

**Seventh Year Wetland Mitigation Site Monitoring for the Tamms Site,
FAS 1907 (IL 127), Alexander County, Illinois – 2010**

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Introduction

Wetland compensation activity has been initiated along FAS 1907 (Illinois Route 127), one mile north of Tamms, Alexander County, Illinois (Figure 1). The legal location of the site is NE¼, NW¼ and SE¼, SE¼, SW¼, Section 31, T. 14 S., R. 1 W. (Mill Creek, IL Quad). This site is mitigation for wetland impacts [0.704 ha (1.739 ac)] incurred during the widening of IL 127 in Union and Alexander counties. The total mitigation required for this project is 1.750 ha (4.325 ac).

Prior to wetland construction this mitigation site was mostly in row crops with some abandoned railroad embankment (IDOT Wetland Conceptual Plan). This site is located within the Bottomlands Section of the Coastal Plain Natural Division of Illinois. The pre-settlement forests of this section were primarily bottomland oak-hickory forests (*Quercus bicolor*, *Q. lyrata*, *Q. michauxii*, *Q. pagoda*, *Q. palustris*, *Q. shumardii*, *Carya laciniosa*, *C. ovata*, *C. cordiformis* as well as *Fraxinus* spp., *Liquidambar styraciflua*, *Nyssa sylvatica*, and many others) (Schwegman et al. 1973). The wetland conceptual plan for this area suggests that emergent ponds, wet meadow, and a wetland tree planting would be the most likely development for this site (IDOT Wetland Conceptual Plan).

Illinois Natural History Survey (INHS) personnel began field monitoring of this area in 2004 and will continue for a minimum of five years, as requested by the Illinois Department of Transportation (IDOT) (Marlow 2003). The Illinois State Geological Survey (ISGS) was also tasked to monitor the hydrology of this 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 this wetland mitigation project are based on information contained in the original wetland conceptual plan for this site (IDOT Wetland Conceptual Plan). Performance criteria are based on those specified in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987), *Guidelines for Developing Mitigation Proposals* (USACOE 1993), and *Assessment of Created Wetland Performance in Illinois* (Plocher and Matthews 2004). Each goal should be attained by the end of the monitoring period. Project goals, objectives and performance criteria are listed below.

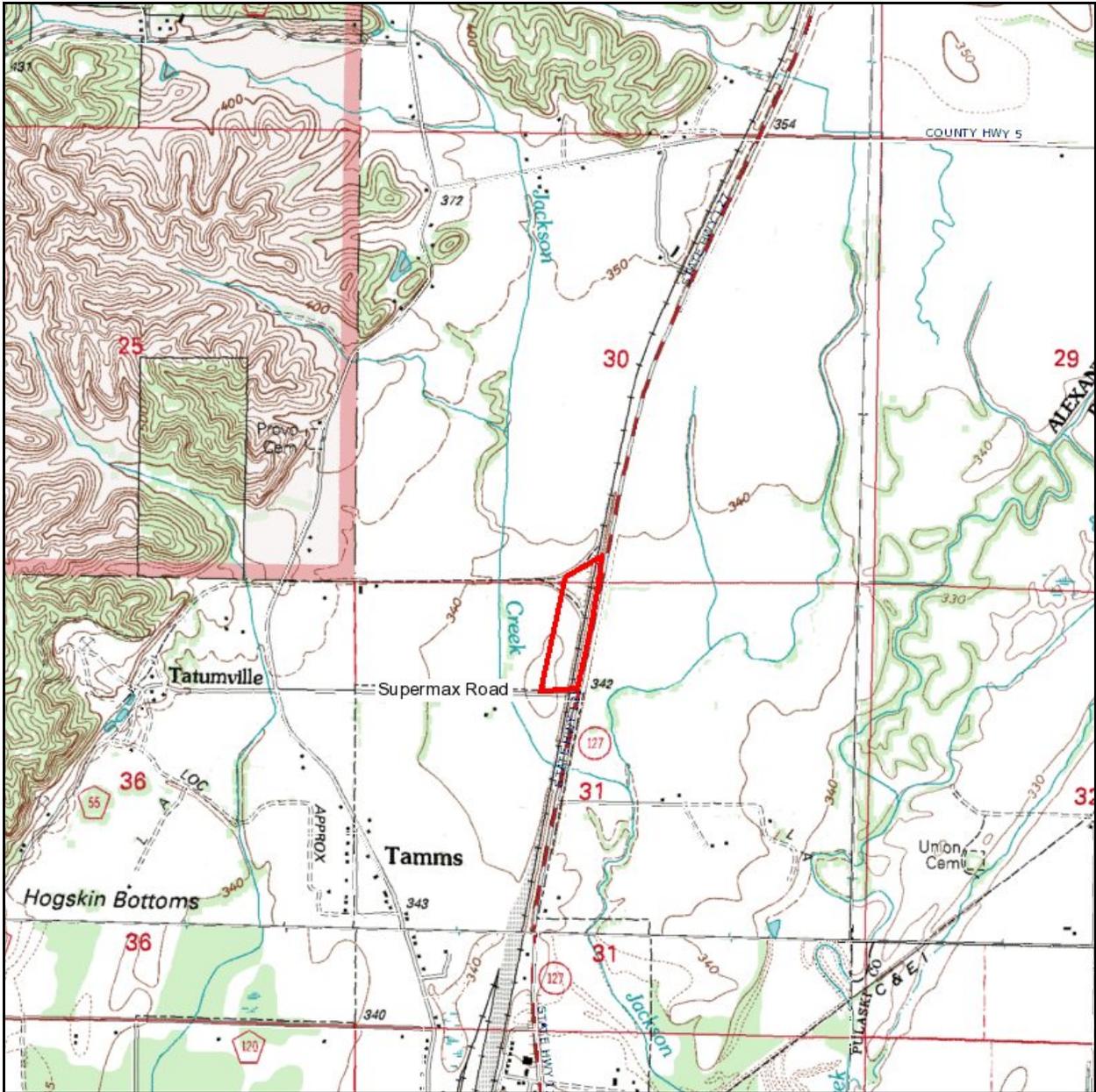


Figure 1. Project location map for the Tamms Wetland Mitigation Site [FAS 1907 (IL 127)], Alexander County, Illinois.

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

Objective: The created wetlands should comprise 1.750 hectares (4.325 acres) of jurisdictional wetland.

Performance Criteria: The created wetlands 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: Native, non-weedy, emergent wetland communities will be created (Sites 1, 2, and 3).

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

Table 1. Proposed emergent species to be planted at FAS 1907 (IL 127) wetland monitoring site.

Quantity	Scientific Name	Common Name	Size
500	<i>Acorus calamus</i>	Sweet Flag	2" x 3" pots
500	<i>Iris shrevei</i>	Blue Flag Iris	2" x 3" pots
500	<i>Pontederia cordata</i>	Pickerelweed	2" x 3" pots
500	<i>Scirpus acutus</i>	Hardstem Bulrush	2" x 3" pots
500	<i>Sagittaria latifolia</i>	Arrowhead	2" x 3" pots

In addition to these species it appears that an unknown quantity of *Juncus effusus* (common rush) was also planted at the mitigation area.

Performance Criteria:

- A. At least 50% of the planted emergent species should be represented by live, healthy individuals at the end of the monitoring period.
- B. At least 50% of the plant species present should be native and non-weedy species.
- C. Furthermore, none of the dominant plant species may be non-native.

Project Goal #3: A floodplain forest wetland community will be created (Site 4).

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

Performance Criterion: Seventy-five percent of the planted trees should be in a live and healthy condition each year during the monitoring period.

* 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).

Methods

Monitoring of this wetland mitigation site began in 2004 and will continue for at least the standard five-year monitoring period. INHS personnel will monitor the biological parameters and ISGS personnel will monitor hydrology. The project area has been divided into four sites based on the original wetland conceptual plan (IDOT). Site 1 is located at the north end of the mitigation area and was proposed as an emergent pond community. In 2005, it was decided that Site 1 be divided into two parts, 1A (west side; wet meadow) and 1B (east side; emergent pond/wet meadow). Herbaceous vegetation in both parcels of Site 1 will be monitored annually using standard sampling techniques (Cox 1985). Transects placed 20 m apart have been established and herbaceous vegetation will be assessed using 1m² quadrats placed at two meter intervals along each transect, beginning with a quadrat one meter from the baseline. A minimum of forty 1m² quadrats will be sampled annually at Site 1. Likewise, Site 3 (emergent pond), located at the southeast corner of the mitigation area, will be assessed using standard sampling techniques (Cox 1985). Three transects (273°) have been established perpendicular to a baseline (3°) running along the east side of the wetland. Quadrats (1m²) will be placed at five meter intervals along each transect, beginning with a quadrat two meters from the baseline. A minimum of twenty 1m² quadrats will be sampled annually. Site 2 is a small, narrow, wet meadow site. Because of its small size, Site 2 is not quantitatively sampled. Instead the assessment of dominant herbaceous vegetation in Site 2 will be assessed by a visual estimate of species cover on the site as a whole. Dominant species for Site 4 (proposed wetland tree planting) will also be based on a visual estimate of species cover on the site as a whole.

Results and status of the created wetland sites will be submitted to the IDOT in yearly monitoring reports. 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 monitoring period, written management recommendations will be made to IDOT in an effort to correct any problems.

Floristic Quality Index

The Floristic Quality Index (FQI) of each site was determined using the methods and Coefficient of Conservatism (C) assigned to each species by Taft et al. (1997). Although this index is not a substitute for quantitative vegetation analysis in assessing plant communities, it does provide a measure of the floristic integrity or level of disturbance of a site. This method has been shown to aid in the identification of natural areas and in the monitoring of restored and created wetlands (Swink and Wilhelm 1994). Each native plant species is assigned a rating between 0 and 10 (the Coefficient of Conservatism or C value) that is a subjective indicator of how likely a plant is to be found on an undisturbed site in a natural plant community. A plant species that has a low C value is often common and is known to tolerate disturbed conditions; a species with a high C value is likely relatively rare and requires specific, undisturbed habitats. An Index score below 10 suggests a site of poor natural quality; below 5, a highly disturbed site. An FQI value of 20 or more (and mean C value > 3.0) suggests that a site has evidence of native character and should be considered an environmental asset; over 35, a regionally noteworthy site; and over 45, a natural area of statewide significance (Taft et al. 1997).

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

Monitoring at this site is extended beyond the standard five-year monitoring period, in part, because of attempted and proposed future hydrologic alteration to the site. Wetland delineations will be completed yearly for all wetlands created at this compensation site. In addition, permanent photo stations have been established in each wetland area and photos will be taken annually in order to help monitor changes in the vegetation. Photos are included in Appendix 3 of the report.

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+ or 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 hydrophytic.

Dominant hydrophytic vegetation will be determined each year based on the results of systematic plant sampling (Sites 1 and 3) or by visual estimates (Sites 2 and 4). For systematic plant sampling, cover of all species in each plot is assigned a cover class according to Daubenmire (1959) as modified by Bailey and Poulton (1968) (Table 2). 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 averaged 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 2. Cover classes, percentage range, and midpoint used in quantitative vegetation sampling at the FAS 1907 (IL 127) wetland monitoring site.

Cover Class	Range of Cover (%)	Midpoint of Range (%)
1	0-1	0.5
2	1-5	3.0
3	5-25	15.0
4	25-50	37.5
5	50-75	62.5
6	75-95	85.0
7	95-100	97.5

(Daubenmire 1959; Bailey and Poulton 1968)

B. Presence of Hydric Soils – INHS personnel will examine soil cores for field indicators to determine the presence or absence of hydric soils as described in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) and the *Field Indicators of Hydric Soils in the United States* (USDA 2002).

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 extent of wetland hydrology at this site is monitored by the Illinois State Geological Survey. Wetland hydrology occurs when inundation or saturation to land surface is present for greater than 5% of the growing season (11 days at this site) where the soils and vegetation parameters in the Corps of Engineers Wetland Delineation Manual also are met; if either is lacking, then inundation or saturation must be present for greater than 12.5% of the growing season (28 days at this site) to satisfy the wetland hydrology criteria (Environmental Laboratory 1987 [<http://el.erdc.usace.army.mil/wetlands/pdfs/wlman87.pdf>]). Inundation and saturation at the site are monitored using a combination of 10 monitoring wells and 3 staff gauges. Water levels are ordinarily measured biweekly from March to May, and monthly during the remainder of the year. Manual readings are supplemented by 2 dataloggers, which measure surface-water levels at regular intervals to document all hydrologic events. Additional details regarding site conditions and monitoring results for wetland hydrology will be included in annual reports from the ISGS. In addition, INHS scientists will survey the site annually for field indicators of wetland hydrology.

Project Goal #2: Native, non-weedy, emergent wetland communities will be created (Sites 1, 2, and 3).

Planted emergent species survivorship will be assessed each year beginning in 2004. Planted emergent species survivorship monitoring is extended beyond the standard five-year monitoring period, in part, because of attempted and proposed hydrologic alteration to the site. Initially six emergent species were planted. These emergent species were *Acorus calamus*, *Iris shrevei*, *Juncus effusus*, *Pontederia cordata*, *Sagittaria latifolia* and *Scirpus acutus*. Annually, planted emergent species will be located, identified to species, and determined to be alive or dead. If less than 50% of the planted emergent species are represented by live, healthy individuals at the end of the five-year monitoring period, this part of the performance criteria for project goal #2 will be considered unsatisfied.

A complete species list will be compiled each year and species will be recorded as native or non-native and weedy or non-weedy. Nativity of plants will be determined by consulting Mohlenbrock (1986; 2002) and Taft et al. (1997). 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) or species which are adapted to frequent or severe disturbances (Taft et al. 1997). If native and non-weedy species constitute less than 50% of the plant species present at a particular site, part B of the performance criteria for project goal

#2 will be considered unsatisfied for that site. Furthermore, if any dominant species are non-native, part C of the performance criteria for project goal #2 will be considered unsatisfied.

Project Goal #3: A floodplain forest wetland community will be created (Site 4).

Tree survivorship will be assessed each year beginning in 2004. Tree survivorship monitoring is extended beyond the standard five-year monitoring period, in part, because of attempted and proposed hydrologic alteration to the site. Initially, 201 tree saplings were planted at the Tamms mitigation site. Most were planted within Site 4 where 187 tree saplings were planted. These trees included *Taxodium distichum* (21), *Fraxinus pennsylvanica* (17), *Liquidambar styraciflua* (17), *Platanus occidentalis* (17), *Quercus bicolor* (38), *Q. lyrata* (38), and *Q. palustris* (39). An additional fourteen *T. distichum* (total of 35) were planted at the north end of the mitigation area (around Site 1). Annually, every tree will be located, identified to species, and determined to be alive or dead. If less than 150 (75%) of the planted trees are found to be alive the performance criteria for project goal #3 will be considered unsatisfied. In 2010, an additional 200 tree seedlings (50 *Liquidambar styraciflua*, 50 *Quercus bicolor*, 50 *Q. lyrata*, and 50 *Taxodium distichum*) were planted to compensate for past mortality.

Results

Floristic Quality Index: The FQI was calculated for each wetland delineation site using native species only. Site 1A had a mean C value of 3.2 and a FQI score of 31.6. Site 1B, (mean C = 3.3, FQI = 30.0), Site 2 (mean C = 2.9, FQI = 21.6), and Site 3 (mean C = 3.3, FQI = 31.3) also had values characteristic of good natural quality. Site 4 also had a high FQI (22.9), indicating good natural quality; however, the mean C value was only 2.5. This disparity between the high FQI and fair mean C value may reflect that FQI is influenced by this site's large size. Summary information for wetland delineation sites at the FAS 1907 (IL 127) Tamms wetland monitoring site is given in Table 3.

In 2010, numerous species indicative of higher natural quality were present. Twenty species were present with a C value of 6 or greater. These species were: *Carex bicknellii*, Bicknell's sedge (Sites 1A, 2, and 3), *Carex caroliniana*, short-scaled green sedge (Sites 1A, 1B, 2, 3, and 4), *Carex crinita*, fringed sedge (Sites 1A and 2), *Carex lurida*, bottlebrush sedge (Sites 1A, 2, and 3), *Cocculus carolinus*, snailseed (Site 4), *Eleocharis verrucosa*, slender spikerush (Sites 1A and 3), *Galium tinctorium*, stiff bedstraw (Site 3), *Ilex decidua*, swamp holly (Site 1B), *Juncus nodatus*, stout rush (Sites 1A, 1B, 2, and 3), *Juncus secundus*, side-flowering rush (Site 1A), *Liquidambar styraciflua*, sweet gum (Sites 1A, 1B, and 4), *Ludwigia glandulosa*, false loosestrife (Site 3), *Panicum rigidulum*, munro grass (Sites 1A, 1B and 3), *Pluchea camphorata*, camphor weed (Site 3), *Pontederia cordata*, pickerel weed (Sites 1A and 3), *Populus heterophylla*, swamp cottonwood (Site 3), *Quercus marilandica*, blackjack oak (Site 4), *Ranunculus laxicaulis*, spearwort (Sites 1A, 1B, and 3), *Smilax glauca*, green brier (Sites 1B and 4), and *Verbesina helianthoides*, yellow crownbeard (Site 4).

Furthermore, the Illinois endangered *Glyceria arkansana* (Arkansas manna-grass) has been observed in past years within Site 1B (Herkert and Ebinger 2002; Illinois Endangered Species Protection Board 2005). This species was not seen in 2010.

Table 3. Summary table for wetland delineation sites at FAS 1907 (IL 127) Tamms wetland monitoring site, 2010.

	Site 1A	Site 1B	Site 2	Site 3	Site 4
Total Species Richness	110	96	71	118	117
Native Species Richness	97	85	56	97	83
% Native	88%	89%	79%	82%	71%
% Native and Non-weedy	68%	73%	52%	60%	45%
Mean Conservatism	3.2	3.3	2.9	3.2	2.5
Floristic Quality Index (FQI)	31.6	30.0	21.6	31.3	22.9
% Wetland Species (FAC to OBL)	79%	82%	75%	75%	48%

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.

A. Predominance of Hydrophytic Vegetation – The performance criterion requires that greater than 50% of the dominant plant species be hydrophytic. Dominant plant species for 2010 are given in Tables 4 through 8. Quantitative sampling results for Sites 1A, 1B, and 3 are presented in Tables 9, 10, and 11. More than 50% of the dominant species are hydrophytic for all sites, except Site 4 [Shrubland (proposed floodplain forest)].

Table 4. Dominant species present at FAS 1907 (IL 127) Site 1A (Wet Meadow).

Dominant Plant Species	Indicator Status	Stratum	Importance Value (IV)
1. <i>Carex tribuloides</i>	FACW+	herb	15.5420
2. <i>Aster vimineus</i>	FACW-	herb	12.9807
3. <i>Echinochloa muricata</i>	OBL	herb	10.4183
4. <i>Carex vulpinoidea</i>	OBL	herb	5.4454
5. <i>Aster ontarionis</i>	FAC	herb	5.4150
6. <i>Polygonum hydropiperoides</i>	OBL	herb	5.3847

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

Table 5. Dominant species present at FAS 1907 (IL 127) Site 1B (Emergent Pond/Wet Meadow).

Dominant Plant Species	Indicator Status	Stratum	Importance Value (IV)
1. <i>Boltonia asteroides</i>	FACW	herb	26.0866
2. <i>Aster vimineus</i>	FACW-	herb	17.8951
3. <i>Echinochloa muricata</i>	OBL	herb	8.8385

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

Table 6. Dominant species present at FAS 1907 (IL 127) Site 2 (Wet Meadow).

Dominant Plant Species	Indicator Status	Stratum
1. <i>Aster vimineus</i>	FACW-	herb
2. <i>Juncus nodatus</i>	OBL	herb

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

Table 7. Dominant species present at FAS 1907 (IL 127) Site 3 (Emergent Pond).

Dominant Plant Species	Indicator Status	Stratum	Importance Value (IV)
1. <i>Boltonia asteroides</i>	FACW	herb	14.2938
2. <i>Juncus nodatus</i>	OBL	herb	13.5921
3. <i>Acorus calamus</i>	OBL	herb	9.3543
4. <i>Aster simplex</i>	FACW	herb	7.0941
5. <i>Aster vimineus</i>	FACW-	herb	6.5917

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

Table 8. Dominant species present at FAS 1907 (IL 127) Site 4 [Shrubland (proposed floodplain forest)]

Dominant Plant Species	Indicator Status	Stratum
1. <i>Quercus bicolor</i>	planted	sapling/shrub
2. <i>Quercus lyrata</i>	planted	sapling/shrub
3. <i>Quercus palustris</i>	planted	sapling/shrub
4. <i>Campsis radicans</i>	FAC	herb
5. <i>Lespedeza cuneata</i>	UPL	herb
6. <i>Poa pratensis</i>	FAC-	herb
7. <i>Solidago canadensis</i>	FACU	herb
8. <i>Sorghum halepense</i>	FACU	herb
9. <i>Tridens flavus</i>	UPL	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 17%

Table 9. FAS 1907 (IL 127) Site 1A wetland monitoring site vegetation sampling data including frequency, cover, and importance value for all species sampled in 2010. Dominant species are in bold.

Species	Indicator	Average Cover	Relative Cover	Frequency	Relative Frequency	Importance Value (IV)
<i>Carex tribuloides</i>	FACW+	13.9423	17.9411	0.8846	13.1429	15.5420
<i>Aster vimineus</i>	FACW-	14.8462	19.1042	0.4615	6.8571	12.9807
<i>Echinochloa muricata</i>	OBL	11.3077	14.5509	0.4231	6.2857	10.4183
<i>Carex vulpinoidea</i>	OBL	3.1346	4.0337	0.4615	6.8571	5.4454
<i>Aster ontarionis</i>	FAC	5.3077	6.8300	0.2692	4.0000	5.4150
<i>Polygonum hydropiperoides</i>	OBL	2.5962	3.3408	0.5000	7.4286	5.3847
<i>Panicum dichotomiflorum</i>	FACW-	2.4423	3.1428	0.3846	5.7143	4.4285
<i>Leersia oryzoides</i>	OBL	4.8077	6.1866	0.0769	1.1429	3.6647
<i>Scirpus atrovirens</i>	OBL	2.4231	3.1180	0.1923	2.8571	2.9876
<i>Ludwigia palustris</i>	OBL	2.1731	2.7963	0.1923	2.8571	2.8267
<i>Juncus effusus</i>	OBL	2.2500	2.8953	0.1538	2.2857	2.5905
<i>Aster simplex</i>	FACW	1.1538	1.4848	0.2308	3.4286	2.4567
<i>Polygonum punctatum</i>	OBL	0.6923	0.8909	0.2692	4.0000	2.4454
<i>Eleocharis obtusa</i>	OBL	1.2692	1.6333	0.1154	1.7143	1.6738
<i>Carex hyalinolepis</i>	OBL	1.5577	2.0045	0.0769	1.1429	1.5737
<i>Panicum clandestinum</i>	FACW	1.1538	1.4848	0.0769	1.1429	1.3138
<i>Scirpus cyperinus</i>	OBL	1.1538	1.4848	0.0769	1.1429	1.3138
<i>Diodia virginiana</i>	FACW	0.1731	0.2227	0.1538	2.2857	1.2542
<i>Juncus interior</i>	FAC+	0.3462	0.4454	0.1154	1.7143	1.0799
<i>Solanum carolinense</i>	FACU-	0.2500	0.3217	0.1154	1.7143	1.0180
<i>Apios americana</i>	FACW	0.6923	0.8909	0.0769	1.1429	1.0169
<i>Boltonia asteroides</i>	FACW	0.6923	0.8909	0.0769	1.1429	1.0169
<i>Andropogon virginicus</i>	FAC-	0.6923	0.8909	0.0769	1.1429	1.0169
<i>Campsis radicans</i>	FAC	0.1538	0.1980	0.1154	1.7143	0.9561
<i>Ludwigia alternifolia</i>	OBL	0.2308	0.2970	0.0769	1.1429	0.7199
<i>Panicum implicatum</i>	FAC	0.1346	0.1732	0.0769	1.1429	0.6580
<i>Typha angustifolia</i>	OBL	0.1346	0.1732	0.0769	1.1429	0.6580
<i>Cynanchium laeve</i>	FAC	0.1346	0.1732	0.0769	1.1429	0.6580
<i>Toxicodendron radicans</i>	FAC+	0.1154	0.1485	0.0385	0.5714	0.3600
<i>Acer saccharinum</i>	FACW	0.1154	0.1485	0.0385	0.5714	0.3600
<i>Stachys tenuifolia</i>	OBL	0.1154	0.1485	0.0385	0.5714	0.3600
<i>Solidago canadensis</i>	FACU	0.1154	0.1485	0.0385	0.5714	0.3600
<i>Quercus palustris</i>	FACW	0.1154	0.1485	0.0385	0.5714	0.3600
<i>Carex squarrosa</i>	OBL	0.1154	0.1485	0.0385	0.5714	0.3600
<i>Polygonum pensylvanicum</i>	FACW+	0.1154	0.1485	0.0385	0.5714	0.3600
<i>Carex lurida</i>	OBL	0.1154	0.1485	0.0385	0.5714	0.3600
<i>Polygonum hydropiper</i>	OBL	0.1154	0.1485	0.0385	0.5714	0.3600
<i>Ludwigia polycarpa</i>	OBL	0.1154	0.1485	0.0385	0.5714	0.3600
<i>Ulmus alata</i>	FACU	0.1154	0.1485	0.0385	0.5714	0.3600
<i>Acalypha rhomboidea</i>	FACU	0.1154	0.1485	0.0385	0.5714	0.3600
<i>Penthorum sedoides</i>	OBL	0.1154	0.1485	0.0385	0.5714	0.3600
<i>Ulmus americana</i>	FACW-	0.1154	0.1485	0.0385	0.5714	0.3600
<i>Carex caroliniana</i>	FAC	0.1154	0.1485	0.0385	0.5714	0.3600
Others (7 taxa)		0.8077	1.0393	0.2692	4.0000	2.5197
Bare Ground		77.7115	100.0000	6.7308	100.0000	100.0000
Litter		13.8810				
		55.1190				

Table 10. FAS 1907 (IL 127) Site 1B wetland monitoring site vegetation sampling data including frequency, cover, and importance value for all species sampled in 2010. Dominants are in bold.

Species	Indicator	Average Cover	Relative Cover	Frequency	Relative Frequency	Importance Value (IV)
<i>Boltonia asteroides</i>	FACW	28.5000	35.7990	0.7778	16.3743	26.0866
<i>Aster vimineus</i>	FACW-	17.3194	21.7551	0.6667	14.0351	17.8951
<i>Echinochloa muricata</i>	OBL	8.4861	10.6595	0.3333	7.0175	8.8385
<i>Aster ontarionis</i>	FAC	7.5139	9.4382	0.3056	6.4327	7.9355
<i>Eleocharis obtusa</i>	OBL	6.8889	8.6532	0.3056	6.4327	7.5430
<i>Polygonum hydropiperoides</i>	OBL	0.7083	0.8897	0.4444	9.3567	5.1232
<i>Aster simplex</i>	FACW	2.3750	2.9833	0.2500	5.2632	4.1232
<i>Panicum rigidulum</i>	FACW	2.1250	2.6692	0.1667	3.5088	3.0890
<i>Diodia virginiana</i>	FACW	0.2500	0.3140	0.2222	4.6784	2.4962
<i>Carex tribuloides</i>	FACW+	0.6944	0.8723	0.1667	3.5088	2.1905
<i>Acorus calamus</i>	OBL	0.8611	1.0816	0.1111	2.3392	1.7104
<i>Lespedeza cuneata</i>	NI	0.3333	0.4187	0.1111	2.3392	1.3789
<i>Carex hyalinolepis</i>	OBL	0.8333	1.0468	0.0556	1.1696	1.1082
<i>Juncus effusus</i>	OBL	0.8333	1.0468	0.0556	1.1696	1.1082
<i>Liquidambar styraciflua</i>	FACW	0.1111	0.1396	0.0833	1.7544	0.9470
<i>Ludwigia palustris</i>	OBL	0.1111	0.1396	0.0833	1.7544	0.9470
<i>Panicum dichotomiflorum</i>	FACW-	0.0417	0.0523	0.0833	1.7544	0.9034
<i>Carex vulpinoidea</i>	OBL	0.5000	0.6281	0.0556	1.1696	0.8988
<i>Leersia oryzoides</i>	OBL	0.4306	0.5408	0.0556	1.1696	0.8552
<i>Campsis radicans</i>	FAC	0.1667	0.2094	0.0556	1.1696	0.6895
<i>Eclipta prostrata</i>	FACW	0.0972	0.1221	0.0556	1.1696	0.6459
<i>Fraxinus pennsylvanica</i>	FACW	0.0833	0.1047	0.0278	0.5848	0.3447
<i>Juncus nodatus</i>	OBL	0.0833	0.1047	0.0278	0.5848	0.3447
<i>Acer rubrum</i>	FAC	0.0833	0.1047	0.0278	0.5848	0.3447
<i>Ulmus americana</i>	FACW-	0.0833	0.1047	0.0278	0.5848	0.3447
<i>Panicum implicatum</i>	FAC	0.0139	0.0174	0.0278	0.5848	0.3011
<i>Iva annua</i>	FAC	0.0139	0.0174	0.0278	0.5848	0.3011
<i>Polygonum hydropiper</i>	OBL	0.0139	0.0174	0.0278	0.5848	0.3011
<i>Ipomaea lacunosa</i>	FACW	0.0139	0.0174	0.0278	0.5848	0.3011
<i>Ambrosia artemisiifolia</i>	FACU	0.0139	0.0174	0.0278	0.5848	0.3011
<i>Xanthium strumarium</i>	FAC	0.0139	0.0174	0.0278	0.5848	0.3011
<i>Rumex crispus</i>	FAC+	0.0139	0.0174	0.0278	0.5848	0.3011
		79.6111	100.0000	4.7500	100.0000	100.0000
Bare Ground		18.0417				
Litter		38.1944				

Table 11. FAS 1907 (IL 127) Site 3 wetland monitoring site vegetation sampling data including frequency, cover, and importance value for all species sampled in 2010. Dominants are in bold.

Species	Indicator	Average Cover	Relative Cover	Frequency	Relative Frequency	Importance Value (IV)
<i>Boltonia asteroides</i>	FACW	6.8750	16.2653	0.9286	12.3223	14.2938
<i>Juncus nodatus</i>	OBL	6.4821	15.3359	0.8929	11.8483	13.5921
<i>Acorus calamus</i>	OBL	5.3036	12.5475	0.4643	6.1611	9.3543
<i>Aster simplex</i>	FACW	3.3929	8.0270	0.4643	6.1611	7.0941
<i>Aster vimineus</i>	FACW-	2.7679	6.5484	0.5000	6.6351	6.5917
<i>Ludwigia palustris</i>	OBL	3.1964	7.5623	0.2857	3.7915	5.6769
<i>Phyla lanceolata</i>	OBL	2.8929	6.8441	0.2500	3.3175	5.0808
<i>Diodia virginiana</i>	FACW	2.0357	4.8162	0.3929	5.2133	5.0147
<i>Panicum dichotomiflorum</i>	FACW-	0.8929	2.1124	0.3929	5.2133	3.6628
<i>Polygonum hydropiperoides</i>	OBL	0.9464	2.2391	0.3214	4.2654	3.2523
<i>Xanthium strumarium</i>	FAC	1.3393	3.1686	0.2500	3.3175	3.2431
<i>Pontederia cordata</i>	OBL	1.3929	3.2953	0.1429	1.8957	2.5955
<i>Scirpus cyperinus</i>	OBL	0.8571	2.0279	0.1429	1.8957	1.9618
<i>Ludwigia peploides</i>	OBL	0.4464	1.0562	0.1786	2.3697	1.7129
<i>Iva annua</i>	FAC	0.3571	0.8450	0.1786	2.3697	1.6073
<i>Carex tribuloides</i>	FACW+	0.2679	0.6337	0.1786	2.3697	1.5017
<i>Sida spinosa</i>	FACU	0.2679	0.6337	0.1786	2.3697	1.5017
<i>Echinochloa muricata</i>	OBL	0.2321	0.5492	0.1071	1.4218	0.9855
<i>Aster ontarionis</i>	FAC	0.2321	0.5492	0.1071	1.4218	0.9855
<i>Leersia oryzoides</i>	OBL	0.1429	0.3380	0.1071	1.4218	0.8799
<i>Eclipta prostrata</i>	FACW	0.1429	0.3380	0.1071	1.4218	0.8799
<i>Scirpus atrovirens</i>	OBL	0.5357	1.2674	0.0357	0.4739	0.8707
<i>Ipomaea hederacea</i>	FAC	0.0536	0.1267	0.1071	1.4218	0.7743
<i>Cyperus esculentus</i>	FACW	0.1250	0.2957	0.0714	0.9479	0.6218
<i>Rumex crispus</i>	FAC+	0.1250	0.2957	0.0714	0.9479	0.6218
<i>Carex vulpinoidea</i>	OBL	0.1250	0.2957	0.0714	0.9479	0.6218
<i>Solanum carolinense</i>	FACU-	0.1071	0.2535	0.0357	0.4739	0.3637
<i>Campsis radicans</i>	FAC	0.1071	0.2535	0.0357	0.4739	0.3637
<i>Chamaesyce humistrata</i>	FACW	0.1071	0.2535	0.0357	0.4739	0.3637
<i>Lespedeza cuneata</i>	NI	0.1071	0.2535	0.0357	0.4739	0.3637
<i>Aster pilosus</i>	FACU+	0.1071	0.2535	0.0357	0.4739	0.3637
<i>Juncus brachycarpus</i>	FACW	0.1071	0.2535	0.0357	0.4739	0.3637
<i>Senecio glabellus</i>	OBL	0.0179	0.0422	0.0357	0.4739	0.2581
<i>Polygonum punctatum</i>	OBL	0.0179	0.0422	0.0357	0.4739	0.2581
<i>Daucus carota</i>	UPL	0.0179	0.0422	0.0357	0.4739	0.2581
<i>Lathyrus latifolius</i>	UPL	0.0179	0.0422	0.0357	0.4739	0.2581
<i>Bromus tectorum</i>	UPL	0.0179	0.0422	0.0357	0.4739	0.2581
<i>Celtis occidentalis</i>	FAC-	0.0179	0.0422	0.0357	0.4739	0.2581
<i>Polygonum pensylvanicum</i>	FACW+	0.0179	0.0422	0.0357	0.4739	0.2581
<i>Fraxinus pennsylvanica</i>	FACW	0.0179	0.0422	0.0357	0.4739	0.2581
<i>Rorippa islandica/sessiliflora</i>	OBL	0.0179	0.0422	0.0357	0.4739	0.2581
<i>Ricciocarpus natans</i> (liverwort)	OBL	0.0179	0.0422	0.0357	0.4739	0.2581
<i>Eupatorium serotinum</i>	FAC+	0.0179	0.0422	0.0357	0.4739	0.2581
		42.2679	100.0000	7.5357	100.0000	100.0000
Bare Ground		8.5690				
Litter		56.6379				

B. Presence of Hydric Soils – The performance criterion requires that hydric soil characteristics be present, or conditions favorable for hydric soil formation should persist. INHS personnel examined soil cores for field indicators to determine the presence or absence of hydric soils as described in the *Corps of Engineers Wetland Delineation Manual* (Environmental, 1987) and the *Field Indicators of Hydric Soils in the United States* (USDA 2003). The NRCS (Natural Resource Conservation Service) had mapped the entire site as hydric soils. After conducting a field investigation, the first three sites that received some excavation appeared to be hydric. The fourth site, which is not considered part of the wetland acreage, but as a buffer, is predominately non-hydric. Hydric soil areas did seem to expand between sites 2 and 3. Following is a soil description of a typical pedon for each site.

Table 12. Site 1A (Wet Meadow) – Okaw silt loam.

<u>Hor- izon</u>	<u>Depth (in)</u>	<u>Matrix Color</u>	<u>Concre- -tions</u>	<u>Iron Masses</u>	<u>Pore linings</u>	<u>Iron Deplet.</u>	<u>Clay Deplet.</u>	<u>Tex- -ture</u>	<u>Struct- -ure</u>
	0-3	10YR 5/2, N 5/		FFD 10YR 5/4				sil	gr
	3-14	2.5Y 6/1 2.5Y 6/2		MCP 7.5YR 5/8				sicl	pl
	14-23	2.5Y 6/2		CMP 7.5YR 5/8 CMP 10YR 5/6				sicl	pr
	23-34	2.5Y 6/2		MCP 7.5YR 5/8 PMP 10YR 5/6				sicl	pr

Table 13. Site 1B (Emergent Pond) – Okaw silt loam.

<u>Hor- izon</u>	<u>Depth (in)</u>	<u>Matrix Color</u>	<u>Concre- -tions</u>	<u>Iron Masses</u>	<u>Pore linings</u>	<u>Iron Deplet.</u>	<u>Clay Deplet.</u>	<u>Tex- -ture</u>	<u>Struct- -ure</u>
	0-3	2.5Y 5/1 5Y 6/1 and 7/1 10YR 5/2		CMP 7.5YR 5/8 CMP 7.5YR 5/6	CM 7.5YR 5/8			sicl	gr
	3-6	2.5Y 5/1 2.5Y 6/1		CMP 7.5YR 5/6 FFP 7.5YR 5/8	CM 7.5YR 5/8			sicl	bl
	6-28	2.5Y 6/2 2.5Y 6/1		FCD 7.5YR 4/6	FM 7.5YR 5/3			sic	pr
	28-38	2.5Y 6/2		MMP 10YR 5/4	FM 7.5YR 5/3			sic	pr

Table 14. Site 2 (Marsh/Wet Meadow) – Cape silty clay loam.

<u>Hor- izon</u>	<u>Depth (in)</u>	<u>Matrix Color</u>	<u>Concre- -tions</u>	<u>Iron Masses</u>	<u>Pore linings</u>	<u>Iron Deplet.</u>	<u>Clay Deplet.</u>	<u>Tex- -ture</u>	<u>Structure</u>
	0-2	2.5Y 6/2		FMP 10YR 5/6 and 5/8				sicl	bl
	2-9	2.5Y 6/2 2.5Y 6/1 5Y 7/1		FMP 10YR 5/6 FMP 7.5YR 5/8				sic	pr
	9-20	2.5Y 5/2		FFP 10YR 5/6 CMP 7.5YR 5/8				sic	pr
	20-	2.5Y 6/2		MMP 10YR 5/6 FFP 7.5YR 5/8				sic	pr

Table 15. Site 3 (Emergent Pond w/fringe) – Cape silty clay loam.

<u>Hor- izon</u>	<u>Depth (in)</u>	<u>Matrix Color</u>	<u>Concre- -tions</u>	<u>Iron Masses</u>	<u>Pore linings</u>	<u>Iron Deplet.</u>	<u>Clay Deplet.</u>	<u>Tex- -ture</u>	<u>Structure</u>
	0-6	2/5Y 5/1 10Y 2.5/	10YR 3/1	CMP 7.5YR 5/8				sil	gr
	6-15	2.5Y 6/2	10YR 3/1	FMP 7.5YR 5/4 CMP 7.5YR 5/8	7.5YR 5/8			sicl	bl
	15-22	2.5Y 6/2	10YR 3/1	FMD 10YR 5/4 FMP 7.5YR 5/8	7.5YR 5/8			sic	pr
	22-36	2.5Y 6/2		MCD 10YR 5/4 FMP 7.5YR 5/8				sic	pr

Table 16. Site 4 (Shrubland; proposed floodplain forest) – Non hydric

<u>Hor- izon</u>	<u>Depth (in)</u>	<u>Matrix Color</u>	<u>Concre- -tions</u>	<u>Iron Masses</u>	<u>Pore linings</u>	<u>Iron Deplet.</u>	<u>Clay Deplet.</u>	<u>Tex- -ture</u>	<u>Structure</u>
	0-4	10YR 4/2						sil	gr
	4-10	10YR 4/3	FM 10YR 2/1	CMP 10YR 5/8				sic	pl
	10-21	2.5Y 5/3 2.5Y 6/2 2.5Y 6/3 10YR 5/4	FM 10YR 2/1	FMP 7.5YR 5/8 FFD 10YR 5/4				sic	pr
	21-36	2.5Y 5/3 2.5Y 6/2 10YR 6/2	CM 10YR 2/1	MCP 7.5YR 4/6 FMP 7.5YR 5/8				sic	pr

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 November 2003. The area exhibiting wetland hydrology has fluctuated annually; however, the actual delineated wetland area seems to be somewhere between the area ISGS found satisfying the wetland hydrology criterion for 5% of the growing season and the area satisfying the wetland hydrology criterion for 12.5% of the growing season. Detailed results of annual hydrology monitoring is available in the ISGS Annual Reports, 2004 to 2010 (Pociask and Shofner 2004; Pociask and Shofner 2005; Pociask 2006; Pociask 2007; Pociask 2008; Pociask 2009; Miner et al. 2010; and Pociask and Campbell 2010).

Their findings for 2010 indicate that 2.2 ha (5.3 ac) out of a total site area of approximately 6.3 ha (15.6 ac) satisfied the wetland hydrology criterion for greater than 5% of the growing season while only 0.9 ha (2.1 ac) conclusively satisfied the wetland hydrology criterion for 12.5% of the growing season (Pociask and Campbell 2010); Figure 2. Annual precipitation was 97% of normal during the 2010 monitoring period.

It is important to note that the area exhibiting wetland hydrology is different than the area of created wetland (1.24 ha (3.07 ac); Figure 3). Although a larger area has satisfied the wetland hydrology criterion for 5% of the growing season in recent years, this area does not appear to be developing hydrophytic vegetation. In fact, the vegetation in most of the additional area has become dominated by perennial non-hydrophytes like *Lespedeza cuneata* (sericea lespedeza) and *Solidago canadensis* (Canada goldenrod). It is apparent that this area will probably never develop dominant hydrophytic vegetation.

During visits to the mitigation area, the following indicators of wetland hydrology were observed: surface water, high water table, saturation, sediment deposits, drift deposits, algal mat or crust, sparsely vegetated concave surface, water-stained leaves, surface soil cracks, and crayfish burrows.

* 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).

Tamms Wetland Mitigation Site (FAS 1907)

Estimated Areal Extent of 2010 Wetland Hydrology
September 1, 2009 through August 31, 2010

map based on USGS digital orthophotograph Mill Creek SE quarter quadrangle
produced from 3/31/2005 aerial photography (ISGS 2006).

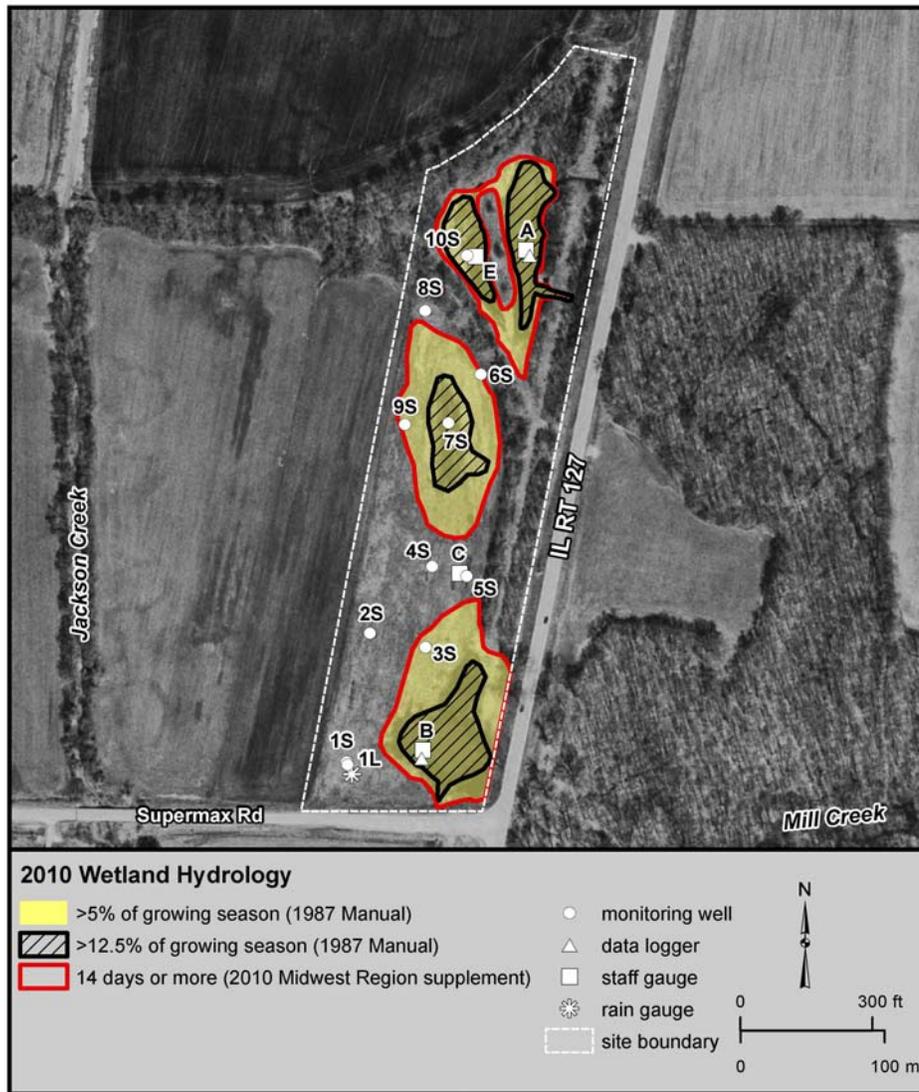
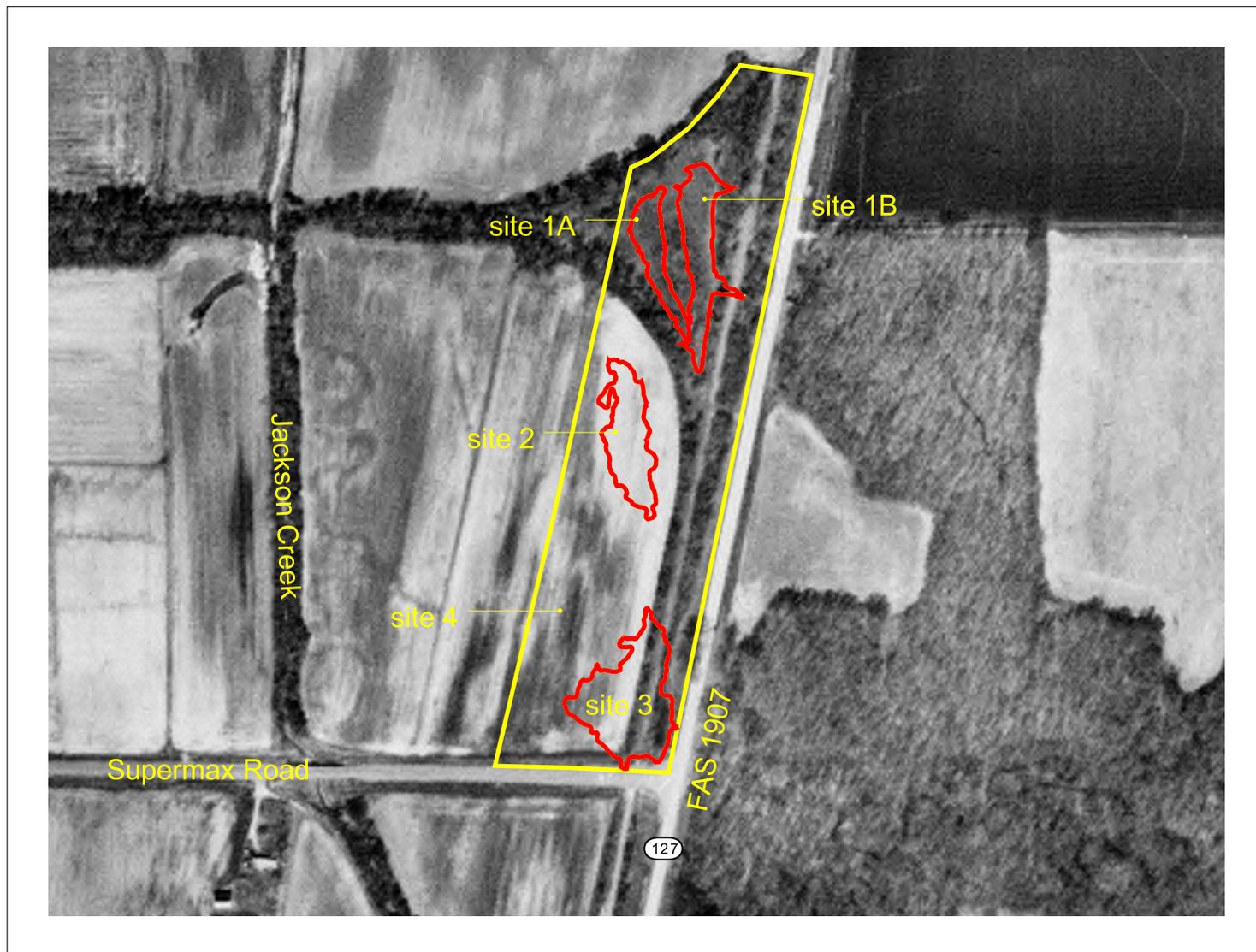


Figure 2. 2010 aerial extent of wetland hydrology for FAS 1907 (IL 127) wetland monitoring site (prepared by ISGS; Pociask 2010; Miner et al. 2010). Note that this area differs significantly from Figure 3 which depicts the aerial extent of the three created wetland sites.

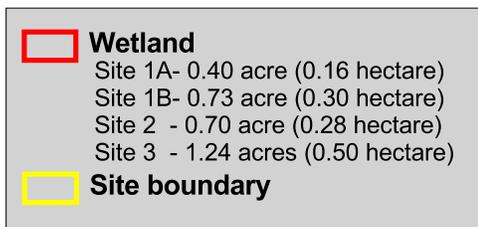
FAS 1907 (IL Route 127) Tamms Monitoring Site Alexander County, Illinois



0 400 800 Feet

scale 1:4800
1 inch=400 ft

0 100 200 Meters



12/2010

Figure 3. Estimated aerial extent of the created wetland sites at the FAS 1907 (IL 127) Tamms Wetland Monitoring Site, Alexander County, Illinois.

Project Goal #2: A native, non-weedy, emergent wetland community will be created (Sites 1, 2, and 3).

Initially five emergent species (*Acorus calamus*, *Iris shrevei*, *Pontederia cordata*, *Sagittaria latifolia*, and *Scirpus acutus*) were to be planted at the FAS 1907 (IL 127) mitigation site (IDOT Wetland Construction Plan). Subsequently *Juncus effusus* was also planted at the mitigation area. In 2007, some of the *Iris* sp. present at the site were observed flowering and determined to be of horticultural origin and not the native *Iris shrevei* that was supposed to have been planted. Numerous live, healthy individuals of all species, except *Scirpus acutus* and *Sagittaria latifolia*, were observed in 2010 (67% of planted emergents were observed in a live, healthy condition). This part of the performance criteria is satisfied in 2010.

Three emergent wetland sites (Sites 1A, 1B, 2, and 3) have been created at the FAS 1907 (IL 127) mitigation area. All three sites had a high percentage of native species (Site 1A = 88%, Site 1B = 89%, Site 2 = 79%, Site 3 = 82%; Table 3). Furthermore, percentages of native and non-weedy species were at acceptable levels (Site 1A = 68%; Site 1B = 73%; Site 2 = 52%; Site 3 = 60%). All three sites satisfy the second part of the performance criteria for project goal #2.

Part C of the performance criteria for project goal #2 states that no dominant species may be a non-native species. All wetland sites were dominated by native species (Tables 4-6, 9-11). Part C of the performance criteria for project goal #2 is satisfied for Sites 1A, 1B, 2 and 3 in 2010.

Project Goal #3: A floodplain forest wetland community will be created (Site 4).

All planted trees within FAS 1907 (IL 127) wetland mitigation area were located, identified and their condition was assessed. Initially, 201 tree saplings were planted at the Tamms mitigation area. An additional 200 tree seedlings were planted on 17 May 2010. These seedlings were planted to compensate for initial low tree survival. Although the additional tree seedlings exhibited extremely poor survival, with only 39 of the new seedlings found alive, there was enough seedling survival to exceed the required 150 seedlings/saplings or 75% survivorship threshold. In 2010, 174 tree seedlings/saplings were found alive (14 *Fraxinus pennsylvanica*, 3 *Liquidambar styraciflua*, 12 *Platanus occidentalis*, 39 *Quercus bicolor*, 36 *Q. lyrata*, 41 *Q. palustris*, and 31 *Taxodium distichum*). This site, although it is not considered to be a wetland, is still valuable as a buffer area around Sites 2 and 3. The performance criterion for project goal #3 has been satisfied.

Summary and Recommendations

Table 17. Summary table of FAS 1907 (IL 127) Project Goal success.

Project Goal #1 - Create jurisdictional wetlands.(Sites 1-4)	
Performance Criterion A (hydrophytic vegetation)	Satisfied (Sites 1-3), Unsatisfied (Site 4)
Performance Criterion B (hydric soils)	Satisfied (Sites 1-3), Unsatisfied (Site 4)
Performance Criterion C (wetland hydrology)	Satisfied (Sites 1-3), Unsatisfied (Site 4)
Required Area of Wetland Creation – Create 1.750 ha (4.325 ac)	Unsatisfied (only 1.24 ha (3.07 ac) created)
Project Goal #2 – Create native, non-weedy emergent wetlands (Sites 1-3)	
Performance Criterion A (50% planted emergent survival)	Satisfied (Sites 1-3)
Performance Criterion B (50% native, non-weedy species)	Satisfied (Sites 1-3)
Performance Criterion C (No non-native dominants)	Satisfied (Sites 1-3)
Project Goal #3 – Create a floodplain forest wetland community (Site 4)	
Performance Criterion [> 150 seedlings/saplings (75% tree survival)]	Unsatisfied (Site 4 is not a wetland) Satisfied (Site 4)

Project goal #1 was satisfied for all sites except Site 4. Site 4, although not a wetland, is still valuable as a buffer for the created emergent wetlands (Sites 2 and 3) at the south end of the mitigation area. Likewise, project goal #2 was met by all four created wetland sites (Sites 1A, 1B, 2 and 3).

At this stage of monitoring, planted herbaceous species have survived satisfactorily and with the recent addition of replacement tree seedlings the tree survivorship is currently above the acceptable level of 150 tree seedlings/saplings or 75% survival. While the initial planting of *Fraxinus pennsylvanica*, green ash (82%), *Quercus palustris*, pin oak (100%), *Q. bicolor*, swamp white oak (79%), and *Q. lyrata*, overcup oak (76%), had acceptable tree survival, *Platanus occidentalis*, sycamore (71%), *Liquidambar styraciflua*, sweet gum (6%), and *Taxodium distichum*, bald cypress (34%), were all below the required 75% threshold for tree survival. Despite poor survival (only 39 alive out of 200 planted seedlings; 20%) exhibited by the replacement seedlings, enough live individuals were observed to exceed the the acceptable level of 150 tree seedlings/saplings or 75% survival. If additional replanting of tree seedlings/saplings is necessary other tree species to consider are: *Quercus michauxii* (basket oak), *Quercus pagoda* (cherrybark oak), *Carya laciniosa* (kingnut hickory), and *Nyssa sylvatica* (black gum).

Floristic quality of all emergent sites is very promising with all created emergent wetland sites being highly diverse. In Site 1A, 110 overall species were recorded including 97 native species. Site 1B had 96 overall species recorded with 85 natives, Site 2 had 71 total species with 56 natives and Site 3 had 118 overall species recorded with 97 of them being native. These values are incredibly high for sites of such small size. FQI scores for all of the created wetland sites at FAS 1907 (IL 127) were above 20 (range from 21.6 at Site 2 to a high of 31.6 at Site 1A). FQI scores in this range are indicative of good natural quality and all of these sites should be considered environmental assets.

Total area of the created wetlands at the Tamms site remains a concern. In 2010, we determined the area of created wetlands at FAS 1907 (IL 127) to be approximately 1.24 ha (3.07 ac) [Figure 3]. The objective for project goal #1 was to create 1.750 ha (4.325 ac) of jurisdictional wetland. Although a larger area has satisfied the wetland hydrology criterion (at least for 5% of the

growing season) and hydric soils criterion in recent years, this area does not appear to be developing hydrophytic vegetation. In fact, the vegetation in most of the additional area has become dominated by perennial non-hydrophytes like *Lespedeza cuneata* (sericea lespedeza) and *Solidago canadensis* (Canada goldenrod). It is apparent that this area will probably never develop dominant hydrophytic vegetation. Additional mitigation area should be searched for and/or the proposed wetland hydrology alterations should be completed if this requirement is to be met.

Dominant species and overall species composition of the three created emergent wetlands are on course for good development. All dominants in the created wetlands are native at this time and all four emergent wetlands are represented by greater than 50% native and non-weedy species. Nonetheless, many aggressive non-native species are present within the mitigation area. These species include: *Lespedeza cuneata* (sericea lespedeza), *Lonicera japonica* (Japanese honeysuckle), *Melilotus alba* (white sweet clover), *Melilotus officinalis* (yellow sweet clover), *Morus alba* (white mulberry), *Phalaris arundinacea* (reed canary grass), *Phragmites australis* (common reed), *Pyrus calleryana* (Bradford pear), *Rosa multiflora* (multiflora rose), *Sorghum halepense* (Johnson grass), *Typha angustifolia* (narrow-leaf cattail) and *Ulmus pumila* (Siberian elm).

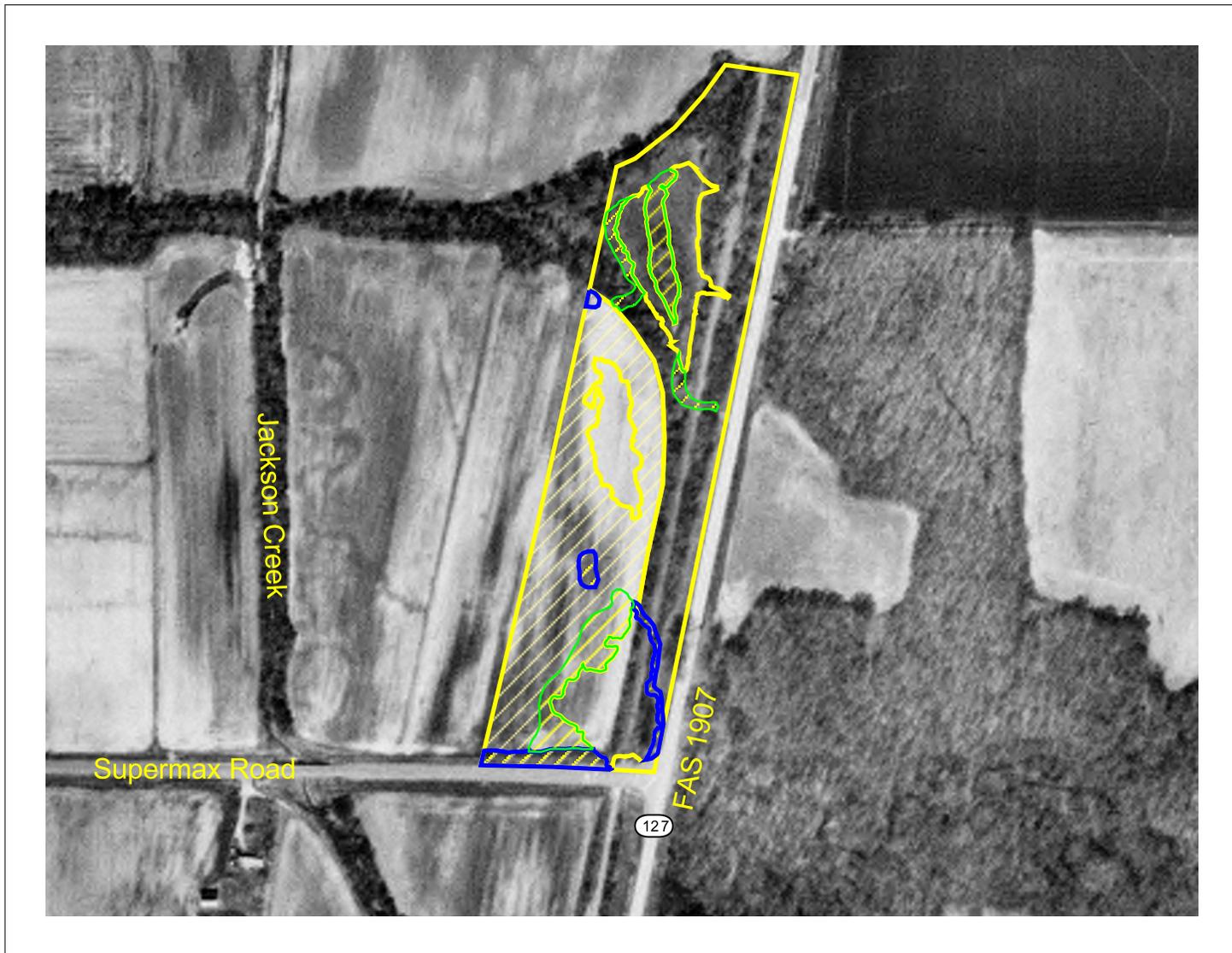
Lespedeza cuneata (sericea lespedeza) continues to be very abundant in upland portions of the mitigation area, especially around the wetland borders. In fact, this weed is now considered a dominant species for the upland buffer area (Site 4). This species is difficult to control, especially after it has developed an extensive seed bank. Burning followed by mowing and finally an herbicide treatment was shown to be effective in Kansas (Phipps and Victory 2002). In 2010, the local IDOT district attempted control measures to limit the spread of this species. In spring, a prescribed burn was conducted throughout the south part of the mitigation area. Research has shown that prescribed burns encourage increased germination of sericea lespedeza seeds so it is imperative that this treatment be followed up with mowing and herbicide treatments (Phipps and Victory 2002). A followup mowing treatment was performed on the site in late summer; however, it is not known whether this was followed by an herbicide treatment. This aggressive species should continue to be treated if floristic quality of the buffer areas is a concern. Since sericea lespedeza is found along the wetland margins and in the upland buffer area any future mowing treatments should be limited to this area of the mitigation site (Figure 4).

Sorghum halepense (Johnson grass) has spread significantly since the 2009 growing season. It has become a dominant species within the upland buffer area (Site 4), being especially abundant along the roadside and field edges. Scattered large patches are also present throughout Site 4. The Illinois Nature Preserves Commission Vegetation Management Guidelines provides treatment suggestions for Johnson grass (Lindsay 2004). Lindsay (2004) suggests spraying the foliage with 2% Roundup (a formulation of glyphosphate) during June in hopes of knocking the plant back just prior to seed maturation. Also, steps should be taken to eliminate potential harm to non-target species, since Roundup is a nonselective herbicide.

Phalaris arundinacea patches should also be treated before this highly invasive species spreads throughout the created wetland sites. At this point, it remains most common in small patches within the upland portion (Site 4) of the mitigation area; however, it is already present within

two of the created wetland sites (Sites 1A and 2). If herbicide application is conducted, early spring application of Rodeo or Dalapon is recommended. Rodeo is a special glyphosate formulation for use in wetlands and near water courses. Dalapon, also approved for use in aquatic areas, is a selective herbicide and plant growth regulator used to control specific annual and perennial grasses and other monocots (Smith 2003). The abundance of all of these aggressive, persistent weeds will continue to be monitored and future management recommendations will be made.

FAS 1907 (IL Route 127) Tamms Monitoring Site Alexander County, Illinois



0 400 800 Feet

scale 1:4800
1 inch=400 ft

0 100 200 Meters

-  Sorghum halepense-high density area (Johnson grass)
-  Lespedeza cuneata-high density area (Sericea lespedeza)
-  Invasives treatment area



12/2010

Figure 4. Recommended invasive species treatment area at the FAS 1907 (IL 127) Tamms Wetland Monitoring Site, Alexander County, Illinois.

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**Appendix 1. Wetland determination forms for FAS 1907 (IL 127),
Tamms Monitoring Site, Alexander County, Illinois.**

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1A (page 1 of 2)

Field Investigators: Marcum, Keene, and Ketzner

Date: 13 May, 21 June and 28 September 2010

Project Name: FAS 1907 (IL 127)

State: Illinois

County: Alexander

Site Name: Wet Meadow

Legal Description: NE1/4, NE1/4, NW1/4 and NW1/4, NW1/4, NE1/4, Section 31, T. 14 S., R. 1 W.; and SW1/4, SW1/4, SE1/4, Section 30, T. 14 S., R. 1 W.

Location: This wet meadow is located from 304.8 m (1000 ft) to 449.6 m (1475 ft) north of Supermax Rd. and between 45.7 m (150 ft) to 114 m (375 ft) west of IL 27.

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

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Importance Value (IV)*
1. <i>Carex tribuloides</i>	FACW+	herb	15.5420
2. <i>Aster vimineus</i>	FACW-	herb	12.9807
3. <i>Echinochloa muricata</i>	OBL	herb	10.4183
4. <i>Carex vulpinoidea</i>	OBL	herb	5.4454
5. <i>Aster ontarionis</i>	FAC	herb	5.4150
6. <i>Polygonum hydropiperoides</i>	OBL	herb	5.3847

*based on quantitative vegetation sampling; Table 9

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: Okaw silt loam

On Alexander County hydric soils list? Yes: X No:

Is the soil a histosol? Yes: No: X Histic epipedon present? Yes: No: X

Redox concentrations: Yes: X No: Redox depletions: Yes: X No:

Matrix color: 5Y 6/1 and 7/1

Other indicators: This soil is found in a depressional area.

Note: At least one foot of the topsoil has been excavated at this site in order to lower this area.

Hydric soils: Yes: X No:

Rationale: The Natural Resources Conservation Service classifies Okaw silt loam as having aquic conditions. This soil has iron masses and an iron depleted matrix. Additionally, this soil meets the NRCS hydric soil indicator F3. These characteristics are evidence of a hydric soil.

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1A (page 2 of 2)

Field Investigators: Marcum, Keene, and Ketzner

Date: 13 May, 21 June and 28 September 2010

Project Name: FAS 1907 (IL 127)

State: Illinois

County: Alexander

Site Name: Wet Meadow

Legal Description: NE1/4, NE1/4, NW1/4 and NW1/4, NW1/4, NE1/4, Section 31, T. 14 S., R. 1 W.; and SW1/4, SW1/4, SE1/4, Section 30, T. 14 S., R. 1 W.

Location: This wet meadow is located from 304.8 m (1000 ft) to 449.6 m (1475 ft) north of Supermax Rd. and between 45.7 m (150 ft) to 114 m (375 ft) west of IL 27.

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: NA

Depth to saturated soil: 0 to 1.02 m (0 to 40 in)

Overview of hydrological flow through the system: This site is located in a depression surrounded by higher ground on all sides. Water enters this site via precipitation, sheet flow from surrounding higher ground, and from occasional overflow of the adjacent wetland paralleling IL 127. Water leaves the site primarily via evapotranspiration and slowly through soil infiltration.

Size of watershed: Less than 2.59 km² (1 mi²).

Other field evidence observed: This site has been excavated to hold water for longer periods. Bare areas indicating ponded water, sediment deposits, drift, algal mats, mud cracks, and blackened leaves have been observed at this site.

Wetland hydrology: Yes: X No:

Rationale: The ISGS hydrology monitoring data (Miner et al. 2010; Pociask and Campbell 2010) show this site satisfies the wetland hydrology criterion.

DETERMINATION AND RATIONALE:

Is the site a wetland?

Yes: X No:

Rationale for decision:

Dominant hydrophytic vegetation, hydric soils, and wetland hydrology are present; therefore, this site is a wetland. The NWI does not code this site as a wetland.

Determined by: Paul Marcum (vegetation, hydrology and GPS)

Dave Ketzner (vegetation and hydrology)

Dennis Keene (soils and hydrology)

Brad Zercher (GIS)

Geoff Pociask (ISGS; hydrology)

Illinois Natural History Survey

Division of Ecology and Conservation Science

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Champaign, Illinois 61820

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ROUTINE ON-SITE WETLAND DETERMINATION

Site 1B (page 2 of 2)

Field Investigators: Marcum, Keene, and Ketzner

Date: 13 May, 21 June, and 27 September 2010 **Project Name:** FAS 1907 (IL 127)

State: Illinois

County: Alexander

Site Name: Emergent Pond/Wet Meadow

Legal Description: NE1/4, NE1/4, NW1/4 and NW1/4, NW1/4, NE1/4, Section 31, T. 14 S., R. 1 W.; and SW1/4, SW1/4, SE1/4, Section 30, T. 14 S., R. 1 W.

Location: This emergent pond is located from 304.8 m (1000 ft) to 449.6 m (1475 ft) north of Supermax Rd. and between 45.7 m (150 ft) to 114 m (375 ft) west of IL 27.

HYDROLOGY

Inundated: Yes: X (in part) No: Depth of standing water: up to ~ 5.1 cm (2 in)

Depth to saturated soil: 0 to 1.02 m (0 to 40 in)

Overview of hydrological flow through the system: This site is located in a depression surrounded by higher ground on all sides. Water enters this site via precipitation and sheetflow from surrounding higher ground. Additional transfer of water occurs through a low area between this site and a long narrow wetland along IL Route 127. Water leaves the site primarily via evapotranspiration and slowly through soil infiltration.

Size of watershed: Less than 2.59 km² (1 mi²).

Other field evidence observed: This site has been excavated to hold water for longer periods. Areas of inundation, sediment deposits, drift, bare areas indicating ponded water, algal mats, mud cracks, and blackened leaves have been observed at this site.

Wetland hydrology: Yes: X No:

Rationale: The ISGS hydrology monitoring data (Miner et al. 2010; Pociask and Campbell 2010) show this site satisfies the wetland hydrology criterion.

DETERMINATION AND RATIONALE:

Is the site a wetland?
Rationale for decision:

Yes: X No:

Dominant hydrophytic vegetation, hydric soils, and wetland hydrology are present; therefore, this site is a wetland. The NWI does not code this site as a wetland.

Determined by: Paul Marcum (vegetation, hydrology and GPS)
 Dave Ketzner (vegetation and hydrology)
 Dennis Keene (soils and hydrology)
 Brad Zercher (GIS)
 Geoff Pociask (ISGS, hydrology)
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 Division of Ecology and Conservation Science
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ROUTINE ON-SITE WETLAND DETERMINATION

Site 2 (page 1 of 2)

Field Investigators: Marcum, Keene, and Ketzner

Date: 13 May and 28 September 2010

Project Name: FAS 1907 (IL 127)

State: Illinois

County: Alexander

Site Name: Wet Meadow

Legal Description: NE1/4, NE1/4, NW1/4, Section 31, T. 14 S., R. 1 W.

Location: This wet meadow is located approximately 251 m (825 ft) north of Supermax Road and 83.8 m (275 ft) west of IL 127.

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

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. <i>Aster vimineus</i>	FACW-	herb
2. <i>Juncus nodatus</i>	OBL	herb

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

Hydrophytic vegetation: Yes: No:

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

SOILS

Series and phase: Cape silty clay loam

On Alexander County hydric soils list? Yes: No:

Is the soil a histosol? Yes: No: Histic epipedon present? Yes: No:

Redox concentrations: Yes: No: Redox depletions: Yes: No:

Matrix color: 2.5Y 6/2 and 2.5Y 6/1

Other indicators: This soil is found in a depressional area.

Note: At least one foot of the topsoil has been excavated at this site in order to lower this area.

Hydric soils: Yes: No:

Rationale: The Natural Resources Conservation Service classifies Cape silty clay loam as having aquic conditions. This soil has iron masses and an iron depleted matrix. Additionally, this soil meets the NRCS hydric soil indicator F3. These characteristics are evidence of a hydric soil.

ROUTINE ON-SITE WETLAND DETERMINATION

Site #2 (page 2 of 2)

Field Investigators: Marcum, Keene, and Ketzner

Date: 13 May and 28 September 2010

State: Illinois

Site Name: Wet Meadow

Legal Description: NE1/4, NE1/4, NW1/4, Section 31, T. 14 S., R. 1 W.

Location: This wet meadow is located approximately 251 m (825 ft) north of Supermax Road and 83.8 m (275 ft) west of IL 127.

Project Name: FAS 1907 (IL 127)

County: Alexander

HYDROLOGY

Inundated: Yes: No: Depth of standing water: NA

Depth to saturated soil: 0 to 1.02 m (0 to 40 in)

Overview of hydrological flow through the system: This site is located in an excavated depression. Water enters this site via precipitation and sheet flow from adjacent higher ground. Water leaves the site primarily through soil infiltration and evapotranspiration. Some water may also leave through sheet flow to the south (toward Site 3).

Size of watershed: Less than 2.59 km² (1 mi²).

Other field evidence observed: This site has been excavated to hold water for longer periods. Bare areas indicating some ponded water, saturated soil, algal mats, mud cracks, and blackened leaves have been observed at this site.

Wetland hydrology: Yes: No:

Rationale: The ISGS hydrology monitoring data (Miner et al. 2010; Pociask and Campbell 2010) show this site satisfies the wetland hydrology criterion.

DETERMINATION AND RATIONALE:

Is the site a wetland?

Yes: No:

Rationale for decision:

Dominant hydrophytic vegetation, hydric soils, and wetland hydrology are all present; therefore, this site is a wetland. The NWI does not code this site as a wetland.

Determined by: Paul Marcum (vegetation, hydrology and GPS)

Dave Ketzner (vegetation and hydrology)

Dennis Keene (soils and hydrology)

Brad Zercher (GIS)

Geoff Pociask (ISGS, hydrology)

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ROUTINE ON-SITE WETLAND DETERMINATION

Site #3 (page 1 of 2)

Field Investigators: Marcum, Keene, and Ketzner

Date: 13 May and 27 September 2010

Project Name: FAS 1907 (IL 127)

State: Illinois

County: Alexander

Site Name: Emergent Pond

Legal Description: SE1/4, NE1/4, NW1/4, Section 31, T. 14 S., R. 1 W.

Location: This emergent pond w/fringe is located in the southeast corner of the mitigation area. The site begins approximately 7.6 m (25 ft) north of Supermax Road and 7.6 m (25 ft) west of IL 127.

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

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Importance Value (IV)*
1. <i>Boltonia asteroides</i>	FACW	herb	14.2938
2. <i>Juncus nodatus</i>	OBL	herb	13.5921
3. <i>Acorus calamus</i>	OBL	herb	9.3543
4. <i>Aster simplex</i>	FACW	herb	7.0941
5. <i>Aster vimineus</i>	FACW-	herb	6.5917

*based on quantitative vegetation sampling; Table 11

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

Hydrophytic vegetation: Yes: No:

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

SOILS

Series and phase: Cape silty clay loam

On Alexander County hydric soils list? Yes: No:

Is the soil a histosol? Yes: No: Histic epipedon present? Yes: No:

Redox concentrations: Yes: No: Redox depletions: Yes: No:

Matrix color: 2.5Y 6/2 and 5Y 7/1

Other indicators: This soil is found in a depression area.

Note: At least one foot of the topsoil has been excavated at this site in order to lower this area.

Hydric soils: Yes: No:

Rationale: The Natural Resources Conservation Service classifies Cape silty clay loam as having aquic conditions. This soil has iron masses and an iron depleted matrix. Additionally, this soil meets the NRCS hydric soil indicator F3. These characteristics are evidence of a hydric soil.

ROUTINE ON-SITE WETLAND DETERMINATION

Site #3 (page 2 of 2)

Field Investigators: Marcum, Keene, and Ketzner

Date: 13 May and 27 September 2010

Project Name: FAS 1907 (IL 127)

State: Illinois

County: Alexander

Site Name: Emergent Pond

Legal Description: SE1/4, NE1/4, NW1/4, Section 31, T. 14 S., R. 1 W.

Location: This emergent pond w/fringe is located in the southeast corner of the mitigation area. The site begins approximately 7.6 m (25 ft) north of Supermax Road and 7.6 m (25 ft) west of IL 127.

HYDROLOGY

Inundated: Yes: X (in part) No: Depth of standing water: up to 5.1 cm (2 in)

Depth to saturated soil: 0 to 1.02 m (0 to 40 in)

Overview of hydrological flow through the system: This site is located in an excavated depression. Water enters this site through precipitation and sheetflow from adjacent higher ground. Water leaves the site primarily through slow soil infiltration and evapotranspiration. Further transfer of water is possible during high water events through culverts on the south and east side of the wetland.

Size of watershed: Less than 2.59 km² (1 mi²).

Other field evidence observed: This site has been excavated to hold water for longer periods. Areas of inundation and saturation, sediment deposits, drift, bare areas indicating ponded water, algal mats, mud cracks, and blackened leaves have been observed at this site.

Wetland hydrology: Yes: X No:

Rationale: The ISGS hydrology monitoring data (Miner et al. 2010; Pociask and Campbell 2010) show this site satisfies the wetland hydrology criterion.

DETERMINATION AND RATIONALE:

Is the site a wetland?

Yes: X No:

Rationale for decision:

Dominant hydrophytic vegetation, hydric soils, and wetland hydrology are all present; therefore, this site is a wetland. The NWI does not code this site as a wetland.

Determined by: Paul Marcum (vegetation, hydrology and GPS)
Dave Ketzner (vegetation and hydrology)
Dennis Keene (soils and hydrology)
Brad Zercher (GIS)
Geoff Pociask (ISGS; hydrology)
Illinois Natural History Survey
Division of Ecology and Conservation Science
1816 S. Oak Street
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(217) 333-8459 (Marcum)

ROUTINE ON-SITE WETLAND DETERMINATION

Site #4 (page 1 of 2)

Field Investigators: Marcum, Keene, and Ketzner

Date: 13 May and 12 October 2010

Project Name: FAS 1907 (IL 127)

State: Illinois

County: Alexander

Site Name: Shrubland (proposed floodplain forest)

Legal Description: E1/2, NE1/4, NW1/4, Section 31, T. 14 S., R. 1 W.

Location: This shrubland is located along the west boundary of the mitigation area. It extends from approximately 7.6 m (25 ft) to 320.0 m (1050 ft) north of Supermax Road.

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

VEGETATION

Dominant Plant Species

Indicator Status

Stratum

1. <i>Quercus bicolor</i>	planted	sapling/shrub
2. <i>Quercus lyrata</i>	planted	sapling/shrub
3. <i>Quercus palustris</i>	planted	sapling/shrub
4. <i>Agrostis alba</i>	FACW	herb
5. <i>Campsis radicans</i>	FAC	herb
6. <i>Lespedeza cuneata</i>	NI (UPL in Region ?)	herb
7. <i>Poa pratensis</i>	FAC-	herb
8. <i>Solidago canadensis</i>	FACU	herb
9. <i>Tridens flavus</i>	UPL	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 33%

Hydrophytic vegetation: Yes: No:

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

SOILS

Series and phase: Undetermined

On Alexander County hydric soils list? Undetermined

Is the soil a histosol? Yes: No: Histic epipedon present? Yes: No:

Redox concentrations: Yes: No: Redox depletions: Yes: No:

Matrix color: 10YR 4/3

Other indicators: None

Hydric soils: Yes: No: (but area may contain some hydric soils)

Rationale: This soil is found higher on the landscape. It has some iron concretions but lacks the required depleted soil matrix.

ROUTINE ON-SITE WETLAND DETERMINATION

Site #4 (page 2 of 2)

Field Investigators: Marcum, Keene, and Ketzner

Date: 13 May and 12 October 2010

Project Name: FAS 1907 (IL 127)

State: Illinois

County: Alexander

Site Name: Shrubland (proposed floodplain forest)

Legal Description: E1/2, NE1/4, NW1/4, Section 31, T. 14 S., R. 1 W.

Location: This shrubland is located along the west boundary of the mitigation area. It extends from approximately 7.6 m (25 ft) to 320.0 m (1050 ft) north of Supermax Road.

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: NA

Depth to saturated soil: > 1.27 m (> 50 in)

Overview of hydrological flow through the system: This site is at a slightly to noticeably higher elevation than Sites 2 and 3. It is level to slightly sloping towards the lower ground. Water enters this site through precipitation and leaves quickly as sheetflow to Sites 2 and 3.

Size of watershed: Less than 2.59 km² (1 mi²).

Other field evidence observed: none

Wetland hydrology: Yes: No: X

Rationale: Field observations suggest that this site is both too high in elevation and too sloping to satisfy the wetland hydrology criterion. In our opinion, the site is not saturated long enough during the growing season to meet the wetland hydrology criterion. The ISGS hydrology monitoring data (Miner et al. 2010; Pociask and Campbell 2010) show that a small portion of this site satisfies the wetland hydrology criterion for greater than 5% of the growing season.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: No: X

Rationale for decision: Dominant hydrophytic vegetation, hydric soils, and wetland hydrology are all absent; therefore, this site is not a wetland. The NWI does not code this site as a wetland.

Determined by: Paul Marcum and Dave Ketzner (vegetation and hydrology)

Dennis Keene (soils and hydrology)

Brad Zercher (GIS)

Geoff Pociask (ISGS, hydrology)

Illinois Natural History Survey

Division of Ecology and Conservation Science

1816 S. Oak Street

Champaign, Illinois 61820

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Appendix 2: Associated species lists for FAS 1907 (IL 127), Tamms Monitoring Site, Alexander County, Illinois. Dominant species and corresponding stratum are bold.

Site 1A (Wet Meadow) Species List

Scientific name	Common name	Stratum	Wetland indicator status	C♦
<i>Acalypha ostryaefolia</i>	three-seeded mercury	herb	UPL	1
<i>Acalypha rhomboidea</i>	three-seeded mercury	herb	FACU	0
<i>Acer negundo</i>	box elder	sapling, shrub, herb	FACW-	1
<i>Acer rubrum</i>	red maple	shrub, herb	FAC	5
<i>Acer saccharinum</i>	silver maple	herb	FACW	1
<i>Acorus calamus</i>	sweetflag	herb	OBL	4
<i>Agrostis alba</i>	red top	herb	FACW	0
<i>Allium vineale</i>	field garlic	herb	FACU	*
<i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
<i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
<i>Andropogon virginicus</i>	broom sedge	herb	FAC-	1
<i>Apios americana</i>	groundnut	herb	FACW	4
<i>Apocynum cannabinum</i>	dogbane	herb	FAC	2
<i>Asclepias syriaca</i>	common milkweed	herb	UPL	0
<i>Aster ontarionis</i>	Ontario aster	herb	FAC	4
<i>Aster simplex</i>	panicked aster	herb	FACW	3
<i>Aster vimineus</i>	frost flower	herb	FACW-	3
<i>Boltonia asteroides</i>	false aster	herb	FACW	5
<i>Calamagrostis canadensis</i>	bluejoint grass	herb	OBL	3
<i>Campsis radicans</i>	trumpet creeper	w-vine, herb	FAC	2
<i>Carex annectens</i>	large yellow fox sedge	herb	FACW	3
<i>Carex bicknellii</i>	Bicknell's sedge	herb	FAC-	8
<i>Carex caroliniana</i>	sedge	herb	FAC	7
<i>Carex crinita</i>	fringed sedge	herb	OBL	8
<i>Carex hyalinolepis</i>	southern lake sedge	herb	OBL	4
<i>Carex lurida</i>	sedge	herb	OBL	7
<i>Carex normalis</i>	sedge	herb	FACW	4
<i>Carex shortiana</i>	Short's sedge	herb	FACW+	4
<i>Carex squarrosa</i>	sedge	herb	OBL	5
<i>Carex tribuloides</i>	awl-fruited oval sedge	herb	FACW+	3
<i>Carex vulpinoidea</i>	fox sedge	herb	OBL	3
<i>Carya ovata</i>	shagbark hickory	herb	FACU	4
<i>Chasmanthium latifolium</i>	sea oats	herb	FACW	4
<i>Crataegus mollis</i>	downy hawthorn	herb	FACW-	2
<i>Cynanchum laeve</i>	blue vine	herb	FAC	1
<i>Cyperus iria</i>	sedge	herb	FACW	*
<i>Diodia virginiana</i>	large buttonweed	herb	FACW	4
<i>Diospyros virginiana</i>	persimmon	shrub, herb	FAC	2
<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>Eleocharis verrucosa</i>	slender spike rush	herb	OBL	6
<i>Elymus virginicus</i>	Virginia wild rye	herb	FACW-	4
<i>Euthamia graminifolia</i>	grassleaf goldenrod	herb	FACW-	3
<i>Festuca arundinacea</i>	tall fescue	herb	FACU+	*
<i>Fraxinus pennsylvanica</i>	green ash	shrub, herb	FACW	2

Species list continued on the following page

Site 1A (Wet Meadow) Species List Continued

Scientific name	Common name	Stratum	Wetland indicator status	C♦
<i>Galium aparine</i>	annual bedstraw	herb	FACU	0
<i>Gleditsia triacanthos</i>	honey locust	shrub, herb	FAC	2
<i>Hibiscus lasiocarpus</i>	hairy rose mallow	herb	FACW+	5
<i>Ipomoea pandurata</i>	wild sweet potato vine	herb	FACU	2
<i>Iva annua</i>	marsh elder	herb	FAC	0
<i>Juncus dudleyi</i>	Dudley's rush	herb	FAC	4
<i>Juncus effusus solutus</i>	common rush	herb	OBL	4
<i>Juncus interior</i>	inland rush	herb	FAC+	3
<i>Juncus nodatus</i>	stout rush	herb	OBL	6
<i>Juncus secundus</i>	rush	herb	FAC-	6
<i>Juncus tenuis</i>	path rush	herb	FAC	0
<i>Leersia lenticularis</i>	catchfly grass	herb	OBL	5
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Lespedeza cuneata</i>	sericea lespedeza	herb	NI	*
<i>Liquidambar styraciflua</i>	sweet gum	sapling, shrub, herb	FACW	6
<i>Lonicera japonica</i>	Japanese honeysuckle	vine, herb	FACU	*
<i>Ludwigia alternifolia</i>	seedbox	herb	OBL	5
<i>Ludwigia palustris americana</i>	marsh purslane	herb	OBL	4
<i>Ludwigia polycarpa</i>	false loosestrife	herb	OBL	5
<i>Panicum clandestinum</i>	deer-tongue grass	herb	FACW	4
<i>Panicum dichotomiflorum</i>	fall panicum	herb	FACW-	0
<i>Panicum implicatum</i>	old field panic grass	herb	FAC	2
<i>Panicum rigidulum</i>	munro grass	herb	FACW	6
<i>Panicum virgatum</i>	prairie switchgrass	herb	FAC+	4
<i>Parthenocissus quinquefolia</i>	Virginia creeper	herb	FAC-	2
<i>Passiflora incarnata</i>	large passion-flower	herb	FACU	3
<i>Penthorum sedoides</i>	ditch stonecrop	herb	OBL	2
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Physalis angulata</i>	ground cherry	herb	FAC	*
<i>Poa pratensis</i>	Kentucky bluegrass	herb	FAC-	*
<i>Polygonum hydropiper</i>	common smartweed	herb	OBL	*
<i>Polygonum hydropiperoides</i>	mild water pepper	herb	OBL	4
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Polygonum punctatum</i>	dotted smartweed	herb	OBL	3
<i>Polygonum scandens</i>	climbing buckwheat	herb	FAC	2
<i>Pontederia cordata</i>	pickerelweed	herb	OBL	8
<i>Populus deltoides</i>	eastern cottonwood	shrub, herb	FAC+	2
<i>Potentilla simplex</i>	common cinquefoil	herb	FACU-	3
<i>Pycnanthemum tenuifolium</i>	slender mountain mint	herb	FAC	4
<i>Quercus pagoda</i>	cherrybark oak	herb	FAC	5
<i>Quercus palustris</i>	pin oak	herb	FACW	4
<i>Ranunculus laxicaulis</i>	spearwort	herb	OBL	6
<i>Rosa multiflora</i>	multiflora rose	shrub	FACU	*
<i>Rubus pensilvanicus</i>	blackberry	shrub	FAC-	2
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
<i>Salix nigra</i>	black willow	sapling, shrub, herb	OBL	3
<i>Scirpus atrovirens</i>	dark green bulrush	herb	OBL	4

Species list continued on the following page

Site 1A (Wet Meadow) Species List Continued

Scientific name	Common name	Stratum	Wetland indicator status	C♦
<i>Scirpus cyperinus</i>	wool grass	herb	OBL	5
<i>Setaria glauca</i>	pigeon grass	herb	FAC	*
<i>Sisyrinchium angustifolium</i>	common blue-eyed grass	herb	FACW-	5
<i>Solanum carolinense</i>	horse nettle	herb	FACU-	0
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Stachys tenuifolia</i>	slenderleaf betony	herb	OBL	5
<i>Teucrium canadense</i>	American germander	herb	FACW-	3
<i>Toxicodendron radicans</i>	poison ivy	shrub, herb	FAC+	1
<i>Typha angustifolia</i>	narrow-leaved cattail	herb	OBL	*
<i>Typha latifolia</i>	cattail	herb	OBL	1
<i>Ulmus alata</i>	winged elm	shrub, herb	FACU	5
<i>Ulmus americana</i>	American elm	shrub, herb	FACW-	5
<i>Ulmus rubra</i>	slippery elm	shrub	FAC	3
<i>Vernonia gigantea</i>	tall ironweed	herb	FAC	4
<i>Vernonia missurica</i>	Missouri ironweed	herb	FAC+	5
<i>Xanthium strumarium</i>	cocklebur	herb	FAC	0

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

*Non-native species

$$\text{mean C value (mCv)} = \sum C/N = 311/97 = 3.2$$

$$\text{FQI} = \sum C/\sqrt{N} = 311/(\sqrt{97}) = 31.6$$

Site 1B (Emergent Pond/Wet Meadow) Species List

Scientific name	Common name	Stratum	Wetland indicator status	C♦
<i>Acer negundo</i>	box elder	shrub	FACW-	1
<i>Acer rubrum</i>	red maple	herb	FAC	5
<i>Acorus calamus</i>	sweetflag	herb	OBL	4
<i>Agrostis alba</i>	red top	herb	FACW	0
<i>Allium vineale</i>	field garlic	herb	FACU	*
<i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
<i>Andropogon virginicus</i>	broom sedge	herb	FAC-	1
<i>Apios americana</i>	groundnut	herb	FACW	4
<i>Apocynum cannabinum</i>	dogbane	herb	FAC	2
<i>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
<i>Aster lateriflorus</i>	side-flowered aster	herb	FACW-	2
<i>Aster ontarionis</i>	Ontario aster	herb	FAC	4
<i>Aster simplex</i>	panicked aster	herb	FACW	3
<i>Aster vimineus</i>	frost flower	herb	FACW-	3
<i>Barbarea vulgaris</i>	winter cress	herb	FAC	*
<i>Boehmeria cylindrica</i>	false nettle	herb	OBL	3
<i>Boltonia asteroides</i>	false aster	herb	FACW	5
<i>Callitriche heterophylla</i>	large water starwort	herb	OBL	5
<i>Campsis radicans</i>	trumpet creeper	shrub, herb	FAC	2
<i>Carex annectens</i>	large yellow fox sedge	herb	FACW	3
<i>Carex caroliniana</i>	sedge	herb	FAC	7
<i>Carex frankii</i>	Frank's sedge	herb	OBL	4
<i>Carex hyalinolepis</i>	southern lake sedge	herb	OBL	4
<i>Carex normalis</i>	sedge	herb	FACW	4
<i>Carex shortiana</i>	Short's sedge	herb	FACW+	4
<i>Carex squarrosa</i>	sedge	herb	OBL	5
<i>Carex tribuloides</i>	awl-fruited oval sedge	herb	FACW+	3
<i>Carex vulpinoidea</i>	fox sedge	herb	OBL	3
<i>Cephalanthus occidentalis</i>	buttonbush	shrub	OBL	4
<i>Cinna arundinacea</i>	stout wood reed	herb	FACW	5
<i>Crataegus viridis</i>	green thorn	shrub, herb	FACW	5
<i>Desmodium dillenii</i>	tick trefoil	herb	FACU	3
<i>Diodia virginiana</i>	large buttonweed	herb	FACW	4
<i>Diospyros virginiana</i>	persimmon	shrub, herb	FAC	2
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Eclipta prostrata</i>	yerba de tajo	herb	FACW	2
<i>Eleocharis acicularis</i>	needle spike rush	herb	OBL	3
<i>Eleocharis erythropoda</i>	red-rooted spikerush	herb	OBL	3
<i>Eleocharis obtusa</i>	blunt spike rush	herb	OBL	2
<i>Fraxinus pennsylvanica</i>	green ash	shrub, herb	FACW	2
<i>Galium aparine</i>	annual bedstraw	herb	FACU	0
<i>Glyceria striata</i>	fowl manna grass	herb	OBL	4
<i>Hibiscus laevis</i>	halberd-leaved rose mallow	herb	OBL	4
<i>Hibiscus lasiocarpus</i>	hairy rose mallow	herb	FACW+	5
<i>Ilex decidua</i>	swamp holly	shrub	FACW	6
<i>Ipomoea lacunosa</i>	small white morning-glory	herb	FACW	1
<i>Iris</i> sp. (cultivated)	iris	herb	----	*

Species list continued on the following page

Site 1B (Emergent Pond/Wet Meadow) Species List Continued

Scientific name	Common name	Stratum	Wetland indicator status	C♦
<i>Iva annua</i>	marsh elder	herb	FAC	0
<i>Juncus dudleyi</i>	Dudley's rush	herb	FAC	4
<i>Juncus effusus solutus</i>	common rush	herb	OBL	4
<i>Juncus nodatus</i>	stout rush	herb	OBL	6
<i>Juncus tenuis</i>	path rush	herb	FAC	0
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Lespedeza cuneata</i>	sericea lespedeza	herb	NI	*
<i>Liquidambar styraciflua</i>	sweet gum	shrub, herb	FACW	6
<i>Lonicera japonica</i>	Japanese honeysuckle	herb	FACU	*
<i>Ludwigia palustris americana</i>	marsh purslane	herb	OBL	4
<i>Panicum dichotomiflorum</i>	fall panicum	herb	FACW-	0
<i>Panicum implicatum</i>	old field panic grass	herb	FAC	2
<i>Panicum rigidulum</i>	munro grass	herb	FACW	6
<i>Panicum virgatum</i>	prairie switchgrass	herb	FAC+	4
<i>Passiflora incarnata</i>	large passion-flower	herb	FACU	3
<i>Penthorum sedoides</i>	ditch stonecrop	herb	OBL	2
<i>Platanus occidentalis</i>	sycamore	shrub	FACW	3
<i>Polygonum hydropiper</i>	common smartweed	herb	OBL	*
<i>Polygonum hydropiperoides</i>	mild water pepper	herb	OBL	4
<i>Polygonum lapathifolium</i>	curttop lady's thumb	herb	FACW+	0
<i>Polygonum persicaria</i>	spotted lady's thumb	herb	FACW	*
<i>Polygonum punctatum</i>	dotted smartweed	herb	OBL	3
<i>Populus deltoides</i>	eastern cottonwood	shrub, herb	FAC+	2
<i>Potentilla simplex</i>	common cinquefoil	herb	FACU-	3
<i>Pycnanthemum tenuifolium</i>	slender mountain mint	herb	FAC	4
<i>Quercus pagoda</i>	cherrybark oak	shrub	FAC	5
<i>Quercus palustris</i>	pin oak	shrub, herb	FACW	4
<i>Ranunculus laxicaulis</i>	spearwort	herb	OBL	6
<i>Rorippa sessiliflora</i>	sessile-flowered cress	herb	OBL	3
<i>Rosa setigera</i>	Illinois rose	shrub	FACU+	5
<i>Rubus pensilvanicus</i>	blackberry	shrub	FAC-	2
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
<i>Salix nigra</i>	black willow	shrub, herb	OBL	3
<i>Scirpus atrovirens</i>	dark green bulrush	herb	OBL	4
<i>Scirpus cyperinus</i>	wool grass	herb	OBL	5
<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>Sisyrinchium angustifolium</i>	common blue-eyed grass	herb	FACW-	5
<i>Smilax glauca</i>	greenbrier	vine	FACU	6
<i>Solanum carolinense</i>	horse nettle	herb	FACU-	0
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
♣ <i>Taxodium distichum</i>	bald cypress	sapling	OBL	7
<i>Teucrium canadense</i>	American germander	herb	FACW-	3
<i>Toxicodendron radicans</i>	poison ivy	herb	FAC+	1
<i>Ulmus americana</i>	American elm	shrub, herb	FACW-	5
<i>Vernonia missurica</i>	Missouri ironweed	herb	FAC+	5

Species list continued on the following page

Site 1B (Emergent Pond/Wet Meadow) Species List Continued

Scientific name	Common name	Stratum	Wetland indicator status	C♦
<i>Vitis cinerea</i>	winter grape	w-vine	FACW-	4
<i>Xanthium strumarium</i>	cocklebur	herb	FAC	0

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

$$\text{mean C value (mCv)} = \sum C/N = 277/85 = 3.3$$

$$\text{FQI} = \sum C/\sqrt{N} = 277/(\sqrt{85}) = 30.0$$

Site 2 (Wet Meadow) Species List

Scientific name	Common name	Stratum	Wetland indicator status	C♦
<i>Acer negundo</i>	box elder	shrub	FACW-	1
<i>Achillea millefolium</i>	common milfoil	herb	FACU	*
<i>Agrostis alba</i>	red top	herb	FACW	0
<i>Alisma plantago-aquatica</i>	broad-leaf water-plantain	herb	OBL	2
<i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
<i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
<i>Andropogon virginicus</i>	broom sedge	herb	FAC-	1
<i>Apios americana</i>	groundnut	herb	FACW	4
<i>Asclepias syriaca</i>	common milkweed	herb	UPL	0
<i>Aster ontarionis</i>	Ontario aster	herb	FAC	4
<i>Aster pilosus</i>	hairy aster	herb	FACU+	0
<i>Aster simplex</i>	panicked aster	herb	FACW	3
<i>Aster vimineus</i>	frost flower	herb	FACW-	3
<i>Barbarea vulgaris</i>	winter cress	herb	FAC	*
<i>Boltonia asteroides</i>	false aster	herb	FACW	5
<i>Campsis radicans</i>	trumpet creeper	shrub, herb	FAC	2
<i>Carex bicknellii</i>	Bicknell's sedge	herb	FAC-	8
<i>Carex caroliniana</i>	sedge	herb	FAC	7
<i>Carex crinita</i>	fringed sedge	herb	OBL	8
<i>Carex granularis</i>	meadow sedge	herb	FACW+	2
<i>Carex lurida</i>	sedge	herb	OBL	7
<i>Carex normalis</i>	sedge	herb	FACW	4
<i>Carex shortiana</i>	Short's sedge	herb	FACW+	4
<i>Carex squarrosa</i>	sedge	herb	OBL	5
<i>Carex tribuloides</i>	awl-fruited oval sedge	herb	FACW+	3
<i>Carex vulpinoidea</i>	fox sedge	herb	OBL	3
<i>Cerastium vulgatum</i>	common mouse-ear chickweed	herb	FACU	*
<i>Cynanchum laeve</i>	blue vine	herb	FAC	1
<i>Cyperus strigosus</i>	straw-colored flatsedge	herb	FACW	0
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Eleocharis erythropoda</i>	red-rooted spikerush	herb	OBL	3
<i>Erigeron philadelphicus</i>	marsh fleabane	herb	FACW	3
<i>Festuca arundinacea</i>	tall fescue	herb	FACU+	*
<i>Fraxinus pennsylvanica</i>	green ash	shrub, herb	FACW	2
<i>Galium aparine</i>	annual bedstraw	herb	FACU	0
<i>Ipomoea hederacea</i>	ivy-leaved morning glory	herb	FAC	*
<i>Iva annua</i>	marsh elder	herb	FAC	0
<i>Juncus acuminatus</i>	knotty-leaved rush	herb	OBL	4
<i>Juncus effusus solutus</i>	common rush	herb	OBL	4
<i>Juncus interior</i>	inland rush	herb	FAC+	3
<i>Juncus nodatus</i>	stout rush	herb	OBL	6
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Lespedeza cuneata</i>	sericea lespedeza	herb	NI	*
<i>Ludwigia alternifolia</i>	seedbox	herb	OBL	5
<i>Melilotus</i> sp.	sweet clover	herb	FACU	*
<i>Myosotis verna</i>	scorpion grass	herb	FAC-	3
<i>Panicum clandestinum</i>	deer-tongue grass	herb	FACW	4

Species list continued on the following page

Site 2 (Wet Meadow) Species List Continued

Scientific name	Common name	Stratum	Wetland indicator status	C♦
<i>Panicum virgatum</i>	prairie switchgrass	herb	FAC+	4
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Phyla lanceolata</i>	fog-fruit	herb	OBL	1
<i>Poa pratensis</i>	Kentucky bluegrass	herb	FAC-	*
<i>Pycnanthemum tenuifolium</i>	slender mountain mint	herb	FAC	4
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
<i>Scirpus atrovirens</i>	dark green bulrush	herb	OBL	4
<i>Scirpus cyperinus</i>	wool grass	herb	OBL	5
<i>Scirpus pendulus</i>	red bulrush	herb	OBL	3
<i>Senecio glabellus</i>	butterweed	herb	OBL	0
<i>Setaria glauca</i>	pigeon grass	herb	FAC	*
<i>Sida spinosa</i>	prickly sida	herb	FACU	*
<i>Sisyrinchium angustifolium</i>	common blue-eyed grass	herb	FACW-	5
<i>Solanum carolinense</i>	horse nettle	herb	FACU-	0
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Solidago gigantea</i>	late goldenrod	herb	FACW	3
♣ <i>Taxodium distichum</i>	bald cypress	tree	OBL	7
<i>Toxicodendron radicans</i>	poison ivy	herb	FAC+	1
<i>Trifolium pratense</i>	red clover	herb	FACU+	*
<i>Typha angustifolia</i>	narrow-leaved cattail	herb	OBL	*
<i>Typha latifolia</i>	cattail	herb	OBL	1
<i>Ulmus americana</i>	American elm	shrub	FACW-	5
<i>Valerianella radiata</i>	corn salad	herb	FAC+	1
<i>Vicia villosa</i>	winter vetch	herb	UPL	*

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

*Non-native species

$$\text{mean C value (mCv)} = \sum C/N = 162/56 = 2.9$$

$$\text{FQI} = \sum C/\sqrt{N} = 162/(\sqrt{56}) = 21.6$$

Site 3 (Emergent Pond) Species List

Scientific name	Common name	Stratum	Wetland indicator status	C♦
<i>Acalypha rhomboidea</i>	three-seeded mercury	herb	FACU	0
<i>Acer negundo</i>	box elder	shrub, herb	FACW-	1
<i>Acorus calamus</i>	sweetflag	herb	OBL	4
<i>Agrostis alba</i>	red top	herb	FACW	0
<i>Alisma plantago-aquatica</i>	broad-leaf water-plantain	herb	OBL	2
<i>Allium vineale</i>	field garlic	herb	FACU	*
<i>Alopecurus carolinianus</i>	annual foxtail	herb	FACW	0
<i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
<i>Ammannia coccinea</i>	long-leaved ammannia	herb	OBL	5
<i>Andropogon virginicus</i>	broom sedge	herb	FAC-	1
<i>Apocynum cannabinum</i>	dogbane	herb	FAC	2
<i>Aster ontarionis</i>	Ontario aster	herb	FAC	4
<i>Aster pilosus</i>	hairy aster	herb	FACU+	0
<i>Aster simplex</i>	panicked aster	herb	FACW	3
<i>Aster vimineus</i>	frost flower	herb	FACW-	3
<i>Bidens aristosa</i>	swamp marigold	herb	FACW	1
<i>Boltonia asteroides</i>	false aster	herb	FACW	5
<i>Bromus tectorum</i>	cheat grass brome	herb	UPL	*
<i>Bromus sp.</i>				
<i>Callitriche heterophylla</i>	large water starwort	herb	OBL	5
<i>Campsis radicans</i>	trumpet creeper	herb	FAC	2
<i>Carex annectens</i>	large yellow fox sedge	herb	FACW	3
<i>Carex bicknellii</i>	Bicknell's sedge	herb	FAC-	8
<i>Carex caroliniana</i>	sedge	herb	FAC	7
<i>Carex cephalophora</i>	short-headed bracted sedge	herb	FACU	3
<i>Carex granularis</i>	meadow sedge	herb	FACW+	2
<i>Carex hyalinolepis</i>	southern lake sedge	herb	OBL	4
<i>Carex lurida</i>	sedge	herb	OBL	7
<i>Carex normalis</i>	sedge	herb	FACW	4
<i>Carex pellita</i>	wooly sedge	herb	OBL	4
<i>Carex shortiana</i>	Short's sedge	herb	FACW+	4
<i>Carex tribuloides</i>	awl-fruited oval sedge	herb	FACW+	3
<i>Carex vulpinoidea</i>	fox sedge	herb	OBL	3
<i>Celtis occidentalis</i>	hackberry	herb	FAC-	3
<i>Chamaesyce humistrata</i>	milk spurge	herb	FACW	1
<i>Cyperus esculentus</i>	yellow nut-sedge	herb	FACW	0
<i>Cyperus pseudovegetus</i>	false green flat sedge	herb	FACW	5
<i>Daucus carota</i>	Queen Anne's lace	herb	UPL	*
<i>Desmodium paniculatum</i>	panicked tick trefoil	herb	FACU	2
<i>Diodia virginiana</i>	large buttonweed	herb	FACW	4
<i>Diospyros virginiana</i>	persimmon	shrub, herb	FAC	2
<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 verrucosa</i>	slender spike rush	herb	OBL	6
<i>Elymus virginicus</i>	Virginia wild rye	herb	FACW-	4
<i>Erigeron philadelphicus</i>	marsh fleabane	herb	FACW	3

Species list continued on the following page

Site 3 (Emergent Pond) Species List Continued

Scientific name	Common name	Stratum	Wetland indicator status	C♦
<i>Eupatorium serotinum</i>	late boneset	herb	FAC+	1
<i>Festuca arundinacea</i>	tall fescue	herb	FACU+	*
<i>Fraxinus pennsylvanica</i>	green ash	shrub, herb	FACW	2
<i>Galium tinctorium</i>	stiff bedstraw	herb	OBL	6
<i>Gratiola virginiana</i>	round-fruited hedge hyssop	herb	OBL	5
<i>Ipomoea hederacea</i>	ivy-leaved morning glory	herb	FAC	*
<i>Ipomoea lacunosa</i>	small white morning-glory	herb	FACW	1
<i>Iris shrevei</i>	southern blue flag	herb	OBL	5
<i>Iris</i> sp. (cultivated)	iris	herb	----	*
<i>Iva annua</i>	marsh elder	herb	FAC	0
<i>Juncus acuminatus</i>	knotty-leaved rush	herb	OBL	4
<i>Juncus brachycarpus</i>	short-fruited rush	herb	FACW	5
<i>Juncus effusus solutus</i>	common rush	herb	OBL	4
<i>Juncus nodatus</i>	stout rush	herb	OBL	6
<i>Juncus tenuis</i>	path rush	herb	FAC	0
<i>Juncus torreyi</i>	Torrey's rush	herb	FACW	3
<i>Juncus</i> sp.	rush	herb	----	--
<i>Kummerowia striata</i>	Japanese lespedeza	herb	FACU	*
<i>Lathyrus latifolius</i>	everlasting pea	herb	UPL	*
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Lespedeza cuneata</i>	sericea lespedeza	herb	NI	*
<i>Lindernia dubia</i>	false pimpernel	herb	OBL	5
<i>Ludwigia glandulosa</i>	false loosestrife	herb	OBL	8
<i>Ludwigia palustris americana</i>	marsh purslane	herb	OBL	4
<i>Ludwigia peploides glabrescens</i>	creeping primrose willow	herb	OBL	5
<i>Melilotus</i> sp.	sweet clover	herb	FACU	*
<i>Myosotis verna</i>	scorpion grass	herb	FAC-	3
<i>Panicum dichotomiflorum</i>	fall panicum	herb	FACW-	0
<i>Panicum rigidulum</i>	munro grass	herb	FACW	6
<i>Panicum virgatum</i>	prairie switchgrass	herb	FAC+	4
<i>Paspalum laeve</i>	smooth lens grass	herb	UPL	2
<i>Passiflora incarnata</i>	large passion-flower	herb	FACU	3
<i>Penstemon digitalis</i>	foxglove beard-tongue	herb	FAC-	4
<i>Phyla lanceolata</i>	fog-fruit	herb	OBL	1
<i>Pluchea camphorata</i>	camphor weed	herb	FACW	7
<i>Poa pratensis</i>	Kentucky bluegrass	herb	FAC-	*
<i>Polygonum hydropiper</i>	common smartweed	herb	OBL	*
<i>Polygonum hydropiperoides</i>	mild water pepper	herb	OBL	4
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Polygonum punctatum</i>	dotted smartweed	herb	OBL	3
<i>Pontederia cordata</i>	pickerelweed	herb	OBL	8
<i>Populus deltoides</i>	eastern cottonwood	shrub	FAC+	2
<i>Populus heterophylla</i>	swamp cottonwood	shrub, herb	OBL	8
<i>Pycnanthemum tenuifolium</i>	slender mountain mint	herb	FAC	4
<i>Pycnanthemum virginianum</i>	common mountain mint	herb	FACW+	5
<i>Ranunculus laxicaulis</i>	spearwort	herb	OBL	6
<i>Ranunculus sardous</i>	buttercup	herb	FAC	*

Species list continued on the following page

Site 3 (Emergent Pond) Species List Continued

Scientific name	Common name	Stratum	Wetland indicator status	C♦
<i>Ricciocarpus natans</i>	liverwort	herb	OBL	--
<i>Rorippa islandica</i>	marsh yellow cress	herb	OBL	4
<i>Rorippa sessiliflora</i>	sessile-flowered cress	herb	OBL	3
<i>Rosa multiflora</i>	multiflora rose	shrub	FACU	*
<i>Rumex altissimus</i>	pale dock	herb	FACW-	2
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
<i>Salix nigra</i>	black willow	shrub, herb	OBL	3
<i>Scirpus atrovirens</i>	dark green bulrush	herb	OBL	4
<i>Scirpus cyperinus</i>	wool grass	herb	OBL	5
<i>Scirpus pendulus</i>	red bulrush	herb	OBL	3
<i>Senecio glabellus</i>	butterweed	herb	OBL	0
<i>Setaria glauca</i>	pigeon grass	herb	FAC	*
<i>Sida spinosa</i>	prickly sida	herb	FACU	*
<i>Sisyrinchium angustifolium</i>	common blue-eyed grass	herb	FACW-	5
<i>Solanum carolinense</i>	horse nettle	herb	FACU-	0
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
♣ <i>Taxodium distichum</i>	bald cypress	sapling, shrub	OBL	7
<i>Toxicodendron radicans</i>	poison ivy	herb	FAC+	1
<i>Typha angustifolia</i>	narrow-leaved cattail	herb	OBL	*
<i>Typha latifolia</i>	cattail	herb	OBL	1
<i>Ulmus americana</i>	American elm	shrub, herb	FACW-	5
<i>Valerianella radiata</i>	corn salad	herb	FAC+	1
<i>Veronica peregrina</i>	purslane speedwell	herb	FACW+	0
<i>Vicia villosa</i>	winter vetch	herb	UPL	*
<i>Xanthium strumarium</i>	cocklebur	herb	FAC	0

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

*Non-native species

mean C value (mCv) = $\sum C/N = 308/97 = 3.2$

FQI = $\sum C/\sqrt{N} = 308/(\sqrt{97}) = 31.3$

Site 4 [Shrubland (proposed Floodplain Forest)] Species List

Scientific name	Common name	Stratum	Wetland indicator status	C♦
<i>Acalypha ostryaefolia</i>	three-seeded mercury	herb	UPL	1
<i>Acalypha rhomboidea</i>	three-seeded mercury	herb	FACU	0
<i>Acer negundo</i>	box elder	sapling, shrub, herb	FACW-	1
<i>Achillea millefolium</i>	common milfoil	herb	FACU	*
<i>Agrostis alba</i>	red top	herb	FACW	0
<i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
<i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
<i>Andropogon virginicus</i>	broom sedge	herb	FAC-	1
<i>Apocynum cannabinum</i>	dogbane	herb	FAC	2
<i>Artemisia vulgaris</i>	common mugwort	herb	UPL	*
<i>Asclepias syriaca</i>	common milkweed	herb	UPL	0
<i>Aster lateriflorus</i>	side-flowered aster	herb	FACW-	2
<i>Aster pilosus</i>	hairy aster	herb	FACU+	0
<i>Aster simplex</i>	panicled aster	herb	FACW	3
<i>Aster vimineus</i>	frost flower	herb	FACW-	3
<i>Barbarea vulgaris</i>	winter cress	herb	FAC	*
<i>Bromus commutatus</i>	hairy brome	herb	UPL	*
<i>Campsis radicans</i>	trumpet creeper	shrub, w-vine, herb	FAC	2
<i>Cardamine hirsuta</i>	hairy bitter cress	herb	FACU	*
<i>Carex annectens</i>	large yellow fox sedge	herb	FACW	3
<i>Carex caroliniana</i>	sedge	herb	FAC	7
<i>Carex cephalophora</i>	short-headed bracted sedge	herb	FACU	3
<i>Carex granularis</i>	meadow sedge	herb	FACW+	2
<i>Carex normalis</i>	sedge	herb	FACW	4
<i>Cerastium vulgatum</i>	mouse-ear chickweed	herb	FACU	*
<i>Chamaesyce maculata</i>	nodding spurge	herb	FACU-	0
<i>Chenopodium album</i>	lamb's quarters	herb	FAC-	*
<i>Cirsium discolor</i>	pasture thistle	herb	UPL	3
<i>Cocculus carolinus</i>	snailseed	w-vine	FAC	6
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
<i>Cynanchum laeve</i>	blue vine	herb	FAC	1
<i>Cyperus esculentus</i>	yellow nut-sedge	herb	FACW	0
<i>Dactylis glomerata</i>	orchard grass	herb	FACU	*
<i>Daucus carota</i>	Queen Anne's lace	herb	UPL	*
<i>Desmodium paniculatum</i>	panicled tick trefoil	herb	FACU	2
<i>Diospyros virginiana</i>	persimmon	shrub, herb	FAC	2
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Elymus canadensis</i>	Canada wild rye	herb	FAC-	4
<i>Elymus virginicus</i>	Virginia wild rye	herb	FACW-	4
<i>Erigeron annuus</i>	annual fleabane	herb	FAC-	1
<i>Erigeron philadelphicus</i>	marsh fleabane	herb	FACW	3
<i>Festuca arundinacea</i>	tall fescue	herb	FACU+	*
♣ <i>Fraxinus pennsylvanica</i>	green ash	sapling/shrub	FACW	2
<i>Geranium carolinianum</i>	wild cranesbill	herb	UPL	2
<i>Geum canadense</i>	white avens	herb	FAC	2
<i>Gleditsia triacanthos</i>	honey locust	shrub, herb	FAC	2
<i>Gnaphalium obtusifolium</i>	catfoot	herb	UPL	2

Species list continued on the following page

Site 4 [Shrubland (proposed Floodplain Forest)] Species List Continued

Scientific name	Common name	Stratum	Wetland indicator status	C♦
<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>Juncus effusus solutus</i>	common rush	herb	OBL	4
<i>Juncus tenuis</i>	path rush	herb	FAC	0
<i>Kummerowia striata</i>	Japanese lespedeza	herb	FACU	*
<i>Lactuca serriola</i>	prickly lettuce	herb	FAC	*
<i>Lespedeza cuneata</i>	sericea lespedeza	herb	NI	*
<i>Liquidambar styraciflua</i>	sweet gum	sapling/shrub, herb	FACW	6
<i>Lonicera japonica</i>	Japanese honeysuckle	herb	FACU	*
<i>Melilotus alba</i>	white sweet clover	herb	FACU	*
<i>Melilotus officinalis</i>	yellow sweet clover	herb	FACU	*
<i>Morus alba</i>	white mulberry	shrub, herb	FAC	*
<i>Myosotis verna</i>	scorpion grass	herb	FAC-	3
<i>Oxalis stricta</i>	yellow wood sorrel	herb	FACU	0
<i>Panicum anceps</i>	panic grass	herb	FACW	3
<i>Panicum clandestinum</i>	deer-tongue grass	herb	FACW	4
<i>Panicum virgatum</i>	prairie switchgrass	herb	FAC+	4
<i>Paspalum laeve</i>	smooth lens grass	herb	UPL	2
<i>Paspalum pubiflorum glabrum</i>	beadgrass	herb	FACW	3
<i>Passiflora incarnata</i>	large passion-flower	herb	FACU	3
<i>Penstemon digitalis</i>	foxglove beard-tongue	herb	FAC-	4
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Phragmites australis</i>	common red reed	herb	FACW+	1
<i>Physalis heterophylla</i>	ground cherry	herb	UPL	2
<i>Phytolacca americana</i>	pokeweed	herb	FAC-	1
♣ <i>Platanus occidentalis</i>	sycamore	sapling/shrub	FACW	3
<i>Poa pratensis</i>	Kentucky bluegrass	herb	FAC-	*
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Potentilla simplex</i>	common cinquefoil	herb	FACU-	3
<i>Prunus serotina</i>	wild black cherry	herb	FACU	1
<i>Pycnanthemum tenuifolium</i>	slender mountain mint	herb	FAC	4
<i>Pyrus calleryana</i>	Bradford pear	sapling	UPL	*
♣ <i>Quercus bicolor</i>	swamp white oak	sapling/shrub	FACW+	7
♣ <i>Quercus lyrata</i>	overcup oak	sapling/shrub	OBL	7
<i>Quercus marilandica</i>	blackjack oak	shrub	UPL	7
<i>Quercus pagoda</i>	cherrybark oak	sapling, shrub	FAC	5
<i>Quercus palustris</i>	pin oak	sapling/shrub	FACW	4
<i>Quercus velutina</i>	black oak	tree	UPL	5
<i>Rosa multiflora</i>	multiflora rose	shrub	FACU	*
<i>Rosa setigera</i>	Illinois rose	shrub	FACU+	5
<i>Rubus pensilvanicus</i>	blackberry	shrub	FAC-	2
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
<i>Scirpus atrovirens</i>	dark green bulrush	herb	OBL	4
<i>Senecio glabellus</i>	butterweed	herb	OBL	0
<i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
<i>Setaria glauca</i>	pigeon grass	herb	FAC	*

Species list continued on the following page

Site 4 [Shrubland (proposed Floodplain Forest)] Species List Continued

Scientific name	Common name	Stratum	Wetland indicator status	C♦
<i>Sida spinosa</i>	prickly sida	herb	FACU	*
<i>Smilax glauca</i>	greenbrier	herb	FACU	6
<i>Solanum carolinense</i>	horse nettle	herb	FACU-	0
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Solidago gigantea</i>	late goldenrod	herb	FACW	3
<i>Sorghum halepense</i>	Johnson grass	herb	FACU	*
<i>Taraxacum officinale</i>	common dandelion	herb	FACU	*
♣ <i>Taxodium distichum</i>	bald cypress	sapling/shrub	OBL	7
<i>Toxicodendron radicans</i>	poison ivy	herb	FAC+	1
<i>Tridens flavus</i>	common purple top	herb	UPL	1
<i>Trifolium campestre</i>	low hop clover	herb	UPL	*
<i>Trifolium hybridum</i>	Alsike clover	herb	FAC-	*
<i>Trifolium pratense</i>	red clover	herb	FACU+	*
<i>Trifolium repens</i>	white clover	herb	FACU+	*
<i>Ulmus americana</i>	American elm	shrub, herb	FACW-	5
<i>Ulmus pumila</i>	Siberian elm	sapling	UPL	*
<i>Ulmus rubra</i>	slippery elm	sapling, shrub	FAC	3
<i>Valerianella radiata</i>	corn salad	herb	FAC+	1
<i>Verbesina helianthoides</i>	yellow crownbeard	herb	UPL	6
<i>Vicia villosa</i>	winter vetch	herb	UPL	*
<i>Vitis aestivalis</i>	summer grape	herb	FACU	4
<i>Vitis riparia</i>	riverbank grape	herb	FACW-	2
<i>Xanthium strumarium</i>	cocklebur	herb	FAC	0

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

♣ denotes planted species

*Non-native species

without planted species:

$$\text{mean C value (mCv)} = \sum C/N = 183/78 = 2.3$$

$$\text{FQI} = \text{mCv}/(\sqrt{N}) = 152/(\sqrt{73}) = 20.7$$

with planted tree species:

$$\text{mean C value (mCv)} = \sum C/N = 183/78 = 2.5$$

$$\text{FQI} = \text{mCv}/(\sqrt{N}) = 209/(\sqrt{83}) = 22.9$$

**Appendix 3. Photos of wetland creation sites for FAS 1907 (IL 127),
Tamms Monitoring Site, Alexander County, Illinois.**



A.



B.



C.

**Figure 1. Site 1A
Wet Meadow**

A. View from near the south end of the site looking north (September 28, 2010).

B. View from the near the north end of the site looking south (May 13, 2010).

C. View from near the center of the site looking south (May 13, 2010).



A.



B.



C.

**Figure 2. Site 1B
Wet Meadow/Emergent
Pond**

**A. View from the south
end of the site looking
north (May 13, 2010).**

**B. View from the south
end of the site looking
north (September 28,
2010).**

**C. View from the north
end of the site looking
south (May 13, 2010).**



A.



B.

**Figure 3. Site 2
Wet Meadow**

**A. View from near the
north end of the site
looking south/southeast
(May 13, 2010).**

**B. View from near the
north end of the site
looking south/southeast
(September 28, 2010).**



A.



B.



C.

**Figure 4. Site 3
Emergent Pond w/fringe**

A. View from near the south end of the site looking north (April 26, 2010).

B. View from the culvert at Supermax Road looking north (May 13, 2010).

C. View from the culvert at Supermax Road looking north (September 28, 2010).



A.



B.



C.

**Figure 5. Site 4
Shrubland (proposed
floodplain forest)**

**A. View from Site 2
looking to the northeast
(September 28, 2010).
Note the abundance of
Solidago canadensis
(Canada Goldenrod).**

**B. Habitat photo of
Sorghum halepense
(Johnson Grass) growing
around the perimeter of
Site 4 (September 28,
2010).**

**C. Habitat photo of
Lespedeza cuneata (Sericea
Lespedeza) growing
around the perimeter of
Site 3 (September 28,
2010).**

**D. Close-up photo of
Lespedeza cuneata (Sericea
Lespedeza) in flower
(September 28, 2010).**



D.