

WETLAND MITIGATION SITE MONITORING REPORT
Harrison Avenue Extension at Pecatonica River Forest Preserve
Winnebago County, 2007

INTRODUCTION

This report details monitoring of the wetland mitigation site created to compensate for wetlands that were impacted during an extension of Harrison Avenue in Rockford, Illinois. Impacted wetlands totaled 1.82 ha (4.49 ac) in area, and included 0.66 ha (1.64 ac) of palustrine emergent wetland, 1.05 ha (2.60 ac) of forested wetland, and 0.10 ha (0.25 ac) of streambed. The compensation site is owned by the Winnebago County Forest Preserve District, and is located just south of Blair Road, adjacent to the Pecatonica River (legal location NW/4, Sect. 19, T 27N, R 10E). The site is approximately 24.3 ha (60 ac) in size, and was formerly agricultural land and a drainage ditch. Because the compensation site is located more than one mile from the impact site, a total of 7.27 ha (17.96 acres; a 4:1 ratio of compensated to impacted area) is required under the Illinois Interagency Wetland Policy Act of 1989. A total of 4.22 ha (10.44 ac) of wet prairie and emergent marsh, 2.64 ha (6.52 ac) of forested wetland, and 0.40 ha (1.00 ac) of streambed wetland were planned for the site. The forested wetland area is located in southernmost part of the site, adjacent to existing forest along the Pecatonica River. The wet prairie and marsh are located in northern part of site near Blair Road. Wetland vegetation was also planted in an existing tributary along the west side of the property. Herbaceous wetlands were planted with seeds and live plant material, and the forested site was planted with wet prairie seeds and tree saplings (Hey and Associates 1999). Wetland construction was completed in 2003. On-site monitoring was conducted on 10, 17 and 24 August 2005, 14 August 2006, 9 August and 3 October 2007.

This report discusses the goals, objectives, and performance criteria for the mitigation project, the methods used for monitoring the site, the monitoring results from 2007, and a discussion and recommendations based on those results. Methods and results are discussed by performance criteria for each goal.

Goals, Objectives, and Performance Standards

Goals, objectives, and performance standards follow those specified in the wetland compensation plan that Hey and Associates, Inc. (1999) listed for this site. Each goal should be attained by the end of the 5-year monitoring period. Goals, objectives, and performance criteria are listed below.

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

Objective: 4.22 ha (10.44 ac) of wet prairie and emergent marsh, 2.64 ha (6.52 ac) of forested wetland, and 0.40 ha (1.00 ac) of streambed wetland will compensate for impacts

to 0.66 ha (1.64 ac) of palustrine emergent wetland, 1.05 ha (2.60 ac) of forested wetland and 0.10 ha (0.25 ac) of streambed, at a total ratio 4 ha of wetland compensation to 1 ha of impacted wetland.

Performance criteria:

- a. Predominance of hydrophytic vegetation: More than 50% of the dominant plant species must be hydrophytic.
- b. Presence of wetland hydrology: The area must be either permanently or periodically inundated at average depths less than 2 m (6.6 ft) or have soils that are saturated to the surface for at least 12.5% of the growing season.
- c. Occurrence of hydric soils: Hydric soil characteristics should be present, or conditions favorable for hydric soil formation should persist at the site.

Project goal 2: The wetland plant community should meet minimum standards for floristic integrity and plant species composition.

Objectives: An emergent marsh, wet prairie, forested wetland, and a vegetated streambed wetland will be established by planting native wetland vegetation.

Performance criteria:

- a. Floristic Quality Index: Floristic Quality Index (FQI) (Taft et al. 1997) will be greater than or equal to 20 over entire project area by fifth year of site monitoring. Native FQI will increase each successive year after planting through the end of monitoring.
- b. Vegetation cover and species richness: By end of the fifth year the site will exhibit minimum of 60% vegetative cover and will include minimum of 30 native species.
- c. Mean wetness coefficient: Mean native wetness coefficient (Reed 1988) will be less than or equal to zero by end of the fifth year.
- d. Importance of native plant species: Relative importance value of total native plants will increase each successive year after planting.
- e. Non-native and weedy species dominance: By end of fifth year no more than 20% of the area will have non-native or weedy species dominance (including *Typha* spp., *Salix interior*, and *Phragmites australis*).

Project goal 3: The forested wetland should meet minimum standards for planted tree and shrub survival.

Objectives: A forested wetland will be established by planting native trees and shrubs.

Performance criteria:

- a. Percent survival of planted trees and shrubs: Planted tree and shrub survival must be at least 80% each year.
- b. Number of planted tree and shrub species: The site must have at least five species of planted trees and three species of planted shrubs.

METHODS

Project goal 1

a. Predominance of hydrophytic vegetation

The method for determining dominant vegetation at a wetland site is described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and further explained in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (Federal Interagency Committee for Wetland Delineation 1989). The relative Importance Value, a combination of relative coverage and relative frequency, for each species was determined by quantitatively sampling vegetation at each site (see project goal 2, below). Species were then arranged by Importance Value in decreasing order, and Importance Values were sequentially summed, starting with the most prevalent species, until the total reached 50. Those species included in the summation were considered dominant species. Each of the dominant plant species was then assigned its wetland indicator status rating (Reed 1988). Any plant rated facultative or wetter (*i.e.*, FAC, FAC+, FACW, or OBL) is considered a hydrophyte. A predominance of vegetation in the wetland plant community exists if more than 50% of the dominant species present are hydrophytic.

b. Presence of wetland hydrology

The extent of wetland hydrology at the Pecatonica River Forest Preserve Wetland Compensation Site was monitored by the Illinois State Geological Survey and is shown on the accompanying figure (Fucciolo et al. 2007). Wetland hydrology occurs when inundation or saturation to land surface is present for greater than 5% of the growing season (9 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 (23 days at this site) to satisfy wetland hydrology criteria (Environmental Laboratory 1987 [<http://el.erdc.usace.army.mil/wetlands/pdfs/wlman87.pdf>]). Inundation and saturation at the site were monitored using a combination of 23 monitoring wells and 3 stage gauges. Water levels were measured at least biweekly during April and May, and monthly during the remainder of the year. Manual readings were supplemented by 4 dataloggers, which measure surface- and ground-water levels at regular intervals to document all hydrologic events. Additional details regarding site conditions and monitoring results for wetland hydrology in 2007 are summarized in ISGS' Annual Report for Active IDOT Wetland Compensation and Hydrologic Monitoring Sites, September 1, 2006 to September 1, 2007 (Fucciolo et al. 2007).

c. Occurrence of hydric soils

The soil was sampled in each plant community in order to monitor hydric soil development. Soil profile morphology, including horizon color, texture, and structure, was described from one or more representative, permanent sampling points in each vegetation community. Additionally, the presence, type, size, and abundance of redoximorphic features were noted.

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

Project goal 2

Vegetation in the wet prairie/emergent marsh community (hereafter referred to as Site 1) was quantitatively sampled using 0.5-m x 0.5-m (0.25 m²) quadrats (n = 29) placed every 30 m along five transects. A baseline was established along the northern boundary of the site, parallel to Blair Road. The plant community was sampled along five parallel transects placed every 30 m (100 ft) and running north to south. Locations of these transects are marked on the enclosed map. All plant species in each quadrat were recorded and each species was assigned a cover class (Table 1), an estimate of the amount of area within the sample quadrat that is covered by that species. Data from quadrats were used to calculate frequency (percent of quadrats in which the species is present), relative frequency (frequency relative to other species), average cover per quadrat, relative cover, and Importance Value (average of relative frequency and relative cover) for each sampled species.

Table 1: Cover classes used to estimate aerial cover by plant species in sample quadrats

Cover class	Range of aerial cover	Midpoint of range
R	<1%, solitary	0%
+	<1%, seldom	0%
1	1-5%	3%
2	5-25%	15%
3	25-50%	37.5%
4	50-75%	62.5%
5	75-95%	85%
6	95-100%	97.5%

Because the forested wetland community (Site 2) has been unsuccessful in meeting goals for wetland establishment and planted tree survival, herbaceous vegetation at site 2 was not quantitatively sampled.

In order to approximate relative species abundances in the streambed wetland (Site 3), we employed a semi-quantitative method in which all species were assigned an abundance value ranging from one to five based on visual estimates of abundance and cover. Species that were present as a single or a few individuals were assigned a value of one; species present, but uncommon were assigned a two; species which occurred at moderate frequency throughout the site were assigned a three; species which were common and abundant across the site were assigned a four; and species which were dominant at the site (greater than 20% areal cover) were assigned a five.

The Floristic Quality Assessment (Taft et al. 1997) was applied to each plant community at each site to evaluate ecological integrity. The assessment methodology is used to identify natural areas and facilitate floristic comparisons among sites. This technique is part of the procedure for the long-term monitoring of natural areas and the monitoring of restored or created wetlands (Swink and Wilhelm 1994). Plant species not native to Illinois are not included in the FQI. Each native plant species is assigned a coefficient of conservatism (*C*) ranging from 0 to 10. Lower numbers have been assigned to species that tend to be more tolerant of disturbance and higher numbers to species that are generally found in less disturbed natural areas. A mean coefficient value (mCv) is determined by summing the coefficients of conservatism (*C*) and dividing by the total

number of native species (N). The Floristic Quality Index (FQI) is then determined by dividing the sum of the coefficients of conservatism by the square root of N . This calculation is done to incorporate numerical species diversity into the FQI value. Sites with FQI values less than 10 suggest that the area has been highly disturbed or is in an early successional stage. Sites with FQI values of 20 or more generally possess some evidence of natural character and may be considered environmental assets. Sites with values of 35 or more are considered to be of natural area quality.

At each plant community the mean wetness coefficient was calculated as the average of the numerical values associated with individual species wetness coefficients for all species in the community (Reed 1988), where the numerical values are: UPL = 5, FACU- = 4, FACU = 3, FACU+ = 2, FAC- = 1, FAC = 0, FAC+ = -1, FACW- = -2, FACW = -3, FACW+ = -4, and OBL = -5.

Boundaries of the plant communities within the project area were recorded using a Trimble Global Positioning System. Locations of these sites were overlain on digital ortho-quadrangles (DOQs), and approximate wetland acreage was determined for each site using ArcView. Printouts of these DOQs are included with this report.

Project goal 3

All living planted trees and shrubs were counted and identified to species to assess survival rates.

RESULTS

Project goal 1

a. Predominance of hydrophytic vegetation

An emergent marsh/wet prairie community was planned for the northwestern portion of the project area (Site 1). During the 2005, 2006 and 2007 monitoring seasons, a portion of Site 1 has consistently supported wet meadow and marsh vegetation, and is referred to as Site 1A. The remainder of Site 1, however, lacked dominant hydrophytic vegetation, and is referred to as Site 1B (see Fig. 2, Appendix B). The plant community at Site 1B is currently non-native grassland. Dominant plant species for the marsh/wet meadow (Site 1A), non-native grassland (Site 1B), forested site (Site 2) and streambed wetland (Site 3) are shown in Tables 2-5. At two of the four sites (Sites 1A and 3), greater than 50% of the dominant species are rated OBL, FACW or FAC, and therefore, the dominant vegetation is hydrophytic.

Table 2. Dominant plant species by stratum for the marsh/wet meadow (Site 1A)

Dominant plant species	Stratum	Indicator status
1. <i>Phalaris arundinacea</i>	herb	FACW+
2. <i>Polygonum amphibum</i>	herb	OBL

Table 3. Dominant plant species by stratum for the non-native grassland (Site 1B)

Dominant plant species	Stratum	Indicator status
1. <i>Conyza canadensis</i>	herb	FAC-
2. <i>Polygonum pensylvanicum</i>	herb	FACW+
3. <i>Setaria faberi</i>	herb	FACU+

Table 4. Dominant plant species by stratum and wetland indicator status for the forested site (Site 2)

Dominant plant species	Stratum	Indicator status
1. <i>Polygonum pensylvanicum</i>	herb	FACW+
2. <i>Setaria faberi</i>	herb	FACU+

Table 5. Dominant plant species by stratum and wetland indicator status for the streambed wetland (Site 3)

Dominant plant species	Stratum	Indicator status
1. <i>Lemna minor</i>	herb	OBL
2. <i>Phalaris arundinacea</i>	herb	FACW+

During the 2007 monitoring season, small portions of Site 1B, totaling 0.06 ha (0.15 acres), appeared to be developing hydrophytic vegetation. These areas occupy topographic depressions within site 1B, and dominant plant species are listed in table 6. The depressions did not have dominant hydrophytic vegetation in 2005 or 2006, nor did they have greater than 50% dominant hydrophytic vegetation in 2007. However, these areas met criteria for hydric soils and wetland hydrology in 2007 (see below), and may eventually develop hydrophytic vegetation. Because these areas within Site 1B did not have dominant hydrophytic vegetation in 2007, we did not complete separate wetland determination forms. We will continue to monitor these areas in future years.

Table 6. Dominant plant species by stratum and wetland indicator status for topographic depressions within Site 1B

Dominant plant species	Stratum	Indicator status
1. <i>Echinochloa muricata</i>	herb	OBL
2. <i>Elymus canadensis</i>	herb	FAC-
3. <i>Setaria faberi</i>	herb	FACU+
4. <i>Spartina pectinata</i>	herb	FACW+

b. Presence of wetland hydrology

Hydrologic data for the sites for September 2006 through September 2007 are presented in Appendix B. An estimated 6.9 ha (17.1 ac) within the total project area conclusively satisfied the wetland hydrology criterion for greater than 5% of the growing season during the monitoring period, and an additional 3.8 ha (9.4 ac) conclusively satisfied the wetland hydrology criterion for greater than 12.5% of the growing season (Fig. 1, Appendix B; Plankell and Benton 2007). With the exception of some very small areas immediately adjacent to Blair Road, Sites 1A, 1B, 2 and 3 entirely met the hydrology criterion for greater than 5% of the growing season, and portions of each site met the criterion for greater than 12.5% of the growing season.

c. Occurrence of hydric soils

Soils in the northern portion of the project area (Site 1) were mapped as four different soil map units (107, 242, 415, and 451) by the Natural Resources Conservation Service (NRCS) (Grantham 1980). Map unit 107 (Sawmill silty clay loam) was found in the

northwestern, wetter part of the site (Site 1A), whereas the southeastern, drier part of the site (Site 1B) was comprised of the map unit 415 (Orion silt loam). Within Site 1B, small depressions were mapped separately this year. The soil was determined to be a generic Cummlie Epiaquall. Map units 242 (Kendall silt loam) and 451 (Lawson silt loam) were not found during field investigation.

Sawmill silty clay loam is a poorly drained, hydric soil, formed in silty and clayey water-deposited sediments. It can be typically found on low stream terraces, in broad alluvial valleys, and in small upland drainageways. Orion silt loam is a somewhat poorly drained, non-hydric soil. It formed in silty alluvium and is typically found along small streams and at the upper end of drainageways.

The NRCS mapped units 107 (Sawmill silty clay loam) and 451 (Lawson silt loam) in southern part of the project area (Site 2). Only map unit 451 was found during field investigation. Lawson silt loam is a somewhat poorly drained, non-hydric soil formed in alluvium. It is typically found on bottomlands along the Pecatonica River and along small streams and drainage ways.

Soil within the streambed wetland (Site 3) showed features of a hydric soil. The areas adjacent to the stream were mapped as Sawmill silty clay loam (map unit 107). We classified the soil of the stream bottom as a Vertic Epiaquept. On 3 October 2007, the creek contained water and the underlying soil material was saturated, creating a very loose consistency, to a depth of 20 cm (8 in).

Typical pedons found within the project area are described below. The locations of the soil profiles used for the descriptions are marked on the enclosed map.

Table 7. Soil at the marsh/wet meadow (Site 1A) (Sawmill silty clay loam, hydric)

Depth [cm]	Matrix Color	Redox Concentrations	Redox Depletions	Texture	Structure
0 – 30	10YR 2/1	10YR 3/4	-	silty clay loam	subangular blocky
30 – 46	10YR 3/1	10YR 3/4	10YR 4/2	silty clay loam	subangular blocky

Table 8. Soil at the non-native grassland (Site 1B) (Orion silt loam, non-hydric)

Depth [in]	Matrix Color	Redox Concentrations	Redox Depletions	Texture	Structure
0 – 8	10YR 4/2	-	-	silt loam	subangular blocky
8 – 38	10YR 4/2.5	-	-	silt loam	subangular blocky
38 – 48	10YR 4/2	7.5YR 3/4	-	silt loam	subangular blocky
48 – 60	10YR 3/1	10YR 4/4	10YR 5/2	silt loam	subangular blocky

Table 9. Soil at the forested site (Site 2) (Lawson silt loam, non-hydric)

Depth [cm]	Matrix Color	Redox Concentrations	Redox Depletions	Texture	Structure
0 – 50	10YR 2/1	-	-	silt loam to loam	subangular blocky
50 – 76	10YR 3/2	-	-	silt loam to loam	subangular blocky to massive

Table 10. Soil at the streambed wetland (Site 2) (generic Vertic Epiaquept, hydric)

Depth [cm]	Matrix Color	Redox Concentrations	Redox Depletions	Texture	Structure
+20 – 0					unconsolidated materials
0 – 30	2.5Y 3/1	7.5YR 2.5/3 & 10YR 3/6	-	silt clay loam	subangular blocky

Table 11. Soil at the topographic depressions within Site 1B (generic Cummlic Epiaquoll, hydric)

Depth [cm]	Matrix Color	Redox Concentrations	Redox Depletions	Texture	Structure
0 – 15	10YR 2/1	-	-	light silty clay loam	Granular to subangular blocky
15 – 51	10Y 3/1	7.5YR 3/4	-	silt clay loam	massive
51- 76	10YR 3/2	7.5YR 3/4	10Y 2.75/1	silty to sandy clay loam	massive

Project goal 2

Mean coefficient of conservatism and FQI values were calculated for each site from the species lists included in Appendix A. For each site, mCv and FQI values were calculated using only species that became established on the site naturally (volunteer species), and then recalculated to include planted species (Table 12). In 2007 the FQI exceeded the stated performance criterion of 20 for the entire project area. However, because the entire project area is large and includes several plant communities, it is likely to support a large number of native plant species regardless of the area's floristic conservation value. An FQI value above 20 for the entire project area should not be considered exceptionally high. When considered individually, FQI and mCv values for each site suggest high natural quality in Sites 1A and 2 when planted species are included, and fair natural quality in Sites 1B and 3. As required by the performance criterion, native FQI increased from 2005 to 2006, and again from 2006 to 2007, for the entire project area.

Sites 1A, 1B and 2 met the performance criterion of at least 60% vegetative cover in 2006. Areal cover by bare ground was less than 5%, on average, per 0.25 m² quadrat in Sites 1A and 1B. Though not quantified in Site 2, a similar amount of bare ground was observed in this site. The streambed wetland had large areas of bare ground due to prolonged flooding in 2007, and had only approximately 30% vegetation coverage.

Table 12. Mean coefficient of conservatism (mCv) and Floristic Quality Index (FQI) values for constructed wetlands

<u>a. Planted species not included</u> Site	2005		2006		2007	
	mCv	FQI	mCv	FQI	mCv	FQI
1A. Wet meadow	2.3	12.9	1.9	13.0	2.2	15.9
1B. Non-native grassland	1.4	7.8	1.5	10.9	1.8	12.4
2. Forested site	1.8	11.0	1.7	10.8	2.0	13.3
3. Stream channel	2.1	11.3	2.5	13.5	2.9	12.6
TOTAL PROJECT AREA	2.1	17.9	2.0	18.9	2.2	21.2

<u>b. Planted species included</u> Site	2005		2006		2007	
	mCv	FQI	mCv	FQI	mCv	FQI
1A. Wet meadow	2.8	17.7	2.4	17.7	2.6	20.6
1B. Non-native grassland	2.1	13.7	1.9	14.1	2.3	17.4
2. Forested site	2.6	19.6	2.6	19.6	2.8	22.5
3. Stream channel	2.4	13.8	2.7	15.8	2.9	15.8
TOTAL PROJECT AREA	2.7	27.1	2.7	28.4	2.7	30.3

When planted species are included, 126 native plant species were observed across the entire project area, far exceeding the performance criterion of 30 native species. However, the stated performance criterion is far too low for an area of this size, and is therefore not an appropriate standard for judging the floristic integrity of the area. When considered individually, Sites 1A, 1B and 2 had at least 30 native species (Site 1A: 64 species; Site 1B: 59 species; Site 2: 65 species). Several species previously found in Site 3 were absent in 2007, and we observed only 20 native species at Site 3 in 2007.

The project area as a whole, and each site individually, met the performance criterion of having a mean wetness coefficient less than zero (total project area: -1.01; Site 1A: -2.09; Site 1B: -0.23; Site 2: -0.41; Site 3: -3.82).

The total Importance Values of native species were 53.0 at Site 1A and 43.6 at Site 1B, indicating a large amount of cover by, and high frequency of, exotic species. In 2006 the total Importance Values of native species were 40.0 at Site 1A and 32.1 at Site 1B, and in 2005 these values were 37.8 at Site 1A and 33.1 at Site 1B. Thus, consistent with project objectives, the importance of native species at the site has generally increased over time. As in 2006, two exotic grasses were particularly common in 2007: *Phalaris arundinacea* had an Importance Value of 42.8 at Site 1A, and *Setaria faberi* had an Importance Value of 36.6 at Site 1B.

One of the two dominant species in Site 1A, *Phalaris arundinacea*, is exotic. One of the three dominant species at Site 1B, *Setaria faberi*, is exotic. *Setaria faberi* is also one of the two dominant species at Site 2. *Phalaris arundinacea* is one of the two dominant

species in Site 3. Therefore, no sites met the performance criterion of having no more than 20% of the area with non-native or weedy species dominance.

Project goal 3

Seven species of planted native trees and five species of planted native shrubs were represented by live individuals at Site 2 in August 2007 (Table 13). Therefore, the site met the performance standard of having at least five species of planted trees and three species of planted shrubs. However, total tree and shrub survival was only 25.7%, far below the specified performance standard of 80% survival. A large number of *Juglans nigra*, *Celtis occidentalis* and *Fraxinus pennsylvanica* individuals have naturally regenerated at the site, making it difficult to distinguish naturally recruited versus planted individuals. The reported values for survival of planted individuals for these species are therefore overestimates. In addition, a large number of naturally recruited *Ulmus americana* seedlings were observed.

Table 13. Planted tree and shrub survival at Site 2

Species	Number planted	Surviving 2005	Surviving 2006	Surviving 2007	Percent survival
<i>Acer nigrum</i>	20				0.0
<i>Amelanchier arborea</i>	30	28	4	4	13.3
<i>Carya ovata</i>	20				0.0
<i>Celtis occidentalis</i>	15	7	7	14	93.3
<i>Cephalanthus occidentalis</i>	50	15	8	14	28.0
<i>Cornus amomum</i>	25			3	12.0
<i>Cornus stolonifera</i>	50	4	3	7	14.0
<i>Corylus americana</i>	50	11	14	2	4.0
<i>Fraxinus pennsylvanica</i>	25		17	23	92.0
<i>Juglans nigra</i>	20	10	16	20	100.0
<i>Physocarpus opulifolius</i>	25	7	1		0.0
<i>Platanus occidentalis</i>	10	4	1	2	20.0
<i>Quercus bicolor</i>	25	25	13	14	56.0
<i>Quercus macrocarpa</i>	25	16	18	17	68.0
<i>Salix amygdaloides</i>	30			1	3.3
<i>Salix nigra</i>	30				0.0
<i>Tilia americana</i>	15	2	1		0.0
<i>Ulmus americana</i>	5				0.0
Total	470	129	103	121	25.7

DISCUSSION

After four years of site development since construction, these sites showed limited progress towards wetland establishment. There is a high probability that Site 3 and a portion of Site 1 (Site 1A) will comply with project goal 1 (establishment of a jurisdictional wetland) by the

end of the monitoring period. However, Site 2 and a majority of Site 1B lacked dominant hydrophytic vegetation and hydric soils, and are unlikely to develop these characteristics given current site conditions. Based on dominance of hydrophytic vegetation and presence of hydric soils, we estimate that 0.40 ha of 0.40 ha (1.00 ac of 1.00 ac) at Site 3 and 2.02 ha of 4.22 ha (4.99 ac of 10.44 ac) at Site 1 currently meet the jurisdictional criteria of a wetland (Fig. 2, Appendix B). An additional 0.06 ha (0.15 acres) within Site 1B met the hydrology and soils criteria in 2007, but the number of dominant hydrophytic species was not greater than 50%. This area will likely develop dominant hydrophytic vegetation in the future. The portion of Site 1 estimated to meet jurisdictional criteria based on vegetation and soils corresponded well to the estimated portion of the site meeting the wetland hydrology criterion for greater than 12.5% of the growing season (crosshatched area, Fig. 1, Appendix B). A portion of Site 2 also met the wetland hydrology criterion for 12.5% of the growing season in 2007. However, precipitation was 124% above normal for the 2007 monitoring period (Plankell and Benton 2007), and based on soils, vegetation and hydrologic data from 2005 through 2007, we believe that there is a low probability that Site 2 will comply with project goal 1 by the end of the monitoring period.

Success was limited with respect to project goal 2 (minimum standards for floristic integrity and species composition). In 2005, 2006 and 2007 the project area as a whole met performance standards for having an FQI above 20, when planted species are included, and for supporting greater than 30 native species. However, for an area this large these performance standards should be considered lenient, and not necessarily indicative of successful restoration. Even highly disturbed or early successional sites of this size are likely to have more than 30 native species. Floristic quality values and the relative importance of native species have generally increased each year. All sites met the criterion of having a mean wetness coefficient less than zero, but only Sites 1A, 1B and 2 met the criterion of having greater than 60% vegetation cover. No site met the criterion regarding dominance by non-native and weedy species. Because these sites were recently established they are dominated, in part, by disturbance-adapted, annual species (such as *Setaria faberi* and *Polygonum pensylvanicum*). These species will decline in importance over the course of site development as they are replaced by perennial vegetation. However, the current dominance of Sites 1A and 3 by the invasive grass *Phalaris arundinacea* will present a major barrier to establishing minimum standards for floristic integrity and species composition at the sites. *Phalaris arundinacea* was also common at Site 1B.

Several planted herbaceous species were located at Sites 1A, 1B and 2, and planted species appeared to be spreading from the areas where they were originally planted. Continued persistence of planted herbaceous species will elevate the floristic integrity of these sites. However, following intense flood scouring and prolonged inundation, several planted species previously observed at Site 3 were not observed in 2007. In addition, vegetation cover and total species richness declined in Site 3 compared to previous years.

Site 2, the forested wetland, did not meet the planted tree and shrub survival criterion for project goal 3 in 2005, 2006 or 2007. Percent survival in each year was far less than the goal of 80% survival, and several surviving trees and shrubs were overtopped by tall herbaceous vegetation. Because this site is not likely to meet the primary goal of creating jurisdictional wetland, it may not be practical to attempt to replant trees at this site.

Literature Cited

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APPENDIX A: WETLAND DETERMINATION FORMS

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1A (page 2 of 5)

Field Investigators: Matthews, Kurylo, Ketzner and Tessene

Date: 9 August 2007

Project Name: Harrison Avenue Extension at Pecatonica

State: Illinois **County:** Winnebago **Applicant:** IDOT District 2

Site Name: Marsh/wet meadow

Legal Description: NE/4, NW/4, Sect. 19, T 27N, R 10E

Location: This site is located in northern part of the project area, just south of Blair Road.

HYDROLOGY

Inundated: Yes: X (partially) No: Depth of standing water: 0.46 m (1.5 ft)

Depth to saturated soil: at or near surface

Overview of hydrological flow through the system: This site receives water through precipitation, sheet flow from surrounding higher ground, a culvert under Blair Road to the north, and infrequent overflow from the Pecatonica River. Water leaves the site via evapotranspiration, soil infiltration and surface flow to Site 3.

Size of Watershed: 4429 km² (1710 mi²) (Ogata 1975)

Other field evidence observed: Sediment deposits on vegetation, wetland drainage patterns, drift accumulation, algal mats

Wetland hydrology: Yes: X No:

Rationale: This site is located in a depressional area. According to a report by ISGS personnel (Plankell and Benton 2007) this site was inundated or saturated for a sufficient duration to satisfy the wetland hydrology criterion during 2007.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: X No:

Rationale: This site supports dominant hydrophytic vegetation, hydric soils, and wetland hydrology. We determined that this site is a wetland.

Determined by: Jeff Matthews, Dave Ketzner and Paul Tessene
(vegetation and hydrology)
Jessica Kurylo (soils and hydrology)
Illinois Natural History Survey
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ROUTINE ON-SITE WETLAND DETERMINATION

Site 1A (page 3 of 5)

Field Investigators: Matthews, Kurylo, Ketzner and Tessene

Date: 9 August 2007

Project Name: Harrison Avenue Extension at Pecatonica

State: Illinois **County:** Winnebago **Applicant:** IDOT District 2

Site Name: Marsh/wet meadow

Legal Description: NE/4, NW/4, Sect. 19, T 27N, R 10E

Location: This site is located in northern part of the project area, just south of Blair Road.

SPECIES LIST

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
<i>Abutilon theophrasti</i>	velvet-leaf	herb	FACU-	*
<i>Acalypha rhomboidea</i>	three-seeded mercury	herb	FACU	0
<i>Acer saccharinum</i>	silver maple	tree	FACW	1
† <i>Acorus calamus</i>	sweetflag	herb	OBL	4
† <i>Alisma plantago-aquatica</i>	broad-leaf water-plantain	herb	OBL	2
<i>Amaranthus tuberculatus</i>	tall waterhemp	herb	OBL	1
<i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
<i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
† <i>Andropogon gerardii</i>	big bluestem	herb	FAC-	5
<i>Apocynum cannabinum</i>	dogbane	herb	FAC	2
<i>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
<i>Asclepias verticillata</i>	horsetail milkweed	herb	UPL	1
<i>Aster ontarionis</i>	Ontario aster	herb	FAC	4
<i>Bidens cernua</i>	nodding beggar's ticks	herb	OBL	2
<i>Bidens frondosa</i>	common beggar's ticks	herb	FACW	1
<i>Carex comosa</i>	bristly sedge	herb	OBL	6
† <i>Carex hystricina</i>	bottlebrush sedge	herb	OBL	6
† <i>Carex vulpinoidea</i>	fox sedge	herb	OBL	3
<i>Celtis occidentalis</i>	hackberry	herb	FAC-	3
<i>Cirsium arvense</i>	Canada thistle	herb	FACU	*
<i>Cirsium vulgare</i>	bull thistle	herb	FACU-	*
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
<i>Cyperus</i> sp.	nutsedge	herb	----	--
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Echinocystis lobata</i>	wild balsam-apple	herb	FACW-	4
<i>Epilobium coloratum</i>	cinnamon willow herb	herb	OBL	3
<i>Eragrostis hypnoides</i>	creeping love grass	herb	OBL	5
<i>Erechtites hieracifolia</i>	fire weed	herb	FACU	2
<i>Erigeron annuus</i>	annual fleabane	herb	FAC-	1
<i>Eupatorium perfoliatum</i>	common boneset	herb	FACW+	4
<i>Geum canadense</i>	white avens	herb	FAC	2
<i>Gratiola neglecta</i>	clammy hedge hyssop	herb	OBL	5
<i>Helenium autumnale</i>	autumn sneezeweed	herb	FACW+	3

(continued on next page)

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1A (page 4 of 5)

Field Investigators: Matthews, Kurylo, Ketzner and Tessene

Date: 9 August 2007

Project Name: Harrison Avenue Extension at Pecatonica

State: Illinois **County:** Winnebago **Applicant:** IDOT District 2

Site Name: Marsh/wet meadow

Legal Description: NE/4, NW/4, Sect. 19, T 27N, R 10E

Location: This site is located in northern part of the project area, just south of Blair Road.

SPECIES LIST (continued)

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
<i>Helianthus tuberosus</i>	Jerusalem artichoke	herb	FAC	3
<i>Impatiens capensis</i>	jewelweed	herb	FACW	2
<i>Ipomoea lacunosa</i>	small white morning-glory	herb	FACW	1
† <i>Iris shrevei</i>	southern blue flag	herb	OBL	5
<i>Lactuca serriola</i>	prickly lettuce	herb	FAC	*
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Lemna minor</i>	common duckweed	herb	OBL	3
<i>Lobelia cardinalis</i>	cardinal-flower	herb	OBL	6
† <i>Mimulus ringens</i>	monkey flower	herb	OBL	5
<i>Nasturtium officinale</i>	water cress	herb	OBL	*
<i>Panicum capillare</i>	witch grass	herb	FAC	0
† <i>Panicum virgatum</i>	prairie switchgrass	herb	FAC+	4
<i>Polygonum amphibium</i>	water smartweed	herb	OBL	3
<i>Polygonum hydropiper</i>	common smartweed	herb	OBL	*
<i>Polygonum lapathifolium</i>	curttop lady's thumb	herb	FACW+	0
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Polygonum persicaria</i>	spotted lady's thumb	herb	FACW	*
<i>Polygonum scandens</i>	climbing buckwheat	herb	FAC	2
<i>Populus deltoides</i>	eastern cottonwood	shrub	FAC+	2
<i>Potentilla norvegica</i>	rough cinquefoil	herb	FAC	0
<i>Ranunculus sp.</i>	buttercup	herb	----	--
<i>Rorippa palustris</i>	marsh yellow cress	herb	OBL	4
<i>Rosa multiflora</i>	multiflora rose	herb	FACU	*
<i>Rumex altissimus</i>	pale dock	herb	FACW-	2
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
† <i>Sagittaria latifolia</i>	arrowhead	herb	OBL	4
<i>Salix amygdaloides</i>	peach-leaved willow	shrub	FACW	4
<i>Salix exigua</i>	sandbar willow	shrub	OBL	1
<i>Sambucus canadensis</i>	common elder	shrub	FACW-	2
† <i>Scirpus atrovirens</i>	dark green bulrush	herb	OBL	4
<i>Scirpus cyperinus</i>	wool grass	herb	OBL	5
<i>Scirpus tabernaemontanii</i>	great bulrush	herb	OBL	4
† <i>Scutellaria lateriflora</i>	mad-dog skullcap	herb	OBL	4

(continued on next page)

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1A (page 5 of 5)

Field Investigators: Matthews, Kurylo, Ketzner and Tessene

Date: 9 August 2007

Project Name: Harrison Avenue Extension at Pecatonica

State: Illinois **County:** Winnebago **Applicant:** IDOT District 2

Site Name: Marsh/wet meadow

Legal Description: NE/4, NW/4, Sect. 19, T 27N, R 10E

Location: This site is located in northern part of the project area, just south of Blair Road.

SPECIES LIST (continued)

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
<i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
<i>Setaria glauca</i>	pigeon grass	herb	FAC	*
<i>Solanum carolinense</i>	horse nettle	herb	FACU-	0
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Sonchus asper</i>	prickly sowthistle	herb	FAC	*
† <i>Spartina pectinata</i>	freshwater cord grass	herb	FACW+	4
<i>Toxicodendron radicans</i>	poison ivy	shrub	FAC+	1
<i>Typha angustifolia</i>	narrow-leaved cattail	herb	OBL	*
<i>Typha latifolia</i>	cattail	herb	OBL	1
<i>Urtica dioica</i>	stinging nettle	herb	FAC+	2
<i>Verbena hastata</i>	blue vervain	herb	FACW+	3
<i>Verbena urticifolia</i>	white vervain	herb	FAC+	3
<i>Vitis riparia</i>	riverbank grape	herb	FACW-	2

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

* Non-native species

† Planted species

With planted species:

$$mCv = \sum C/N = 165/64 = 2.6$$

$$FQI = \sum C/\sqrt{N} = 165/\sqrt{64} = 20.6$$

Without planted species:

$$mCv = \sum C/N = 115/52 = 2.2$$

$$FQI = \sum C/\sqrt{N} = 115/\sqrt{52} = 15.9$$

ROUTINE ON-SITE WETLAND DETERMINATION
Site 1B (page 2 of 5)

Field Investigators: Matthews, Kurylo, Ketzner and Tessene
Date: 9 August 2007, 3 October 2007
Project Name: Harrison Avenue Extension at Pecatonica
State: Illinois **County:** Winnebago **Applicant:** IDOT District 2
Site Name: Non-native grassland
Legal Description: NE/4, NW/4, Sect. 19, T 27N, R 10E
Location: This site is located in northern part of the project area, just south of Blair Road, and north of the Pecatonica River.

HYDROLOGY

Inundated: Yes: X No: Depth of standing water: N/A
Depth to saturated soil: 0.05 m (2 in)

Overview of hydrological flow through the system: This site receives water through precipitation and infrequent overflow from the Pecatonica River. Water leaves the site via evapotranspiration, soil infiltration and sheet flow to Site 1A and the Pecatonica River.

Size of Watershed: 4429 km² (1710 mi²) (Ogata 1975)

Other field evidence observed: Sediment deposits on vegetation, wetland drainage patterns, drift accumulation, algal deposits

Wetland hydrology: Yes: No: Undetermined: X

Rationale: According to a report by ISGS personnel (Plankell and Benton 2007) this site was inundated or saturated for at least 5% of the 2007 growing season, but did not meet the wetland hydrology criterion in 2005 or 2006.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: No: X

Rationale: This site lacks dominant hydrophytic vegetation and hydric soils, and may not have wetland hydrology. We determined that this site is not a wetland.

Determined by: Jeff Matthews, Dave Ketzner and Paul Tessene
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ROUTINE ON-SITE WETLAND DETERMINATION

Site 1B (page 3 of 5)

Field Investigators: Matthews, Kurylo, Ketzner and Tessene

Date: 9 August 2007, 3 October 2007

Project Name: Harrison Avenue Extension at Pecatonica

State: Illinois **County:** Winnebago **Applicant:** IDOT District 2

Site Name: Non-native grassland

Legal Description: NE/4, NW/4, Sect. 19, T 27N, R 10E

Location: This site is located in northern part of the project area, just south of Blair Road, and north of the Pecatonica River.

SPECIES LIST

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
<i>Acer negundo</i>	box elder	herb, shrub	FACW-	1
<i>Acer saccharinum</i>	silver maple	herb	FACW	1
<i>Agrostis alba</i>	red top	herb	FACW	0
<i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
† <i>Andropogon gerardii</i>	big bluestem	herb	FAC-	5
<i>Apocynum cannabinum</i>	dogbane	herb	FAC	2
<i>Arctium minus</i>	common burdock	herb	UPL	*
<i>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
<i>Asclepias syriaca</i>	common milkweed	herb	UPL	0
† <i>Aster novae-angliae</i>	New England aster	herb	FACW	4
<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>Bidens vulgata</i>	tall beggar's ticks	herb	FACW	0
<i>Bromus japonicus</i>	Japanese brome	herb	FACU	*
<i>Campanula americana</i>	American bellflower	herb	FAC	4
† <i>Carex stricta</i>	tussock sedge	herb	OBL	5
<i>Chenopodium album</i>	lamb's quarters	herb	FAC-	*
<i>Cichorium intybus</i>	chickory	herb	UPL	*
<i>Cirsium arvense</i>	Canada thistle	herb	FACU	*
<i>Cirsium discolor</i>	pasture thistle	herb	UPL	3
<i>Cirsium vulgare</i>	bull thistle	herb	FACU-	*
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
<i>Daucus carota</i>	Queen Anne's lace	herb	UPL	*
<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>Epilobium coloratum</i>	cinnamon willow herb	herb	OBL	3
<i>Erigeron annuus</i>	annual fleabane	herb	FAC-	1
<i>Geum canadense</i>	white avens	herb	FAC	2
<i>Hackelia virginiana</i>	stickseed	herb	FAC-	1
† <i>Iris shrevei</i>	southern blue flag	herb	OBL	5
<i>Lactuca serriola</i>	prickly lettuce	herb	FAC	*

(continued on next page)

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1B (page 4 of 5)

Field Investigators: Matthews, Kurylo, Ketzner and Tessene

Date: 9 August 2007, 3 October 2007

Project Name: Harrison Avenue Extension at Pecatonica

State: Illinois **County:** Winnebago **Applicant:** IDOT District 2

Site Name: Non-native grassland

Legal Description: NE/4, NW/4, Sect. 19, T 27N, R 10E

Location: This site is located in northern part of the project area, just south of Blair Road, and north of the Pecatonica River.

SPECIES LIST (continued)

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
<i>Laportea canadensis</i>	wood nettle	herb	FACW	2
<i>Lobelia inflata</i>	Indian tobacco	herb	FACU-	4
<i>Medicago lupulina</i>	black medic	herb	FAC-	*
<i>Monarda fistulosa</i>	wild bergamot	herb	FACU	4
<i>Morus alba</i>	white mulberry	herb	FAC	*
<i>Oenothera biennis</i>	evening primrose	herb	FACU	1
<i>Oxalis stricta</i>	yellow wood sorrel	herb	FACU	0
<i>Panicum capillare</i>	witch grass	herb	FAC	0
<i>Panicum dichotomiflorum</i>	fall panicum	herb	FACW-	0
† <i>Panicum virgatum</i>	prairie switchgrass	herb	FAC+	4
<i>Pastinaca sativa</i>	parsnip	herb	UPL	*
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Pilea pumila</i>	Canada clearweed	herb	FACW	3
<i>Polygonum amphibium</i>	water smartweed	herb	OBL	3
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Polygonum persicaria</i>	spotted lady's thumb	herb	FACW	*
<i>Polygonum scandens</i>	climbing buckwheat	herb	FAC	2
<i>Populus deltoides</i>	eastern cottonwood	herb	FAC+	2
<i>Potentilla norvegica</i>	rough cinquefoil	herb	FAC	0
<i>Prunus serotina</i>	wild black cherry	herb	FACU	1
<i>Rorippa sylvestris</i>	creeping yellow cress	herb	OBL	*
<i>Rubus occidentalis</i>	black raspberry	shrub	UPL	2
<i>Rudbeckia hirta</i>	black-eyed Susan	herb	FACU	2
<i>Rudbeckia laciniata</i>	cutleaf coneflower	herb	FACW+	3
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
<i>Sambucus canadensis</i>	common elder	shrub	FACW-	2
† <i>Scutellaria lateriflora</i>	mad-dog skullcap	herb	OBL	4
<i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
<i>Setaria glauca</i>	pigeon grass	herb	FAC	*
† <i>Silphium perfoliatum</i>	cup plant	herb	FACW-	4
† <i>Silphium terebinthinaceum</i>	dock rosin-weed	herb	FAC-	4
<i>Solanum carolinense</i>	horse nettle	herb	FACU-	0
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1

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ROUTINE ON-SITE WETLAND DETERMINATION

Site 1B (page 5 of 5)

Field Investigators: Matthews, Kurylo, Ketzner and Tessene

Date: 9 August 2007, 3 October 2007

Project Name: Harrison Avenue Extension at Pecatonica

State: Illinois **County:** Winnebago **Applicant:** IDOT District 2

Site Name: Non-native grassland

Legal Description: NE/4, NW/4, Sect. 19, T 27N, R 10E

Location: This site is located in northern part of the project area, just south of Blair Road, and north of the Pecatonica River.

SPECIES LIST (continued)

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
<i>Solidago gigantea</i>	late goldenrod	herb	FACW	3
<i>Sonchus asper</i>	prickly sowthistle	herb	FAC	*
† <i>Spartina pectinata</i>	freshwater cord grass	herb	FACW+	4
<i>Stachys tenuifolia</i>	slenderleaf betony	herb	OBL	5
<i>Taraxacum officinale</i>	common dandelion	herb	FACU	*
<i>Teucrium canadense</i>	American germander	herb	FACW-	3
<i>Toxicodendron radicans</i>	poison ivy	herb	FAC+	1
<i>Trifolium pratense</i>	red clover	herb	FACU+	*
<i>Ulmus americana</i>	American elm	herb	FACW-	5
<i>Urtica dioica</i>	stinging nettle	herb	FAC+	2
<i>Verbascum thapsus</i>	woolly mullein	herb	UPL	*
<i>Verbena urticifolia</i>	white vervain	herb	FAC+	3
<i>Viola pratincola</i>	common blue violet	herb	FAC	1
<i>Vitis riparia</i>	riverbank grape	herb	FACW-	2

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

* Non-native species

† Planted species

With planted species:

$$mCv = \sum C/N = 134/59 = 2.3$$

$$FQI = \sum C/\sqrt{N} = 134/\sqrt{59} = 17.4$$

Without planted species:

$$mCv = \sum C/N = 85/47 = 1.8$$

$$FQI = \sum C/\sqrt{N} = 85/\sqrt{47} = 12.4$$

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

Field Investigators: Matthews, Kurylo, Ketzner and Tessene
Date: 9 August 2007, 3 October 2007
Project Name: Harrison Avenue Extension at Pecatonica
State: Illinois **County:** Winnebago **Applicant:** IDOT District 2
Site Name: Forested site
Legal Description: S/2, NW/4, Sect. 19, T 27N, R 10E
Location: This site is located in southern part of the project area, north and west of the Pecatonica River.

HYDROLOGY

Inundated: Yes: X (in parts) No: Depth of standing water: up to 0.1 m (4 inches)
Depth to saturated soil: from surface to greater than 0.76 m (30 in)
Overview of hydrological flow through the system: This site receives water through precipitation and sheet flow from surrounding higher ground, and infrequent overflow from the Pecatonica River. Water leaves the site via evapotranspiration, soil infiltration and surface flow to the Pecatonica River.
Size of Watershed: 4429 km² (1710 mi²) (Ogata 1975)
Other field evidence observed: Wetland drainage patterns

Wetland hydrology: Yes: No: Undetermined: X
Rationale: According to a report by ISGS personnel (Plankell and Benton 2007) this site was inundated or saturated for at least 5% of the growing season during 2007, but did not meet the wetland hydrology criterion in 2005 or 2006.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: No: X
Rationale: This site lacks dominant hydrophytic vegetation and hydric soils, and may not have wetland hydrology. We determined that this site is not a wetland.

Determined by: Jeff Matthews, Dave Ketzner and Paul Tessene
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ROUTINE ON-SITE WETLAND DETERMINATION

Site 2 (page 3 of 5)

Field Investigators: Matthews, Kurylo, Ketzner and Tessene

Date: 9 August 2007, 3 October 2007

Project Name: Harrison Avenue Extension at Pecatonica

State: Illinois **County:** Winnebago **Applicant:** IDOT District 2

Site Name: Forested site

Legal Description: S/2, NW/4, Sect. 19, T 27N, R 10E

Location: This site is located in southern part of the project area, north and west of the Pecatonica River.

SPECIES LIST

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
<i>Abutilon theophrasti</i>	velvet-leaf	herb	FACU-	*
<i>Acer saccharinum</i>	silver maple	herb	FACW	1
<i>Agropyron repens</i>	quack grass	herb	FACU	*
<i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
† <i>Amelanchier arborea</i>	juneberry	tree	FACU	7
† <i>Andropogon gerardii</i>	big bluestem	herb	FAC-	5
<i>Apocynum cannabinum</i>	dogbane	herb	FAC	2
<i>Asclepias incarnata</i>	swamp milkweed	herb	OBL	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 praealtus</i>	willow-leaved aster	herb	FACW	4
† <i>Aster simplex</i>	panicked aster	herb	FACW	3
<i>Berteroa incana</i>	hoary alyssum	herb	UPL	*
<i>Bidens vulgata</i>	tall beggar's ticks	herb	FACW	0
<i>Calystegia sepium</i>	American bindweed	herb	FAC	1
<i>Campanula americana</i>	American bellflower	herb	FAC	4
† <i>Carex vulpinoidea</i>	fox sedge	herb	OBL	3
† <i>Celtis occidentalis</i>	hackberry	tree	FAC-	3
† <i>Cephalanthus occidentalis</i>	buttonbush	shrub	OBL	4
<i>Chenopodium album</i>	lamb's quarters	herb	FAC-	*
<i>Cirsium arvense</i>	Canada thistle	herb	FACU	*
<i>Cirsium vulgare</i>	bull thistle	herb	FACU-	*
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
† <i>Cornus amomum</i>	silky dogwood	shrub	FACW+	10
† <i>Cornus stolonifera</i>	red osier dogwood	shrub	FACW	4
† <i>Corylus americana</i>	American filbert	shrub	FACU-	4
<i>Cyperus ferruginescens</i>	rusty nut-sedge	herb	OBL	1
<i>Daucus carota</i>	Queen Anne's lace	herb	UPL	*
† <i>Elymus canadensis</i>	Canada wild rye	herb	FAC-	4
<i>Elymus virginicus</i>	Virginia wild rye	herb	FACW-	4
<i>Fraxinus pennsylvanica</i>	green ash	shrub, herb	FACW	2

(continued on next page)

ROUTINE ON-SITE WETLAND DETERMINATION

Site 2 (page 4 of 5)

Field Investigators: Matthews, Kurylo, Ketzner and Tessene

Date: 9 August 2007, 3 October 2007

Project Name: Harrison Avenue Extension at Pecatonica

State: Illinois **County:** Winnebago **Applicant:** IDOT District 2

Site Name: Forested site

Legal Description: S/2, NW/4, Sect. 19, T 27N, R 10E

Location: This site is located in southern part of the project area, north and west of the Pecatonica River.

SPECIES LIST (continued)

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
<i>Geum canadense</i>	white avens	herb	FAC	2
<i>Gleditsia triacanthos</i>	honey locust	shrub	FAC	2
<i>Hordeum jubatum</i>	squirrel-tail	herb	FAC+	*
† <i>Iris shrevei</i>	southern blue flag	herb	OBL	5
† <i>Juglans nigra</i>	black walnut	tree	FACU	4
<i>Lactuca serriola</i>	prickly lettuce	herb	FAC	*
<i>Laportea canadensis</i>	wood nettle	herb	FACW	2
<i>Lycopus americanus</i>	common water horehound	herb	OBL	3
<i>Monarda fistulosa</i>	wild bergamot	herb	FACU	4
<i>Morus alba</i>	white mulberry	shrub, herb	FAC	*
<i>Oenothera biennis</i>	evening primrose	herb	FACU	1
† <i>Panicum virgatum</i>	prairie switchgrass	herb	FAC+	4
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Physalis subglabrata</i>	smooth ground cherry	herb	UPL	0
† <i>Platanus occidentalis</i>	sycamore	tree	FACW	3
<i>Polygonum amphibium</i>	water smartweed	herb	OBL	3
<i>Polygonum lapathifolium</i>	curttop lady's thumb	herb	FACW+	0
<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>Populus deltoides</i>	eastern cottonwood	shrub	FAC+	2
† <i>Quercus bicolor</i>	swamp white oak	tree	FACW+	7
† <i>Quercus macrocarpa</i>	bur oak	tree	FAC-	5
<i>Rosa multiflora</i>	multiflora rose	shrub	FACU	*
<i>Rudbeckia hirta</i>	black-eyed Susan	herb	FACU	2
<i>Rudbeckia laciniata</i>	cutleaf coneflower	herb	FACW+	3
<i>Rumex altissimus</i>	pale dock	herb	FACW-	2
† <i>Salix amygdaloides</i>	peach-leaved willow	tree	FACW	4
<i>Salix exigua</i>	sandbar willow	shrub	OBL	1
<i>Scrophularia marilandica</i>	late figwort	herb	FACU-	4
<i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
† <i>Silphium perfoliatum</i>	cup plant	herb	FACW-	4
<i>Smilax hispida</i>	bristly greenbrier	vine	FAC	3

(continued on next page)

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

Field Investigators: Matthews, Kurylo, Ketzner and Tessene
Date: 9 August 2007, 3 October 2007
Project Name: Harrison Avenue Extension at Pecatonica
State: Illinois **County:** Winnebago **Applicant:** IDOT District 2
Site Name: Forested site
Legal Description: S/2, NW/4, Sect. 19, T 27N, R 10E
Location: This site is located in southern part of the project area, north and west of the Pecatonica River.

SPECIES LIST (continued)

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
<i>Solanum ptycanthum</i>	black nightshade	herb	FACU-	0
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Solidago gigantea</i>	late goldenrod	herb	FACW	3
<i>Sonchus arvensis</i>	field sowthistle	herb	FAC-	*
† <i>Sorghastrum nutans</i>	Indian grass	herb	FACU+	4
<i>Stachys tenuifolia</i>	slenderleaf betony	herb	OBL	5
<i>Toxicodendron radicans</i>	poison ivy	herb	FAC+	1
† <i>Ulmus americana</i>	American elm	tree	FACW-	5
<i>Urtica dioica</i>	stinging nettle	herb	FAC+	2
<i>Verbena hastata</i>	blue vervain	herb	FACW+	3
<i>Verbena stricta</i>	hoary vervain	herb	UPL	2
<i>Viola sororia</i>	woolly blue violet	herb	FAC-	3
<i>Vitis riparia</i>	riverbank grape	vine	FACW-	2
<i>Xanthium strumarium</i>	cocklebur	herb	FAC	0
<i>Zea mays</i>	corn	herb	UPL	*

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

* Non-native species

† Planted species

With planted species:

$$mCv = \sum C/N = 181/65 = 2.8$$

$$FQI = \sum C/\sqrt{N} = 181/\sqrt{65} = 22.5$$

Without planted species:

$$mCv = \sum C/N = 89/45 = 2.0$$

$$FQI = \sum C/\sqrt{N} = 89/\sqrt{45} = 13.3$$

ROUTINE ON-SITE WETLAND DETERMINATION
Site 3 (page 2 of 3)

Field Investigators: Matthews, Kurylo, and Ketzner
Date: 3 October 2007
Project Name: Harrison Avenue Extension at Pecatonica
State: Illinois **County:** Winnebago **Applicant:** IDOT District 2
Site Name: Streambed wetland
Legal Description: NW/4, Sect. 19, T 27N, R 10E
Location: This site is located along the western boundary of the project area, beginning just south of Blair Road, and extending south to the Pecatonica River.

HYDROLOGY

Inundated: Yes: X No: Depth of standing water: up to 0.4 m (16 in)
Depth to saturated soil: saturated at surface
Overview of hydrological flow through the system: This site is a streambed and receives water primarily through stream flow from the north. In addition the site receives water through precipitation, sheet flow from surrounding higher ground, and possible backflow from the Pecatonica River. Water leaves the site via evapotranspiration, soil infiltration and stream flow into the Pecatonica River at the south end.
Size of Watershed: 4429 km² (1710 mi²) (Ogata 1975)
Other field evidence observed: Barren soil in some areas

Wetland hydrology: Yes: X No:
Rationale: This site is located in a streambed and holds water for a long duration during the growing season. Although this site has not been monitored by the ISGS, field evidence indicates that the site was inundated or saturated for a sufficient duration to satisfy the wetland hydrology criterion during 2007.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: X No:
Rationale: This site supports dominant hydrophytic vegetation, hydric soils, and wetland hydrology. We determined that this site is a wetland.

Determined by: Jeff Matthews and Dave Ketzner (vegetation and hydrology)
Jessica Kurylo (soils and hydrology)
Illinois Natural History Survey
1816 S. Oak Street
Champaign, Illinois 61820
(217) 244-2168 (Matthews)

ROUTINE ON-SITE WETLAND DETERMINATION

Site 3 (page 3 of 3)

Field Investigators: Matthews, Kurylo, and Ketzner

Date: 3 October 2007

Project Name: Harrison Avenue Extension at Pecatonica

State: Illinois **County:** Winnebago **Applicant:** IDOT District 2

Site Name: Streambed wetland

Legal Description: NW/4, Sect. 19, T 27N, R 10E

Location: This site is located along the western boundary of the project area, beginning just south of Blair Road, and extending south to the Pecatonica River.

SPECIES LIST

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
<i>Acer saccharinum</i>	silver maple	tree, herb	FACW	1
<i>Alisma plantago-aquatica</i>	broad-leaf water-plantain	herb	OBL	2
<i>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
<i>Aster simplex</i>	panicked aster	herb	FACW	3
<i>Carex</i> sp.	sedge	herb	----	--
<i>Cephalanthus occidentalis</i>	buttonbush	shrub	OBL	4
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Lemna minor</i>	common duckweed	herb	OBL	3
<i>Lysimachia ciliata</i>	fringed loosestrife	herb	FACW	4
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Pilea pumila</i>	Canada clearweed	herb	FACW	3
<i>Polygonum amphibium</i>	water smartweed	herb	OBL	3
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Polygonum punctatum</i>	dotted smartweed	herb	OBL	3
<i>Rosa multiflora</i>	multiflora rose	shrub	FACU	*
<i>Rumex verticillatus</i>	swamp dock	herb	OBL	5
<i>Salix exigua</i>	sandbar willow	shrub	OBL	1
<i>Salix nigra</i>	black willow	tree	OBL	3
<i>Scirpus cyperinus</i>	wool grass	herb	OBL	5
† <i>Scirpus fluviatilis</i>	river bulrush	herb	OBL	3
<i>Urtica dioica</i>	stinging nettle	herb	FAC+	2
<i>Verbena hastata</i>	blue vervain	herb	FACW+	3
<i>Vitis riparia</i>	riverbank grape	vine	FACW-	2

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

* Non-native species

† Planted species

With planted species:

$$mCv = \sum C/N = 58/20 = 2.9$$

$$FQI = \sum C/\sqrt{N} = 58/\sqrt{20} = 15.8$$

Without planted species:

$$mCv = \sum C/N = 55/19 = 2.5$$

$$FQI = \sum C/\sqrt{N} = 55/\sqrt{19} = 12.6$$

APPENDIX B: VEGETATION, WETLAND AND HYDROLOGIC MAPS

Figure 1: Estimated extent of 2007 wetland hydrology within the project area (figure prepared by ISGS, from Plankell and Benton 2007).

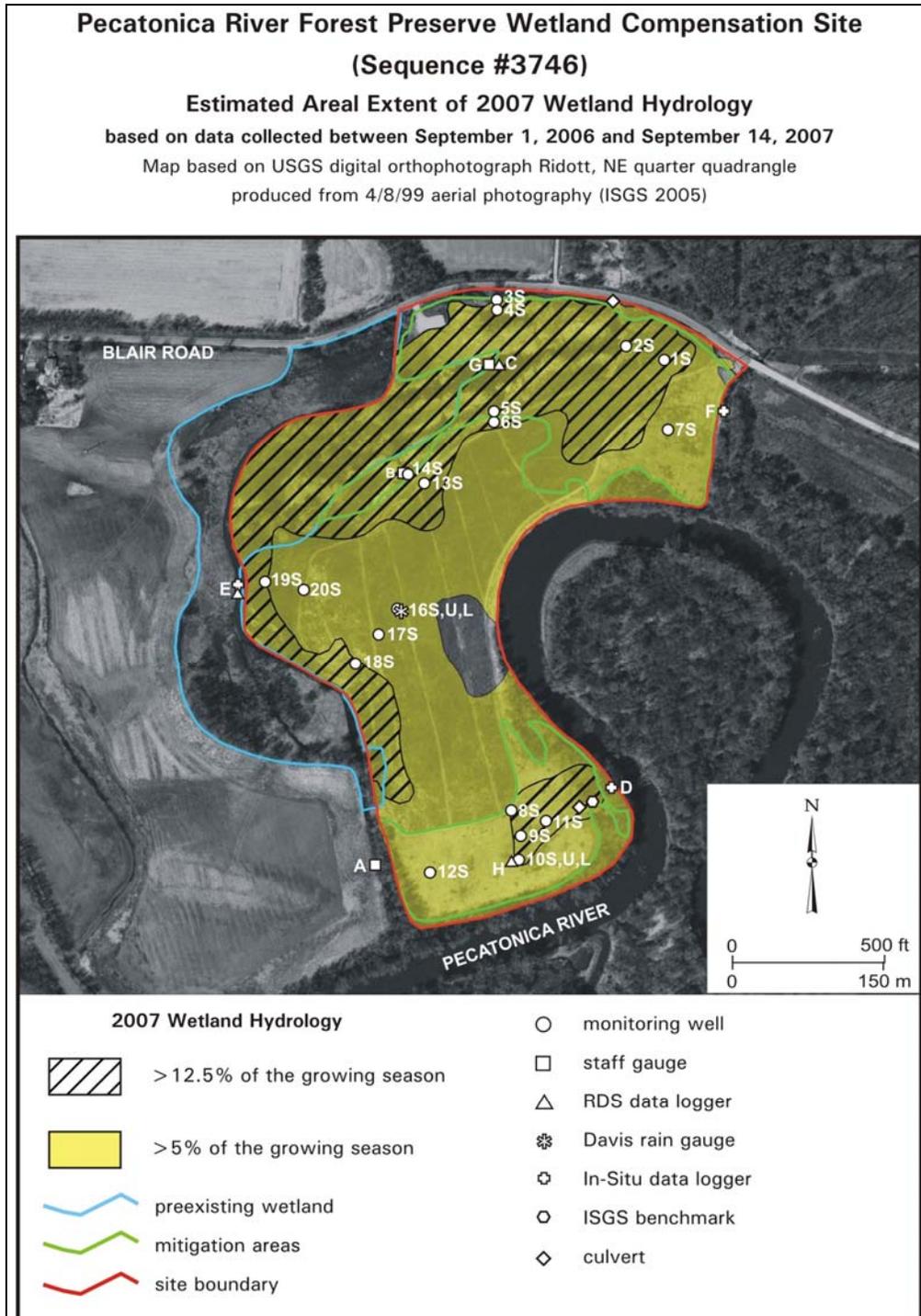
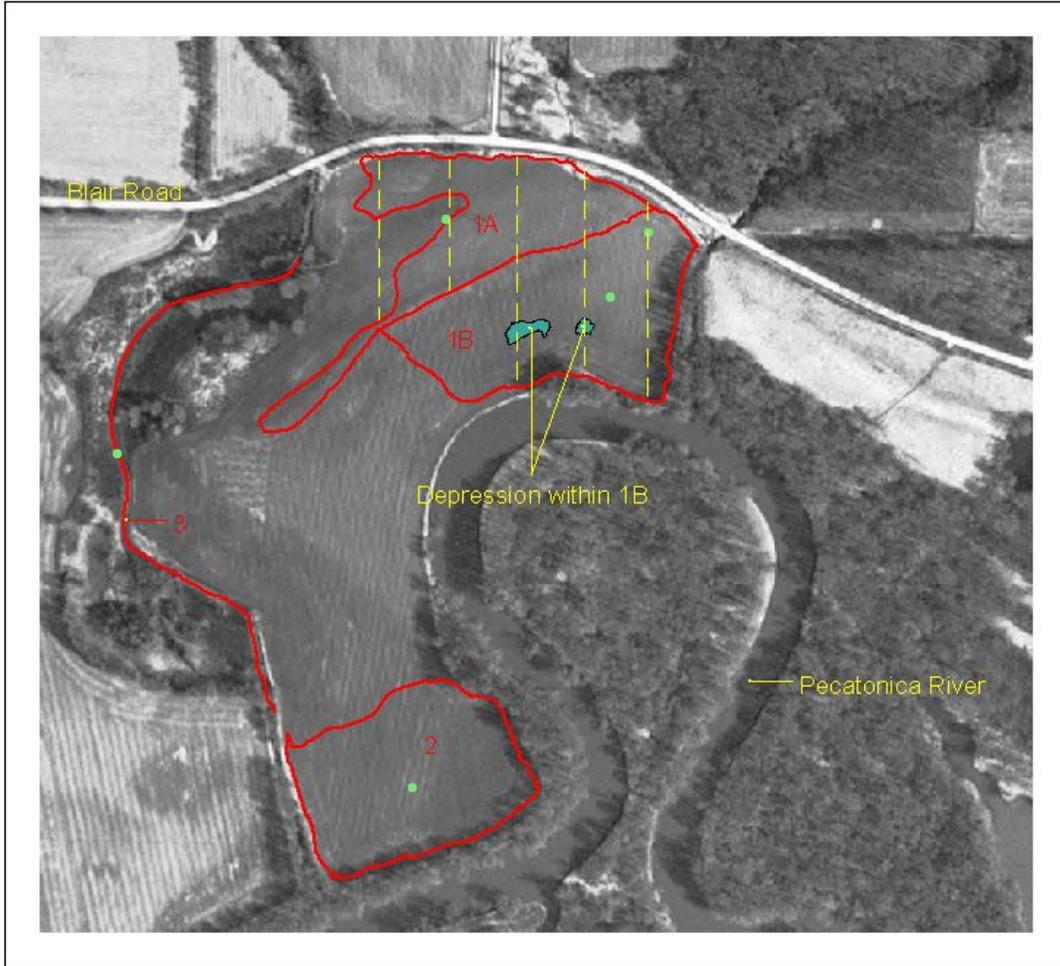


Figure 2: Locations of wetland determination sites/vegetation communities within the project area.

**Pecatonica River Forest Preserve
Mitigation Site
Winnebago County**



0 400 800 Feet

scale 1:4800
1 inch=400 ft

0 100 200 Meters



11/07

APPENDIX C: RESULTS OF QUANTITATIVE VEGETATION SAMPLING

Table 1: Results of 2007 quantitative vegetation sampling at Site 1A (marsh/wet meadow)

Species	Frequency	Relative frequency	Average cover	Relative cover	IV
<i>Phalaris arundinacea</i>	100.0	26.7	71.6	58.9	42.8
<i>Polygonum amphibium</i>	31.3	8.3	10.5	8.6	8.5
<i>Echinochloa muricata</i>	18.8	5.0	5.6	4.6	4.8
<i>Lemna minor</i>	18.8	5.0	3.5	2.9	3.9
<i>Alisma plantago-aquatica</i>	12.5	3.3	2.5	2.1	2.7
<i>Panicum capillare</i>	12.5	3.3	2.5	2.1	2.7
<i>Setaria faberi</i>	6.3	1.7	3.9	3.2	2.4
<i>Bidens cernua</i>	12.5	3.3	1.9	1.5	2.4
<i>Scirpus atrovirens</i>	12.5	3.3	1.1	0.9	2.1
<i>Acer saccharinum</i>	6.3	1.7	2.3	1.9	1.8
<i>Leersia oryzoides</i>	6.3	1.7	2.3	1.9	1.8
<i>Salix exigua</i>	6.3	1.7	2.3	1.9	1.8
<i>Acalypha rhomboidea</i>	6.3	1.7	0.9	0.8	1.2
<i>Ambrosia trifida</i>	6.3	1.7	0.9	0.8	1.2
<i>Asclepias incarnata</i>	6.3	1.7	0.9	0.8	1.2
<i>Cirsium arvense</i>	6.3	1.7	0.9	0.8	1.2
<i>Cyperus sp.</i>	6.3	1.7	0.9	0.8	1.2
<i>Epilobium coloratum</i>	6.3	1.7	0.9	0.8	1.2
<i>Erigeron annuus</i>	6.3	1.7	0.9	0.8	1.2
<i>Polygonum pennsylvanicum</i>	6.3	1.7	0.9	0.8	1.2
<i>Scutellaria lateriflora</i>	6.3	1.7	0.9	0.8	1.2
<i>Verbena hastata</i>	6.3	1.7	0.9	0.8	1.2
<i>Abutilon theophrasti</i>	6.3	1.7	0.2	0.2	0.9
<i>Amaranthus tuberculatus</i>	6.3	1.7	0.2	0.2	0.9
<i>Carex hystricina</i>	6.3	1.7	0.2	0.2	0.9
<i>Conyza canadensis</i>	6.3	1.7	0.2	0.2	0.9
<i>Eragrostis hypnoides</i>	6.3	1.7	0.2	0.2	0.9
<i>Geum canadense</i>	6.3	1.7	0.2	0.2	0.9
<i>Gratiola neglecta</i>	6.3	1.7	0.2	0.2	0.9
<i>Polygonum persicaria</i>	6.3	1.7	0.2	0.2	0.9
<i>Potentilla norvegica</i>	6.3	1.7	0.2	0.2	0.9
<i>Toxicodendron radicans</i>	6.3	1.7	0.2	0.2	0.9
<i>Vitis riparia</i>	6.3	1.7	0.2	0.2	0.9
Sum	375	100	122	100	100

Table 2: Results of 2007 quantitative vegetation sampling at Site 1B (non-native grassland)

Species	Frequency	Relative frequency	Average cover	Relative cover	IV
<i>Setaria faberi</i>	100.0	26.0	51.7	47.3	36.6
<i>Polygonum pensylvanicum</i>	46.2	12.0	15.1	13.8	12.9
<i>Conyza canadensis</i>	30.8	8.0	9.1	8.3	8.1
<i>Phalaris arundinacea</i>	23.1	6.0	8.8	8.1	7.0
<i>Potentilla norvegica</i>	23.1	6.0	4.3	3.9	5.0
<i>Echinochloa muricata</i>	7.7	2.0	4.8	4.4	3.2
<i>Elymus canadensis</i>	15.4	4.0	1.4	1.3	2.6
<i>Sonchus asper</i>	15.4	4.0	1.4	1.3	2.6
<i>Polygonum amphibium</i>	7.7	2.0	2.9	2.6	2.3
<i>Taraxacum officinale</i>	15.4	4.0	0.5	0.4	2.2
<i>Cirsium vulgare</i>	7.7	2.0	1.2	1.1	1.5
<i>Erigeron annuus</i>	7.7	2.0	1.2	1.1	1.5
<i>Monarda fistulosa</i>	7.7	2.0	1.2	1.1	1.5
<i>Rudbeckia laciniata</i>	7.7	2.0	1.2	1.1	1.5
<i>Rumex crispus</i>	7.7	2.0	1.2	1.1	1.5
<i>Solidago gigantea</i>	7.7	2.0	1.2	1.1	1.5
<i>Cirsium arvense</i>	7.7	2.0	0.2	0.2	1.1
<i>Lactuca serriola</i>	7.7	2.0	0.2	0.2	1.1
<i>Panicum capillare</i>	7.7	2.0	0.2	0.2	1.1
<i>Silphium terebinthinaceum</i>	7.7	2.0	0.2	0.2	1.1
<i>Solanum carolinense</i>	7.7	2.0	0.2	0.2	1.1
Sum	369	100	108	100	100

Table 3: Results of 2007 vegetation sampling at Site 3 (streambed wetland)

Species	Commonness
<i>Lemna minor</i>	5
<i>Phalaris arundinacea</i>	5
<i>Leersia oryzoides</i>	3
<i>Polygonum pensylvanicum</i>	3
<i>Acer saccharinum</i>	2
<i>Alisma plantago-aquatica</i>	2
<i>Aster simplex</i>	2
<i>Pilea pumila</i>	2
<i>Polygonum amphibium</i>	2
<i>Salix exigua</i>	2
<i>Scirpus cyperinus</i>	2
<i>Scirpus fluviatilis</i>	2
<i>Asclepias incarnata</i>	1
<i>Carex sp.</i>	1
<i>Cephalanthus occidentalis</i>	1
<i>Lysimachia ciliata</i>	1
<i>Polygonum punctatum</i>	1
<i>Rosa multiflora</i>	1
<i>Rumex verticillatus</i>	1
<i>Salix nigra</i>	1
<i>Urtica dioica</i>	1
<i>Verbena hastata</i>	1
<i>Vitis riparia</i>	1

APPENDIX D: PHOTOGRAPHS OF WETLAND MITIGATION SITE

Fig. 1. View of Sites 1A and 1B from northeast corner of 1A, facing southwest



Fig. 2. View of Site 1A from northwest corner, facing southeast



Fig. 3. View of Site 1B from southeast corner, facing northwest



Fig. 4. View of Site 2 from northeast corner, facing south



Fig. 5. View of Site 2 from east side, facing northwest



Fig. 6. View of Site 3 from center, facing north



Fig. 7. View of Site 3 from center, facing south

