, IDOT Wetlands Unit, 1995) developed for this site. Performance criteria are based on those specified in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and in *Guidelines for Developing Mitigation Proposals* (USACE 1993). Each goal should be attained by the end of the 5-year monitoring period. Goals, objectives, and performance criteria are listed below.

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

Objective: The created wetland should compensate for the loss of 2.8 ha (6.8 ac) of scrub-shrub wetland at a 1:1 ratio.

Performance criteria:

- a. Predominance of hydrophytic vegetation: More than 50% of the dominant plant species must be hydrophytic.
- b. Presence of wetland hydrology: The 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.
- c. Occurrence of hydric soils: Hydric soil characteristics should be present, or conditions favorable for hydric soil formation should persist at the site.

Project goal 2: The created wetland plant community should meet standards for floristic composition and vegetation cover.

Objectives: Planting native shrubs and tree sapling species will create a scrub-shrub wetland. Herbaceous vegetation will be allowed to colonize the site naturally.

Performance criteria:

- a. Establishment of planted shrubs and trees: Planted shrubs and tree seedlings should have a survival rate of 80% each year for five years.
- b. Floristic Quality Assessment: At least 50% of the plant species present should be non-weedy, native perennial species.
- c. Dominance of vegetation: None of the three most dominant plant species in either site may be non-native or weedy species.

Methods

Project goal 1

a. Predominance of hydrophytic vegetation

The method for determining dominant vegetation at a wetland site is described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and further explained in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (Federal Interagency Committee for Wetland Delineation 1989). It is based on aerial coverage estimates for individual plant species. Each of the dominant plant species is then assigned its wetland indicator status rating (Reed 1988). Any plant rated facultative or wetter, *i.e.*, FAC, FAC+, FACW, and OBL, is considered a hydrophyte. A predominance of vegetation in the wetland plant community exists if more than 50% of the dominant species present are hydrophytic. Since the survival of planted hydrophytic trees and shrubs on non-wetlands (*i.e.* yards) is well documented, these species were excluded from calculations of percentage of dominant hydrophytic species.

b. Presence of wetland hydrology

Illinois State Geological Survey (ISGS) personnel installed three ground water monitoring wells and one surface-water monitoring device at the site in 1999. Locations for these sites can be found in the ISGS report *Veteran's Parkway, Springfield Wetland Compensation Site* (Miner 1999). Water-level data was collected beginning in July. Methods are further described in the ISGS document *Annual Water-level Report for Active IDOT Sites* (Fucciolo et al. 1999).

c. Occurrence of hydric soils

The soil was sampled in order to monitor hydric soil development. Soil profile morphology including horizon color, texture, and structure was described at various points throughout the site. Additionally, the presence, type, size, and abundance of redoximorphic features were noted.

Hydric soils probably develop slowly, and characteristics may not be apparent during the first several years after project construction. In the absence of hydric soil indicators at the

end of the five-year monitoring period, hydrologic data could be used as corroborative evidence that conditions favorable for hydric soil formation persist at the site.

Project goal 2

a. Establishment of planted shrubs and tree saplings

In order to create and restore floodplain forest, small shrubs and tree saplings were planted at the compensation site. According to the tasking order for this project (T. Brooks, IDOT Wetlands Unit, memo to Allen Plocher, March 30, 1999), the following number of shrubs and trees were planted at the site:

Table 1. Shrub species planted in the created wetland (Spring 1998).

Species	Common Name	Number
<i>Cephalanthus occidentalis</i>	Buttonbush	570
<i>Cornus stolonifera</i>	Red osier dogwood	570
<i>Ilex decidua</i>	Swamp holly	570
<i>Lindera benzoin</i>	Spicebush	570
<i>Viburnum lentago</i>	Nannyberry	570
TOTAL		2850

Table 2. Tree species planted in the created wetland (Autumn 1997).

Species	Common Name	Number
<i>Betula nigra</i>	River birch	205
<i>Carya laciniosa</i>	Kingnut hickory	205
<i>Fraxinus pennsylvanica</i>	Green ash	205
<i>Quercus bicolor</i>	Swamp white oak	205
<i>Quercus palustris</i>	Pin oak	205
TOTAL		1025

Survivorship and density of planted trees and shrubs was determined through a census of the created wetland. All live trees and shrubs were counted. Dead or cut-off trees were also counted, and identified by species whenever possible. Dead shrub identification proved impossible.

Tree and shrub survival was calculated as a percentage of the number of stems reported to have been planted: (Total number of live planted stems counted/total number of planted stems reported) x 100.

b. Floristic Quality Assessment

The Floristic Quality Assessment (Taft et al. 1997) was applied to the plant community at the site to evaluate floristic quality and nativity. The assessment methodology is used to identify natural areas and facilitate floristic comparisons among sites. This technique is part of the procedure for the long-term monitoring of natural areas and the monitoring of restored or created wetlands (Swink and Wilhelm 1994). The basis of the method is that each native plant species is assigned a conservatism coefficient (C) ranging from 0 to 10. Individual conservatism coefficients are ranks of species behavior and reflect the committee's (Taft et

al. 1997) confidence level for a taxon's correspondence to anthropogenic disturbances. Coefficient values range from 0 to 10, with all adventive species given a coefficient of 0. Plant species assigned 0 have low affinities for natural areas, whereas those assigned 10 have very high affinities. When a complete species list is assembled for a wetland site, the overall average conservatism coefficient (\bar{c}) and a site floristic quality index (FQI) can be calculated. These values provide a measure of site floristic quality. Floristic quality index (FQI) values less than 5 indicate that the area is extremely weedy or in an early successional stage (Swink and Wilhelm 1994). FQI values between 20 and 35 ($\bar{c} = 3.0$) indicate that the area has evidence of native character and can be considered a botanical asset. FQI values between 35 and 50 ($\bar{c} = 3.5$) indicate that the area has significant native character.

c. Dominance of vegetation

Plant species dominance was determined as in project goal 1, a. Predominance of hydrophytic vegetation. The method for determining dominant vegetation at a wetland site is described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and further explained in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands*.

In addition, three permanent photography stations were established so that photographs could be used to document changes in plant community size and composition. The locations of the photo stations are indicated on the enclosed aerial photograph. Arrows indicate the direction in which the photos were taken.

Results

Project goal 1

a. Predominance of hydrophytic vegetation

Dominant plant species for the mitigation site in 1999 are shown in Table 3 and Table 4. There were two distinctly different groups of vegetation at this site which we divided into areas 1 and 2 (see attached aerial photo). All of the dominant species for area 1 are rated OBL, FACW, FAC+, or FAC and are hydrophytic. Based on naturally occurring dominant species, area 2 did not have dominant hydrophytic vegetation.

Table 3. Dominant plant species by stratum and wetland indicator status for area 1.

<u>Dominant Plant Species</u>	<u>Stratum</u>	<u>Indicator Status</u>
1. <i>Amaranthus tuberculatus</i>	herb	OBL
2. <i>Panicum dichotomiflorum</i>	herb	FACW-
3. <i>Populus deltoides</i>	herb	FAC+
4. <i>Cephalanthus occidentalis</i>	shrub	OBL*
5. <i>Cornus stolonifera</i>	shrub	FACW*

* Planted species.

Table 4. Dominant plant species by stratum and wetland indicator status for area 2.

Dominant Plant Species	Stratum	Indicator Status
1. <i>Aster pilosus</i>	herb	FACU-
2. <i>Bidens tripartita</i>	herb	OBL
3. <i>Conyza canadensis</i>	herb	FAC-
4. <i>Poa pratensis</i>	herb	FAC-
5. <i>Betula nigra</i>	shrub	FACW*
6. <i>Carya illinoensis</i>	shrub	FACW*
7. <i>Fraxinus pennsylvanica</i>	shrub	FACW*
8. <i>Quercus bicolor</i>	shrub	FACW+*
9. <i>Quercus palustris</i>	shrub	FACW*

* Planted species.

b. Presence of wetland hydrology

Insufficient data were available to determine the area of the wetland creation site that meets the wetland hydrology criteria.

Based on field evidence observed during an on-site visit, area 1 possesses wetland hydrology, while area 2 does not.

c. Occurrence of hydric soils

Soils examined at the site were found to be highly disturbed. Much excavation has been done and the sites lack an undisturbed A horizon. The existing soil at much of the site is the old subsoil layer. Topsoil was not replaced after excavation as was recommended in the wetland compensation plan (C. Perino, IDOT Wetlands Unit, 1995) developed for this site.

Even though the soils are disturbed, hydric soil indicators are present in area 1.

Following is a soil description of a typical pedon located within area 1:

Table 5. Description of the soils at the created wetland (Area 1).

Depth	Matrix Color	Concentrations	Depletions	Texture	Structure
0-1.5 in	10Y 3/	7.5YR 4/3	None	Silt loam	Granular
1.5-15 in	N6/, 10YR 5/6, and 10YR 5/1	None	None	Silt loam	Subangular blocky grading to none.
15-30+ in	Same as above	None	None	Silt loam	None

The soils in area 2 did not possess any hydric soil indicators. In addition to being disturbed, soils at the restoration site are also compacted. It appears at this time that area 1 and a portion of area 2 will continue hydric soil development, while most of area 2 will not.

Therefore, area 1 satisfies the three criteria of wetlands, while most of area 2 does not. Area 1 includes that portion of the pond which, while shallower than the required 2 m (6.6 ft) depth, does not support hydrophytic vegetation. Current wetland acreage at this site is estimated at 0.5 ha (1.3 ac). This falls short of the project goal of 2.8 ha (6.8 ac).

Project goal 2

a. Establishment of shrubs and tree saplings

Tables 6 and 7 show the results of the census. The shrubs counted were fewer than 10% of what was reported to have been planted at this site. It appeared that the shrubs might have been planted at an elevation that was too low, causing them to be washed away when the site flooded in the spring. Nearly all of the trees reported as planted at the site were accounted for. There were some different species planted than what were reported, however. *Carya laciniosa* was reported to have been planted but was not found at this site, while *Carya illinoensis* and *Platinus occidentalis* were found but not reported as planted.

Tables 7 and 8 show the percent survival for shrubs and trees respectively. These figures were calculated both by species and overall for all species of each in the entire site. In addition, numerous tree individuals were mowed off at this site. These were considered dead, although there is a chance that they will resprout next year.

Table 6. Number of shrubs (by species) counted at the created wetland.

Species	Common Name	Number live	Number dead
<i>Cephalanthus occidentalis</i>	Buttonbush	139	-
<i>Cornus stolonifera</i>	Red osier dogwood	84	-
<i>Ilex decidua</i>	Swamp holly	6	-
<i>Lindera benzoin</i>	Spicebush	0	-
<i>Viburnum lentago</i>	Nannyberry	2	1
Unknown	Unknown	-	53
TOTAL		231	54

Table 7. Number of trees (by species) counted at the created wetland.

Species	Common Name	Number live	Number cut-off
<i>Betula nigra</i>	River birch	173	18
<i>Carya laciniosa</i>	Kingnut hickory	-	-
<i>Carya illinoensis</i>	Pecan	155	8
<i>Fraxinus pennsylvanica</i>	Green ash	175	9
<i>Platinus occidentalis</i>	Sycamore	52	-
<i>Quercus bicolor</i>	Swamp white oak	165	13
<i>Quercus palustris</i>	Pin oak	171	8
Unknown	Unknown	-	77
TOTAL		891	133

Table 8. Percent shrub survival (by species).

Species	Common Name	% of reported
<i>Cephalanthus occidentalis</i>	Buttonbush	24.4
<i>Cornus stolonifera</i>	Red osier dogwood	17.8
<i>Ilex decidua</i>	Swamp holly	1.1
<i>Lindera benzoin</i>	Spicebush	-
<i>Viburnum lentago</i>	Nannyberry	0.4
Unknown	Unknown	0.0
OVERALL		8.1

Table 9. Percent tree survival (by species).

Species	Common Name	% of reported
<i>Betula nigra</i>	River birch	84.4
<i>Carya laciniosa</i>	Kingnut hickory	*
<i>Carya illinoensis</i>	Pecan	75.6
<i>Fraxinus pennsylvanica</i>	Green ash	85.4
<i>Platanus occidentalis</i>	Sycamore	-
<i>Quercus bicolor</i>	Swamp white oak	80.5
<i>Quercus palustris</i>	Pin oak	83.4
OVERALL		86.9

* - Species probably not planted

b. Floristic Quality Assessment

Two FQI values were calculated for each area from the species lists included in Appendix A. The first FQI value is calculated from only species which became established on the site naturally; the second FQI value includes the planted trees. Area 1 has an FQI value of 8.5 and a \bar{C} of 1.8 when only natural vegetation is included. When the planted shrubs are added, the FQI value is raised to 11.9 with a \bar{C} value of 2.3. The FQI value for area 2 is 7.3 with a \bar{C} value of 1.2 when only naturally established vegetation is considered, and 11.2 and 1.8 when the planted trees are included. Therefore both areas are of fair natural quality. Area 1 has 55% non-weedy, native perennial species, however, area 2 has only 28%.

d. Dominance of vegetation

Neither area meets the performance criteria for dominance of vegetation. At least one of the three most dominant species at either area is a non-native or weedy species. All of the dominant species (Table 3 and Table 4) for both areas are native except *Poa pratensis*. This species, although common, is not one of the three most dominant species at area 2. At area 1, *Amaranthus tuberculatus* and *Panicum dichotomiflorum* are weedy or undesirable, while *Populus deltoides* is not. At area 2, *Aster pilosus* and *Conyza Canadensis* are weedy or undesirable, while *Bidens tripartita* is not.

Photographs were taken from the permanent photography stations and are in Appendix B of this report.

Discussion

After one monitoring season, these sites show progress towards scrub/shrub wetland establishment. As the vegetative succession proceeds, area 1 will most likely comply with project goals, objectives, and performance standards by the end of the monitoring period, but most of area 2 will likely not.

The vegetation at area 1 is hydrophytic and meets the dominance criteria for native non-invasive species. The naturally occurring dominant vegetation in area 2 is not hydrophytic and is weedy. Both planted tree seedlings and planted shrubs are becoming established on the sites. There are a large number of species at each site that have very low coefficients of

conservatism (C). This is common on disturbed and early successional sites and is not a cause for concern at this time. It is likely that as succession progresses, more conservative species will become established on the site.

Currently, the primary concern for this site is finding evidence of wetland hydrology within area 2. Area 1 already has hydric soil characteristics and probably wetland hydrology, but area 2 does not. It is doubtful whether area 2 will ever develop either wetland hydrology or hydric soils due to the slope at which it was built. An estimate of current wetland acreage at the site (area 1) is 0.5 ha (1.3 ac). This estimated area is the area between the red and white lines on the attached aerial photograph.

Literature Cited

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Appendix A
Wetland Determination Forms

ROUTINE ONSITE WETLAND DETERMINATION

Area 1 (page 1 of 4)

Field Investigators: Wiesbrook, Wilm, Tessene **Date:** September 22, 1999
Project Name: FA 662 (IL 4) **Section No.:** 1-ILS
State: Illinois **County:** Sangamon **Applicant:** IDOT District 6
Area Name: Scrub/shrub wetland
Legal Description: NW/4, SW/4, Sec. 15, T. 16 N., R. 5 W.
Location: This wetland begins approximately 70 m (230 ft) south of where IL 4 crosses Spring Creek.

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

VEGETATION

Dominant Plant Species	Stratum	Indicator Status
1. <i>Amaranthus tuberculatus</i>	Herb	OBL
2. <i>Panicum dichotomiflorum</i>	Herb	FACW-
3. <i>Populus deltoides</i>	Herb	FAC+
4. <i>Cephalanthus occidentalis</i>	Shrub	OBL*
5. <i>Cornus stolonifera</i>	Shrub	FACW*

* Planted species.

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: Undetermined

On Sangamon County hydric soils list? Yes: No: Undetermined: Is the soil a histosol? Yes: No: Undetermined: Histic epipedon present? Yes: No: Undetermined: Redox Concentrations? Yes: No: Color: 7.5YR 4/3Redox Depletions? Yes: No: Color: N/A

Matrix color: 10Y 3/ over mixture of N 6/, 10YR 5/6, and 10YR 5/1

Other indicators: None.

Hydric soils? Yes: No: **Rationale:** This soil possesses a gleyed matrix and redox concentrations, both of which indicate saturated or reduced conditions. Therefore, the soil at this area meets the hydric soil criterion.

ROUTINE ONSITE WETLAND DETERMINATION

Area 1 (page 2 of 4)

Field Investigators: Wiesbrook, Wilm, Tessene **Date:** September 22, 1999
Project Name: FA 662 (IL 4) **Section No.:** 1-ILS
State: Illinois **County:** Sangamon **Applicant:** IDOT District 6
Area Name: Scrub/shrub wetland
Legal Description: NW/4, SW/4, Sec. 15, T. 16 N., R. 5 W.
Location: This wetland begins approximately 70 m (230 ft) south of where IL 4 crosses Spring Creek.

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: N/A

Depth to saturated soil: 0.18 m (7 in)

Overview of hydrological flow through the system: This area is hydrologically influenced by overflow and culvert flow from Spring Creek and by precipitation. Water leaves the area via evapotranspiration and culvert flow into Spring Creek.

Size of Watershed: 277 km² (107 mi²) near the intersection of IL 4 with IL 125 and IL 97

Other field evidence observed: ISGS is monitoring this area, but had little data for this year. We observed water-stained leaves, algal surface, and wetland drainage patterns.

Wetland hydrology: Yes: X No:

Rationale: Although ISGS water level data collected from the area is inconclusive, field evidence cited above indicates that this area is inundated or saturated for a sufficient duration to satisfy the wetland hydrology criterion.

DETERMINATION AND RATIONALE:

Is the area a wetland? Yes: X No:

Rationale: Dominant hydrophytic vegetation, hydric soils, and wetland hydrology are all present at this area; therefore, we determined that this area is a wetland.

ROUTINE ONSITE WETLAND DETERMINATION

Area 1 (page 3 of 4)

Field Investigators: Wiesbrook, Wilm, Tessene **Date:** September 22, 1999
Project Name: FA 662 (IL 4) **Section No.:** 1-ILS
State: Illinois **County:** Sangamon **Applicant:** IDOT District 6
Area Name: Scrub/shrub wetland
Legal Description: NW/4, SW/4, Sec. 15, T. 16 N., R. 5 W.
Location: This wetland begins approximately 70 m (230 ft) south of where IL 4 crosses Spring Creek.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	Coefficient of conservatism
<i>Acer saccharinum</i>	silver maple	herb	FACW	1
<i>Amaranthus tuberculatus</i>	tall waterhemp	herb	OBL	1
<i>Ammannia coccinea</i>	long-leaved ammannia	herb	OBL	5
<i>Apocynum cannabinum</i>	dogbane	herb	FAC	3
<i>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
<i>Aster simplex</i>	panicled aster	herb	FACW	3
<i>Bidens cernua</i>	nodding beggar-ticks	herb	OBL	2
<i>Bidens tripartita</i>	beggartick	herb	OBL	2
<i>Cyperus strigosus</i>	straw colored flatsedge	herb	FACW	0
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Eclipta prostrata</i>	yerba de tajo	herb	FACW	2
<i>Eragrostis hypnoides</i>	creeping love grass	herb	OBL	5
<i>Eupatorium serotinum</i>	late boneset	herb	FAC+	1
<i>Leucospora multifida</i>	leucospora	herb	FACW+	3
<i>Panicum dichotomiflorum</i>	fall panicum	herb	FACW-	0
<i>Phyla lanceolata</i>	fog-fruit	herb	OBL	1
<i>Polygonum lapathifolium</i>	curttop lady's thumb	herb	FACW+	0
<i>Polygonum pennsylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Populus deltoides</i>	eastern cottonwood	tree	FAC+	2
<i>Salix exigua</i>	sandbar willow	shrub, herb	OBL	1
<i>Salix nigra</i>	black willow	shrub, herb	OBL	3
<i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
<i>Setaria glauca</i>	pigeon grass	herb	FAC	*
<i>Xanthium strumarium</i>	cockle bur	herb	FAC	0
*non-native species	$FQI = \sum C/N = 40/22 = 8.5$		$\bar{c} = \sum C/N = 40/22 = 1.8$	

ROUTINE ONSITE WETLAND DETERMINATION

Area 1 (page 4 of 4)

Field Investigators: Wiesbrook, Wilm, Tessene **Date:** September 22, 1999
Project Name: FA 662 (IL 4) **Section No.:** 1-ILS
State: Illinois **County:** Sangamon **Applicant:** IDOT District 6
Area Name: Scrub/shrub wetland
Legal Description: NW/4, SW/4, Sec. 15, T. 16 N., R. 5 W.
Location: This wetland begins approximately 70 m (230 ft) south of where IL 4 crosses Spring Creek.

Planted Shrubs SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	Coefficient of conservatism
<i>Cephalanthus occidentalis</i>	Buttonbush	shrub	OBL	4
<i>Cornus stolonifera</i>	Red osier dogwood	shrub	FACW	3
<i>Ilex deacidua</i>	Swamp holly	shrub	FACW	6
<i>Lindera benzoin</i>	Spicebush	shrub	FACW-	5
<i>Viburnum lentago</i>	Nannyberry	shrub	FAC+	4

$$*FQI = \sum C/\sqrt{N} = 62/\sqrt{27} = 11.9 \quad *c = \sum C/N = 62/27 = 2.3$$

*These calculations include the complete species list above, as well as the planted shrubs.

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ROUTINE ONSITE WETLAND DETERMINATION

Area 2 (page 1 of 5)

Field Investigators: Wiesbrook, Wilm, Tessene **Date:** September 22, 1999
Project Name: FA 662 (IL 4) **Section No.:** 1-ILS
State: Illinois **County:** Sangamon **Applicant:** IDOT District 6
Area Name: Berm
Legal Description: NW/4, SW/4, Sec. 15, T. 16 N., R. 5 W.
Location: This berm begins approximately 40 m (131 ft) south of where IL 4 crosses Spring Creek.

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

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. <i>Aster pilosus</i>	herb	FACU-
2. <i>Bidens tripartita</i>	herb	OBL
3. <i>Conyza canadensis</i>	herb	FAC-
4. <i>Poa pratensis</i>	herb	FAC-
5. <i>Betula nigra</i>	shrub	FACW*
6. <i>Carya illinoensis</i>	shrub	FACW*
7. <i>Fraxinus pennsylvanica</i>	shrub	FACW*
8. <i>Quercus bicolor</i>	shrub	FACW+*
9. <i>Quercus palustris</i>	shrub	FACW*

* Planted species.

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 25%

Hydrophytic vegetation: Yes: No: X

Rationale: Less than 50% of the dominants are OBL, FACW, FAC+, or FAC.

SOILS

Series and phase: Undetermined

On Sangamon County hydric soils list? Yes: No: X Undetermined:

Is the soil a histosol? Yes: No: X Undetermined:

Histic epipedon present? Yes: No: X Undetermined:

Redox Concentrations? Yes: No: X Color: N/A

Redox Depletions? Yes: No: X Color: N/A

Matrix color: 10YR 4/3

Other indicators: This area is a constructed berm with compacted soils.

Hydric soils? Yes: No: X

Rationale: This soil possesses a high chroma matrix and no redoximorphic features, which indicates saturated or reduced conditions for extremely short duration during the growing season. Therefore, the soil at this area does not meet the hydric soil criterion. Due to extreme disturbance, the colors of this soil material may not reflect the true soil genesis at this area.

ROUTINE ONSITE WETLAND DETERMINATION

Area 2 (page 2 of 5)

Field Investigators: Wiesbrook, Wilm, Tessene **Date:** September 22, 1999
Project Name: FA 662 (IL 4) **Section No.:** 1-ILS
State: Illinois **County:** Sangamon **Applicant:** IDOT District 6
Area Name: Scrub/shrub
Legal Description: NW/4, SW/4, Sec. 15, T. 16 N., R. 5 W.
Location: This wetland begins approximately 40 m (131 ft) south of where IL 4 crosses Spring Creek.

HYDROLOGY

Inundated: **Yes:** **No:** X **Depth of standing water:** N/A

Depth to saturated soil: N/A

Overview of hydrological flow through the system: This area is hydrologically influenced by overflow from Spring Creek and by precipitation. Water leaves the area via evapotranspiration and runoff into area 1.

Size of Watershed: 277 km² (107 mi²) near the intersection of IL 4 with IL 125 and IL 97

Other field evidence observed: ISGS is monitoring this area, but had little data for this year.

Wetland hydrology: **Yes:** **No:** **Undetermined:** X

Rationale: No indicators of wetland hydrology were observed. The relatively high landscape position and slope of this area make it unlikely that this area will be inundated or saturated for a sufficient duration to satisfy the wetland hydrology criterion.

DETERMINATION AND RATIONALE:

Is the area a wetland? **Yes:** **No:** X

Rationale: Although dominant hydrophytic vegetation is present at the area, hydric soils and wetland hydrology are lacking or undetermined at this time; therefore, we determined that this area is currently not a wetland.

ROUTINE ONSITE WETLAND DETERMINATION

Area 2 (page 3 of 5)

Field Investigators: Wiesbrook, Wilm, Tessene **Date:** September 22, 1999
Project Name: FA 662 (IL 4) **Section No.:** 1-ILS
State: Illinois **County:** Sangamon **Applicant:** IDOT District 6
Area Name: Scrub/shrub
Legal Description: NW/4, SW/4, Sec. 15, T. 16 N., R. 5 W.
Location: This wetland begins approximately 40 m (131 ft) south of where IL 4 crosses Spring Creek.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	Coefficient of conservatism
<i>Abutilon theophrasti</i>	buttonweed	herb	FACU-	*
<i>Acalypha rhomboidea</i>	three-seeded mercury	herb	FACU	0
<i>Acer saccharinum</i>	silver maple	herb	FACW	1
<i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
<i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
<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-ticks	herb	OBL	2
<i>Bidens tripartita</i>	beggartick	herb	OBL	2
<i>Bidens vulgata</i>	sticktight	herb	FACW	0
<i>Cirsium discolor</i>	field thistle	herb	UPL	2
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
<i>Cuscuta</i> sp.	dodder	herb	FACW	2
<i>Cynanchum laeve</i>	blue vine	herb	FAC	1
<i>Digitaria ischaemum</i>	smooth crab grass	herb	FACU	*
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Elymus virginicus</i>	Virginia rye	herb	FACW-	4
<i>Erigeron annuus</i>	annual fleabane	herb	FAC-	1
<i>Eupatorium serotinum</i>	late boneset	herb	FAC+	1
<i>Iva annua</i>	marsh elder	herb	FAC	0
<i>Lactuca saligna</i>	willow-leaved lettuce	herb	FACU	*
<i>Lactuca serriola</i>	wild lettuce	herb	FAC	*
<i>Lepidium virginicum</i>	common peppergrass	herb	FACU-	0
<i>Lolium perenne</i>	crested rye grass	herb	FACU	*
<i>Lycopus americanus</i>	common water horehound	herb	OBL	3
<i>Melilotus</i> sp.	sweet clover	herb	FACU	*
<i>Morus alba</i>	white mulberry	herb	FAC	*
<i>Oenothera biennis</i>	evening primrose	herb	FACU	1
<i>Panicum capillare</i>	witch grass	herb	FAC	0
<i>Panicum dichotomiflorum</i>	fall panicum	herb	FACW-	0
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Plantago rugelii</i>	red-stalked plantain	herb	FAC	0
<i>Poa pratensis</i>	Kentucky bluegrass	herb	FAC-	*

Species list continued on the next page.

ROUTINE ONSITE WETLAND DETERMINATION

Area 2 (page 4 of 5)

Field Investigators: Wiesbrook, Wilm, Tessene Date: September 22, 1999
 Project Name: FA 662 (IL 4) Section No.: 1-ILS
 State: Illinois County: Sangamon Applicant: IDOT District 6
 Area Name: Scrub/shrub
 Legal Description: NW/4, SW/4, Sec. 15, T. 16 N., R. 5 W.
 Location: This wetland begins approximately 40 m (131 ft) south of where IL 4 crosses Spring Creek.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	Coefficient of conservatism
<i>Polygonum aviculare</i>	knotweed	herb	FAC-	*
<i>P. cespitosum longisetum</i>	creeping smartweed	herb	UPL	*
<i>P. hydropiper</i>	common smartweed	herb	OBL	*
<i>P. lapathifolium</i>	curttop lady's thumb	herb	FACW+	0
<i>P. pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>P. persicaria</i>	spotted lady's thumb	herb	FACW	*
<i>Potentilla norvegica</i>	rough cinquefoil	herb	FAC	0
<i>Rorippa islandica</i>	marsh yellow cress	herb	OBL	4
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
<i>Salix exigua</i>	sandbar willow	shrub, herb	OBL	1
<i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
<i>Setaria glauca</i>	pigeon grass	herb	FAC	*
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Sonchus arvensis</i>	field sowthistle	herb	FAC-	*
<i>Stachys tenuifolia hispida</i>	hairy hedge nettle	herb	OBL	5
<i>Taraxacum officinale</i>	common dandelion	herb	FACU	*
<i>Toxicodendron radicans</i>	poison ivy	herb	FAC+	1
<i>Trifolium pratense</i>	red clover	herb	FACU+	*
<i>Verbena urticifolia</i>	white vervian	herb	FAC+	3
<i>Xanthium strumarium</i>	cockle bur	herb	FAC	0
*non-native species	$FQI = \Sigma C/N = 43/35 = 7.3$		$\bar{c} = \Sigma C/N = 43/35 = 1.2$	

Planted trees
SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	Coefficient of conservatism
<i>Betula nigra</i>	river birch	shrub	FACW	4
<i>Carya illinoensis</i>	pecan	shrub	FACW	6
<i>Fraxinus pennsylvanica</i>	green ash	shrub	FACW	5
<i>Platanus occidentalis</i>	sycamore	shrub	FACW	3
<i>Quercus bicolor</i>	swamp white oak	shrub	FACW+	7
<i>Quercus palustris</i>	pin oak	shrub	FACW	4
	$FQI = \Sigma C/N = 72/41 = 11.2$		$\bar{c} = \Sigma C/N = 72/41 = 1.8$	

*These calculations include the complete species list above, as well as the planted shrubs.

ROUTINE ONSITE WETLAND DETERMINATION

Area 2 (page 5 of 5)

Field Investigators: Wiesbrook, Wilm, Tessene **Date:** September 22, 1999

Project Name: FA 662 (IL 4) **Section No.:** 1-ILS

State: Illinois **County:** Sangamon **Applicant:** IDOT District 6

Area Name: Scrub/shrub

Legal Description: NW/4, SW/4, Sec. 15, T. 16 N., R. 5 W.

Location: This wetland begins approximately 40 m (131 ft) south of where IL 4 crosses Spring Creek.

Determined by: Brian Wilm and Paul Tessene (vegetation and hydrology)
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Appendix B
Photographs of Wetland Mitigation Sites



Picture 1A. Facing northeast from photostation 1.



Picture 1B. Facing east from photostation 1.



Picture 2A. Facing south from photostation 2.



Picture 2B. Facing west from photostation 2.



Picture 3A. Facing north from photostation 3.



Picture 3B. Facing northwest from photostation 3.