TRANSMITTAL

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

Project Information

Route:	FAP 322
Marked:	U. S. Route 51
Section:	(9, 10) - 3
Job Number:	P-99-104-90
Sequence Number:	9780
Contract Number:	98419
County:	Jackson
IDOT District:	9
From:	Grand Avenue to west of Boskydell

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Date Conducted: 28 June 2006

Project Summary:

Wetland mitigation site monitoring was conducted for the fifth year on a restored stream channel and adjacent areas established as compensation for wetlands impacted on FAP 322 (U. S. 51) in Jackson County, Illinois. Introductory information, goals, objectives, performance criteria, methods, and results are presented in this report, followed by a summary and recommendations. Wetland determinations and species lists are included in Appendix A. Photographs of the wetland creation/enhancement sites are included in Appendix B. An Illinois State Geological Survey figure showing the extent of wetland hydrology for 2006 and a second figure showing the boundaries of the wetland creation/enhancement sites are included in Appendix C.

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

Signed: _____
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Date: _____

Wetland Mitigation Site Monitoring Report for FAP 322 (U. S. Route 51), Jackson County, Illinois - 2006

Introduction

This report details the fifth and final year of monitoring of the wetland mitigation sites created to compensate for approximately 0.8 ha (2 acre) of wetlands impacted as a result of FAP 322 (U. S. 51) relocation and improvement, in Jackson County, Illinois. For reports detailing the first, second, third and fourth years of monitoring see Busemeyer *et al*. (2002), Busemeyer *et al*. (2003), Busemeyer and Wiesbrook (2004) and Busemeyer and Wiesbrook (2006) respectively.

Three areas of wet meadow creation were proposed for the project. Two of these areas (Sites 4 and 5) were actually created. Together these two sites cover approximately 0.52 ha (1.27 acre). Native grasses and cover crops were said to be planted at these sites along with bald cypress (*Taxodium distichum*), swamp white oak (*Quercus bicolor*), and pin oak (*Quercus palustris*) seedlings. A third wet meadow creation (marked Site 9, Appendix C, Figure 2) was found to be unaltered. Besides the wet meadow creation areas, a backwater high flow channel/floodplain forest enhancement was created (Site 2a). This area covers approximately 0.10 ha (0.25 acre). Native grasses and cover crops were said to be planted in this area with the expectation that native hydrophytic tree species from surrounding areas will colonize the site. A second floodplain forest enhancement was not implemented (Site 7, Appendix C, Figure 2). Stream bank restoration was proposed and carried out on an area covering approximately 0.17 ha (0.42 acre) (Site 1). At this site river birch (*Betula nigra*), green ash (*Fraxinus pennsylvanica*), white pine (*Pinus strobus*), swamp white oak (*Quercus bicolor*), pin oak (*Quercus palustris*) and bald cypress (*Taxodium distichum*) seedlings were planted. Two adjacent areas of floodplain forest preservation (Sites 8 and 10) and two areas of upland forest buffer (Sites 3 and 6) are also listed on the schematic diagram (Appendix C, Figure 2), although these areas have had no apparent topographic, hydrologic, or vegetative alterations.

This complex of sites is located along the east side of U. S. Route 51, adjacent to a channelized section of Piles Fork Creek (a tributary of Orchard Creek), alongside the campus of Southern Illinois University south of Carbondale. The legal location is W/2, SE/4, Section 28, T. 9 S., R. 1 W. The project area lies within the United States Geological Survey hydrologic unit 07140106 (Big Muddy River). Details concerning the timing of site construction and tree planting were not provided. It seems likely, however, that the Illinois Department of Transportation (IDOT) completed construction of the site around spring 2002, and that trees were planted on the site around the same time or shortly thereafter. Additional trees were planted on the site between August of 2002 and August of 2003.

This report discusses the goals, objectives, and performance criteria for the mitigation project, the methods used for monitoring the site, monitoring results, and a discussion and recommendations based on the results. Methods and results are discussed by performance criteria for each goal. Wetland determination forms have been completed for Sites 4 and 5 and for both the altered and unaltered sections of Site 2 [the backwater channel creation (Site 2a) and the mesic floodplain forest (Site 2b)]. These forms are included in Appendix A. Photos of Sites 2a, 2b, 4, and 5 were taken during on-site monitoring on 28 June 2006 are included in Appendix B. An Illinois State Geological Survey figure (from Fucciolo *et al*. 2006) showing the extent of measured wetland

hydrology for 2006 and a second figure showing the boundaries of the wetland creation/enhancement sites is included in Appendix C.

Goals, Objectives, and Performance Standards

Goals, objectives, and performance standards follow those specified in the tasking order (Scott Marlow, IDOT Wetlands Unit 2002) developed for this site and the wetland compensation plan (Charles Perino, IDOT Wetlands Unit 1996). Performance criteria are based on those specified in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and in *Guidelines for Developing Mitigation Proposals* (USACE 1993). Each goal should be attained by the end of the 5-year monitoring period. Goals, objectives, and performance criteria are listed below.

Project goal 1: Wet meadow communities (sites 4 and 5) and high flow backwater channel/wetland floodplain forest enhancement areas (sites 2a and 2b) will meet the criteria of jurisdictional wetlands.

Objective: The created wetlands should cover approximately 0.8 ha (2.0 acre).

Performance criteria:
a. Predominance of hydrophytic vegetation: More than 50% of the dominant plant species must be hydrophytic in the created wetlands.
b. Presence of wetland hydrology: The created wetlands must be either permanently or periodically inundated at average depths less than 2 m (6.6 ft) or have soils that are saturated within 30 cm (12 in) of 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 in the created wetlands.

Project goal 2: Created wet meadows (Sites 4 and 5) and high flow backwater channel/wetland floodplain forest enhancement areas (sites 2a and 2b) will meet minimum standards of floristic composition.

Objective: All mitigation areas should be composed of vegetation characteristic of the stated community type.

Performance criteria:
a. Full vegetative cover of the sites: Mitigation sites must have at least 75% vegetative cover.
b. Predominance of non-weedy native vegetation: None of the three most dominant species in any stratum at any of the sites may be invasive native or exotic species such as *Typha* spp. (cattails), *Phalaris arundinacea* (reed canary grass), or *Lonicera* spp. (honeysuckles).
c. Predominance of herbaceous vegetation in wet meadow creations: After five years none of the dominant species may be woody in the wet meadow areas.

Project goal 3: Floodplain forest will be established along the Piles Fork Creek stream bank restoration (Site 1).

Objective: Floodplain forest should cover approximately 0.1 ha (0.2 acre). Native non-invasive herbaceous understory vegetation should colonize the site naturally.

Performance criteria:
a. Establishment of tree seedlings: 50% of planted trees must survive after five years.
b. Dominance of woody vegetation: Woody vegetation should predominate.

Methods

Project goal 1
a. Predominance of hydrophytic vegetation
The method for determining dominant vegetation at a wetland site is described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and further explained in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (Federal Interagency Committee for Wetland Delineation 1989). It is based on aerial coverage estimates for individual plant species. Each of the dominant plant species is then assigned its wetland indicator status rating (Reed 1988). Any plant rated facultative or wetter, *i.e.*, FAC, FAC+, FACW, and OBL, is considered a hydrophyte. A predominance of vegetation in the wetland plant community exists if more than 50% of the dominant species present are hydrophytic.

b. Presence of wetland hydrology
Illinois State Geological Survey (ISGS) personnel installed 16 ground water monitoring wells, one rain gauge, one global data logger, one RDS data logger, and one staff gauge at the site in 2002 and 2003. Locations for these sites can be found in the ISGS document *Annual Water-level Report for Active IDOT Sites* (Appendix C; Fucciolo *et al*. 2003; and Fucciolo *et al*. 2004). Water-level data was collected monthly from May 2002 through 2006. The ISGS has reported on the hydrology of the site in Fucciolo *et al*. 2003, Fucciolo *et al*. 2004, Fucciolo *et al*. 2005 and Fucciolo *et al*. 2006 and is reproduced [for 2006] in Appendix C). Secondary hydrology indicators were also noted during fieldwork on 18 July 2002, 11 September 2003, 18 August 2004, 30 August 2005 and 28 June 2006.

c. Occurrence of hydric soils
At each creation/restoration site the soil was sampled in order to monitor hydric soil development. Soil profile morphology including horizon color, texture, and structure was described. Additionally, the presence, type, size, and abundance of redoximorphic features was noted.

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

Project goal 2
a. 75% vegetative cover of the sites
Percent cover for each site was determined by visual estimation. After five years each of the sites should have at least 75% cover.

b. Predominance of non-weedy native vegetation
Species lists were compiled for each site. Dominant species and all weedy or non-native species were noted. After five years no weedy native or non-native species should be dominant in any of the sites. For purposes of this project, weedy native species are defined as those with a coefficient of conservatism of 0 (Taft *et al*. 1997).

c. Predominance of herbaceous vegetation in wet meadow creations
Any dominant woody plant species for the wet meadow creations were noted. After five years no woody species should be dominant in the wet meadow creation sites.

Project goal 3

a. Establishment of tree seedlings

In order to establish floodplain forest, tree seedlings were planted at Site 1. All planted trees were counted, however, percent survival cannot be calculated for each species, since we do not know how many seedlings were planted at the site. In the floodplain forest enhancement area (Site 2a) propagules from the surrounding forest are expected to regenerate the high flow backwater channel area naturally.

b. Dominance of woody vegetation

After five years the site should be dominated by hydrophytic woody species.

Floristic Quality Index

For all mitigation areas, a complete list of all spontaneous (not planted) plant species found in the area will be recorded and the Floristic Quality Index will be calculated (Taft *et al*. 1997). The Floristic Quality Index provides a measure of the floristic integrity or level of disturbance of a site. Each plant species is assigned a rating between 0 and 10 (the Coefficient of Conservatism) that is a subjective indicator of the likelihood of finding that species on an undisturbed site in a natural plant community. A plant species that has a low Coefficient of Conservatism (C) is common and is likely to tolerate disturbed conditions; a species with a high C is relatively rare and is likely to require specific, undisturbed habitats. Plants not identified to species level are not rated and are not included in the calculations.

The Floristic Quality Index (FQI) is calculated as follows: $FQI = R/\sqrt{N}$, where R represents the sum of the numerical ratings (C) for all species recorded for a site, and N represents the number of plants on the site. The C value for each species is shown in the species list for the site. Species not native to Illinois (indicated by ** in the species list for each site) are not included in calculations. An Index score below 10 suggests a site of low natural quality; below five, a highly disturbed site. An FQI value of 20 or more suggests that a site has evidence of native character and may be considered an environmental asset.

The mean C value (also known as mean rated quality) is also given for each site. This value is calculated as follows: $mCv = R/N$, where R represents the sum of the numerical ratings (C) for all species recorded for a site, and N represents the number of plants on the site. A mCv of greater than 3.0 probably indicates that a site has good native character.

Results

Project goal 1

a. Predominance of hydrophytic vegetation

Dominant plant species for the wet meadow creation areas (Sites 4 and 5) and the high flow backwater channel/floodplain forest enhancement areas (Site 2a and 2b) are shown in Table 1. Since 100% of the dominant species at Sites 2a, 4, and 5 and 56% of the dominant species at site 2b are rated OBL, FACW+, FAC+, or FAC, hydrophytic vegetation is present at all wetland creation/ enhancement sites.

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

Dominant Plant Species	Stratum	Indicator Status
Site 2a.		
1. *Agrostis alba**	herb	FACW
2. *Leersia oryzoides*	herb	OBL
3. *Phyla lanceolata*	herb	OBL
Site 2b.		
1. *Fraxinus americana*	tree	FACU
2. *Platanus occidentalis*	tree	FACW
3. *Populus deltoides*	tree	FAC+
4. *Asimina triloba*	sapling/shrub	FAC
5. *Lonicera maackii**	shrub	UPL
6. *Rosa multiflora**	shrub	FACU
7. *Chasmanthium latifolium*	herb	FACW
8. *Lonicera japonica**	herb	FACU
9. *Toxicodendron radicans*	herb	FAC+
Site 4.		
1. *Salix nigra*	shrub	OBL
2. *Echinochloa muricata**	herb	OBL
3. *Leersia oryzoides*	herb	OBL
Site 5.		
1. *Salix nigra*	shrub	OBL
2. *Leersia oryzoides*	herb	OBL
3. *Phyla lanceolata*	herb	OBL

* Non-native or weedy native species

b. Presence of wetland hydrology

The project area is adjacent to Piles Fork Creek. This creek floods parts of the project area in at least some years during the growing season. A small tributary to Piles Fork Creek also contributes water to Site 4. In 2006, the Illinois State Geological Survey estimated that 0.2 ha (0.6 acre) of the site satisfied the wetland hydrology criterion for greater than 5% of the growing season, whereas only 0.06 ha (0.1 acre) satisfied the wetland hydrology criterion for greater than 12.5% of the growing season (Fucciolo *et al*. 2006). See Appendix C, Figure 1, for a map of the estimated areal extent of 2006 wetland hydrology (taken from Fucciolo *et al*. 2006).

The Illinois State Geological Survey found that wetland hydrology was present over parts of Sites 2a, 4, and 5 for sufficient duration during the growing season in 2003, 2004, 2005 and 2006 to satisfy the wetland hydrology criterion (Fucciolo *et al*. 2003, 2004, 2005, 2006). They estimate that 0.2 ha (0.6 acre) of the 4.0 ha (9.9 acre) site satisfies the wetland hydrology criterion for greater than 5% of the growing season, whereas only 0.1 ha (0.3 acre) satisfied the wetland hydrology criterion for greater than 12.5% of the growing season (Fucciolo *et al*. 2006). Both of these estimates fall well short of the goal of 0.8 ha (2.0 acre) of created wetland.

Secondary indicators of wetland hydrology (matted vegetation, water-stained leaves, drift lines and wetland drainage patterns) were also found during field investigation of Sites 2a, 4, and 5. Neither we nor the Illinois State Geological Survey found any indication of wetland hydrology at Site 1 (stream bank/ floodplain forest restoration), Site 2b (floodplain forest enhancement), or any of the other sites in the project area which were not altered by restoration activities (Sites 3, 6, 7, 8, 9, and 10).

c. Occurrence of hydric soils

Soils examined at both the wet meadow creation sites (Sites 4 and 5) and the backwater high flow channel (Site 2a) were found to be highly disturbed. Much cutting and filling has been done within the top twenty inches and the sites lack a true undisturbed A horizon and part of the B horizon. Even though the soils are disturbed, hydric soil indicators are present. Following is a soil description of a typical pedon at the created wetland sites (Table 2).

Table 2. Description of the soils in the created wetlands

Depth	Matrix Color	Redox Concentrations	Redox Depletions	Texture	Structure
0-13+ in	10YR 4/1, 5/1, 4/3	mmp 7.5YR 4/6 cmp 10YR 4/6	10YR 5/1	SiL	Gr

Project goal 2

a. Full vegetative cover of the sites

At the time of the survey all sites had nearly full (> 95%) vegetative cover.

b. Predominance of non-weedy native vegetation

Dominant plant species at each site are listed by strata in Table 1. The quality of vegetation at all of the sites is fair to good. Floristic quality index (FQI) values range from 18.1 (Site 4) to 23.2 (Site 5) with mean C values (mCv) ranging from 2.4 (Site 4) to 2.9 (Site 2b). However, a number of non-native plants, as well as several weedy native species, are present at each site. Both Sites 2a and 4 have one weedy native species as a dominant. *Agrostis alba* (redtop) is a dominant at Site 2a, while *Echinochloa muricata* (barnyard grass) is a dominant at Site 4. At Site 2b, *Lonicera maackii* (Amur honeysuckle), *Lonicera japonica* (Japanese honeysuckle) and *Rosa multiflora* (multiflora rose) are among the dominant species. All of

these are exotic species that may need to be controlled in order to lessen their abundance. However, as long as quality native plant species are not crowded out of the creation sites by non-native or weedy native species, the quality of the vegetation should stay the same or improve over the years. Species lists for each of the creation/enhancement sites (Sites 2a, 2b, 4 and 5) are given in Appendix A.

c. Predominance of herbaceous vegetation in wet meadow creations

Shrub size individuals of several tree species [particularly *Populus deltoides* (cottonwood) and *Salix* spp. (willow)] are present at all of the constructed sites. Black willow (*Salix nigra*) is a dominant shrub in Sites 4 and 5. These sites are all surrounded by forest that will continue to serve as a source of propagules. Woody vegetation may, therefore, need to be controlled if these sites are to be maintained as wet meadows.

In addition to the spontaneous woody species invading the wet meadow restorations (Sites 4 and 5), a number of seedlings of swamp white oak (*Quercus bicolor*), pin oak (*Quercus palustris*), and bald cypress (*Taxodium distichum*) were planted within or on the edge of the wet meadow sites (Busemeyer and Wiesbrook 2006). The planting of these seedlings, within areas intended as wet meadow, is cause for concern. These seedlings could eventually change the character of the sites as they mature, changing the character from wet meadow to wet shrubland and finally to floodplain forest. In 2006, we found eleven swamp white oak seedlings and 104 bald cypress seedlings. However, we could not locate any pin oak in 2006.

Project goal 3

a. Establishment of tree seedlings

A total of 149 living, planted trees were counted in 2006. As mentioned in the methods section, percent survival of the planted trees could not be determined, since we do not know the total number planted at the site. However, plans called for planting 20 seedlings each of sycamore (*Platanus occidentalis*), river birch (*Betula nigra*), green ash (*Fraxinus pennsylvanica*), swamp white oak (*Quercus bicolor*), pin oak (*Q. palustris*) and bald cypress (*Taxodium distichum*). Therefore, a total of 120 plants were to be planted at Site 1. White pine (*Pinus strobus*), a species not native to southern Illinois and not typical of floodplain forests, was apparently substituted for sycamore. Also, many additional trees were planted outside of Site 1, including within areas designated to become wet meadow. Additional seedlings of some species were apparently also planted at Site 1. Table 3 shows the planted and surviving trees in Site 1.

Table 3. Tree seedling establishment in the floodplain forest restoration (Site 1).

species	common name	present	# called for in plan	# of extra plants
Betula nigra	river birch	58	20	38
Fraxinus pennsylvanica	green ash	25	20	5
Pinus strobus	white pine	35	20	15
Quercus bicolor	swamp white oak	14	20	-6
Quercus palustris	pin oak	5	20	-15
Taxodium distichum	bald cypress	12	20	-8
Total		**149**	**120**	29

Although we were unable to determine percent survival of the planted seedlings, it is apparent that more than enough surviving seedlings are present. The plan called for 120 seedlings to be planted at Site 1, and in 2006, we found 149 that appeared to have been planted. Therefore, the site had 29 plants over what was called for at the end of the five-year monitoring period. However, there are relatively few of some of the species planted.

Nevertheless, we believe that the performance criterion for this project goal has been met. In addition to the extra seedlings of some of the species that were planted, spontaneous individuals of river birch and green ash are common at the site. This site will eventually become floodplain forest, even if all of the remaining planted seedlings die in the coming years.

No tree seedlings have been planted at the backwater high flow channel (Site 2a). However the site is bordered by floodplain forest. Volunteer individuals of several tree species including box elder (*Acer negundo*), river birch (*Betula nigra*), persimmon (*Diospyros virginiana*), green ash (*Fraxinus pennsylvanica*), honey locust (*Gleditsia triacanthos*), sweet gum (*Liquidambar styraciflua*), sycamore (*Platanus occidentalis*), cottonwood (*Populus deltoides*) and black willow (*Salix nigra*) have established as seedlings at the site as a result of propagules from nearby floodplain forest.

b. Dominance of woody vegetation

After five years, the surviving planted tree seedlings are healthy at Site 1. Woody dominance at this site will continue to expand as these trees get larger and natural regeneration progresses.

Discussion

The performance criteria for project goals 1 and 2 have been partially met, and for project goal 3, we believe they have been fully met. At least parts of Sites 2a, 4 and 5 meet all of the criteria of jurisdictional wetlands. These sites have dominant hydrophytic vegetation, indicators of hydric soils, and wetland hydrology. However, Site 2b does not have hydric soils or wetland hydrology and is, therefore, not a wetland. It is highly unlikely Site 2b will ever develop into a wetland, since the topography of the site is relatively high, and Piles Fork Creek does not flood the site, at least not on a regular basis.

Although parts of Sites 2a, 4 and 5 meet all of the criteria of jurisdictional wetlands, these areas are too small to fulfill the objective of 0.8 ha (2.0 acre). All of these areas have hydric soils and hydrophytic vegetation covering almost the entire site, however, only parts of these sites have wetland hydrology. The Illinois State Geological Survey found that wetland hydrology was present over parts of Sites 2a, 4, and 5 for sufficient duration during the growing season in 2003, 2004, 2005 and 2006 to satisfy the wetland hydrology criterion (Fucciolo *et al*. 2003, 2004, 2005, 2006). For the entire 5-year monitoring period, they estimate that 0.2 ha (0.6 acre) of the 4.0 ha (9.9 acre) site satisfies the wetland hydrology criterion for greater than 5% of the growing season, whereas only 0.1 ha (0.3 acre) satisfied the wetland hydrology criterion for greater than 12.5% of the growing season (Fucciolo *et al*. 2006). Both of these estimates fall well short of the goal of 0.8 ha (2.0 acre) of created wetland.

The performance criteria for project goal 2 have also only been partially met. All of the mitigation sites (2a, 2b, 4 and 5) have nearly full (>95%) vegetative cover. However, both Sites 2a and 4 have one weedy native species as a dominant. *Agrostis alba* (redtop) is a dominant at Site 2a, while *Echinochloa muricata* (barnyard grass) is a dominant at Site 4. Although these species can only be considered weedy, their presence at these early successional sites should not be cause for concern. Both of these species will likely decline in importance as the sites mature. At Site 2b, *Lonicera maackii* (Amur honeysuckle), *Lonicera japonica* (Japanese honeysuckle) and *Rosa multiflora* (multiflora rose) are among the dominant species. All of these species are exotic, undesirable, weedy species. Site 5 does not have any weedy native or exotic species as dominants.

Woody vegetation is beginning to dominate the wet meadow creation areas (Sites 4 and 5), with black willow (*Salix nigra*) already abundant enough to be considered a dominant. If woody species are not controlled these sites will probably become floodplain forest. However, the density of shrubs may decline with the recent colonization of the area by beaver (*Castor canadensis*). The foraging activity of beaver alters the species composition, density, growth form, and distribution of woody vegetation around wetlands, and beaver are well known to reduce the density of woody plants as material is cut and moved to the stream for dams and lodges. Willow, the most abundant of the shrub invaders in the wet meadow areas, is often the most used woody riparian species in much of the beaver's range (Baker and Hill 2003). Recently, beaver have built a dam on Piles Fork at the north end of Site 5.

The dominance of woody species in the floodplain forest/ high flow channel restoration (Site 2a) is desirable and will probably increase since floodplain forest is nearby.

We believe that the performance criteria for project goal 3 have been met. Although we were unable to determine percent survival of the planted seedlings at Site 1, it is apparent that more than enough surviving seedlings are present, since there are more planted seedlings present than was called for in the site plan. However, there are relatively few of some of the species planted. Also, white pine (*Pinus strobus*) seedlings were planted in place of sycamore. It should be noted that white pine is not native to southern Illinois and is not normally associated with floodplain forests. In addition to the planted seedlings, spontaneous individuals of several native, woody species are common at the site. This site will eventually become floodplain forest, even if all of the remaining planted seedlings die in the coming years.

There has been some concern regarding siltation buildup at Site 4. The source of the siltation can be traced to a pond located on property of Southern Illinois University, at the Coal Research Center. A tile leads from the pond and empties into a ravine, upstream from the small tributary that runs through Site 4. Excess water from the pond, flowing from the tile, is eroding the sides of the ravine near the outlet, causing siltation to enter the tributary. Some of this silt is deposited onto Site 4, and was noticed at the site during the 2006 monitoring visit. However, most of the silt is deposited into Piles Fork Creek, and a depositional fan covering several square feet was observed at the mouth of the tributary. This problem could easily be remedied by placing riprap along the sides of the ravine at the tile opening. Without remedial action, the siltation could fill-in Site 4, or deposition could eventually block the flow of floodwater from the tributary to the wetland, adversely affecting the hydrology.

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Appendix A

Wetland Determination Forms

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

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: High flow channel creation/floodplain forest enhancement
Legal Description: W 1/2, SE 1/4, Sec. 28, T9S, R1W
Location: 52 m (171 ft) east of U. S. 51 and 390 m (1283 ft) north of the intersection of U. S. 51 and Pleasant Hill Road

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

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. *Agrostis alba*	FACW	herb
2. *Leersia oryzoides*	OBL	herb
3. *Phyla lanceolata*	OBL	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 100%
Hydrophytic vegetation: Yes: X No:
Rationale: More than 50% of the dominants are OBL, FACW, FAC+, or FAC.

SOILS

Series and phase: Undetermined (soil excavated)

On county hydric soils list?	Yes:	No: X	
Is the soil a histosol?	Yes:	No: X	
Histic epipedon present?	Yes:	No: X	
Redox Concentrations?	Yes: X	No:	Color: 7.5YR 4/6 and 10YR 4/6
Redox Depletions?	Yes: X	No:	Color: 10YR 5/1

Matrix color: 10YR 4/1, 5/1, 5/2, over 4/3
Other indicators: This soil was found in a depressional area.

Hydric soils? Yes: X No:
Rationale: This soil has been altered by excavation of the surface soil layers in order to create a wetland. The soil colors present at this site are indicative of a hydric soil, but it is impossible to determine for certain whether these colors are indicative of past or current conditions at this site. However, we believe at this time that the colors reflect the current depressional landscape position. Therefore, the soil at this site meets the hydric soil criterion. This soil meets NRCS hydric soil indicator F3 - Depleted matrix.

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

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: High flow channel creation/floodplain forest enhancement
Legal Description: W 1/2, SE 1/4, Sec. 28, T9S, R1W
Location: 52 m (171 ft) east of U. S. 51 and 390 m (1283 ft) north of the intersection of U. S. 51 and Pleasant Hill Road

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: NA
Depth to saturated soil: at surface to > 1.3 m (50 inches)
Overview of hydrological flow through the system: This site receives water from precipitation, sheet flow from adjacent higher ground, and from overflow of Piles Fork Creek. Water leaves the site via evapotranspiration and sheet flow into Piles Fork Creek.
Size of Watershed: approximately 10 km^2 (3.9 mi^2)
Other field evidence observed: Water-stained leaves were observed at this site. This site is approximately 0.5 - 0.6 m (1.5 - 2 ft) above the level of Piles Fork Creek. Well data collected by the Illinois State Geological Survey in 2006 indicates that this entire site was inundated or saturated for >5% of the growing season, and parts of the site were inundated or saturated for >12.5% of the growing season (Fucciolo *et al*. 2006).

Wetland hydrology: Yes: X No:
Rationale: This site has been excavated to create a high flow (overflow) oxbow. Well data, secondary indicators, and the relatively low topography indicate that wetland hydrology may be present at this site. In our opinion, at least part of this site is flooded or saturated long enough to meet the wetland hydrology criterion.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: X No:
Rationale: Dominant hydrophytic vegetation and hydric soils are present, and wetland hydrology is present in at least part of the site. The NWI did not code this site as a wetland.

Determined by: David Ketzner and Brian Wilm (vegetation and hydrology)
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ROUTINE ON-SITE WETLAND DETERMINATION
Site 2a (page 3 of 5)

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: High flow channel creation/floodplain forest enhancement
Legal Description: W 1/2, SE 1/4, Sec. 28, T9S, R1W
Location: 52 m (171 ft) east of U. S. 51 and 390 m (1283 ft) north of the intersection of U. S. 51 and Pleasant Hill Road

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	C*
Acer negundo	box elder	shrub	FACW-	1
Agrostis alba	red top	herb	FACW	0
Alisma plantago-aquatica	water-plantain	herb	OBL	2
Ambrosia artemisiifolia	common ragweed	herb	FACU	0
Ambrosia trifida	giant ragweed	herb	FAC+	0
Aster lateriflorus	side-flowered aster	herb	FACW-	2
Betula nigra	river birch	sapling, shrub	FACW	4
Bidens cernua	nodding beggar-ticks	herb	OBL	2
Bidens frondosa	common beggar-ticks	herb	FACW	1
Boehmeria cylindrica	false nettle	herb	OBL	3
Callitriche terrestris	terrestrial starwort	herb	FACU	2
Campsis radicans	trumpet creeper	shrub	FAC	2
Carex cristatella	sedge	herb	FACW+	3
Carex frankii	sedge	herb	OBL	4
Carex lurida	sedge	herb	OBL	7
Carex vulpinoidea	fox sedge	herb	OBL	3
Cephalanthus occidentalis	buttonbush	shrub	OBL	4
Cercis canadensis	eastern redbud	herb	FACU	3
Chamaesyce sp.	milk spurge	herb	------	--
Chasmanthium latifolium	sea oats	herb	FACW	4
Cinna arundinacea	stout wood reed	herb	FACW	5
Cirsium vulgare	bull thistle	herb	FACU-	**
Cyperus aristatus	flat sedge	herb	OBL	2
Cyperus sp.	galingale	herb	------	--
Desmanthus illinoensis	Illinois bundleflower	herb	FAC-	4
Diospyros virginiana	persimmon	shrub	FAC	2
Echinochloa muricata	barnyard grass	herb	OBL	0
Elaeagnus umbellata	autumn olive	shrub	UPL	**
Eleocharis obtusa	spike rush	herb	OBL	2
Elymus virginicus	Virginia wild rye	herb	FACW-	4
Equisetum arvense	common horsetail	herb	FAC	0
Erigeron annuus	annual fleabane	herb	FAC-	1

Species list continued on the following page.

ROUTINE ON-SITE WETLAND DETERMINATION
Site 2a (page 4 of 5)

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: High flow channel creation/floodplain forest enhancement
Legal Description: W 1/2, SE 1/4, Sec. 28, T9S, R1W
Location: 52 m (171 ft) east of U. S. 51 and 390 m (1283 ft) north of the intersection of U. S. 51 and Pleasant Hill Road

SPECIES LIST (continued)

Scientific name	Common name	Stratum	Wetland indicator status	C*
Eupatorium coelestinum	mist flower	herb	FAC+	3
Eupatorium perfoliatum	common boneset	herb	FACW+	4
Eupatorium serotinum	late boneset	herb	FAC+	1
Festuca arundinacea	tall fescue	herb	FACU+	**
Fraxinus pennsylvanica	green ash	shrub	FACW	2
Gleditsia triacanthos	honey locust	shrub	FAC	2
Glyceria striata	fowl manna grass	herb	OBL	4
Gratiola neglecta	clammy hedge hyssop	herb	OBL	5
Hibiscus lasiocarpus	hairy rose mallow	herb	FACW+	5
Impatiens capensis	jewelweed	herb	FACW	2
Juncus effusus solutus	common rush	herb	OBL	4
Juncus tenuis	path rush	herb	FAC	0
Juncus torreyi	Torrey's rush	herb	FACW	3
Leersia oryzoides	rice cutgrass	herb	OBL	3
Lespedeza cuneata	sericea lespedeza	herb	NI	**
Leucospora multifida	leucospora	herb	FACW+	3
Liquidambar styraciflua	sweet gum	shrub	FACW	6
Ludwigia alternifolia	seedbox	herb	OBL	5
Lycopus americanus	water horehound	herb	OBL	3
Lycopus virginicus	bugle weed	herb	OBL	5
Medicago lupulina	black medic	herb	FAC-	**
Melilotus sp.	sweet clover	herb	------	**
Mimulus alatus	winged monkey flower	herb	OBL	6
Morus alba	white mulberry	herb	FAC	**
Penthorum sedoides	ditch stonecrop	herb	OBL	2
Phleum pratense	Timothy	herb	FACU	**
Phragmites australis	common reed	herb	FACW+	**
Phyla lanceolata	fog-fruit	herb	OBL	1
Platanus occidentalis	sycamore	shrub	FACW	3
Polygonum sp.	smartweed	herb	------	--
Populus deltoides	eastern cottonwood	shrub	FAC+	2
Rudbeckia hirta	black-eyed Susan	herb	FACU	2

Species list continued on the following page.

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

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: High flow channel creation/floodplain forest enhancement
Legal Description: W 1/2, SE 1/4, Sec. 28, T9S, R1W
Location: 52 m (171 ft) east of U. S. 51 and 390 m (1283 ft) north of the intersection of U. S. 51 and Pleasant Hill Road

SPECIES LIST (continued)

Scientific name	Common name	Stratum	Wetland indicator status	C*
Rumex crispus	curly dock	herb	FAC+	**
Salix nigra	black willow	sapling, shrub	OBL	3
Samolus valerandii	brookweed	herb	OBL	5
Scirpus atrovirens	bulrush	herb	OBL	4
Scutellaria lateriflora	mad-dog skullcap	herb	OBL	4
Senecio glabellus	butterweed	herb	OBL	0
Silphium perfoliatum	cup plant	herb	FACW-	4
Solanum carolinense	horse-nettle	herb	FACU-	0
Solidago canadensis	Canada goldenrod	herb	FACU	1
Solidago gigantea	late goldenrod	herb	FACW	3
Sorghum halepense	Johnson grass	herb	FACU	**
Toxicodendron radicans	poison ivy	herb	FAC+	1
Typha angustifolia	narrow-leaved cattail	herb	OBL	**
Verbena urticifolia	white vervain	herb	FAC+	3
Verbesina alternifolia	wing stem	herb	FACW	4
Xanthium strumarium	cockle bur	herb	FAC	0

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

FQI = R/√N = 175/√65 = 21.7
mCv = R/N = 175/65 = 2.7

ROUTINE ON-SITE WETLAND DETERMINATION
Site 2b (page 1 of 4)

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Mesic floodplain forest (floodplain forest enhancement)
Legal Description: W 1/2, SE 1/4, Sec. 28, T9S, R1W
Location: 50 m (165 ft) east of U. S. Route 51 and 390 m (1283 ft) north of the intersection of U. S. Route 51 and Pleasant Hill Road

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

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. *Fraxinus americana*	FACU	tree
2. *Platanus occidentalis*	FACW	tree
3. *Populus deltoides*	FAC+	tree
4. *Asimina triloba*	FAC	sapling/shrub
5. *Lonicera maackii*	UPL	shrub
6. *Rosa multiflora*	FACU	shrub
7. *Chasmanthium latifolium*	FACW	herb
8. *Lonicera japonica*	FACU	herb
9. *Toxicodendron radicans*	FAC+	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 56%
Hydrophytic vegetation: Yes: X No:
Rationale: More than 50% of the dominants are OBL, FACW, FAC+, or FAC.

SOILS

Series and phase: NRCS mapped as Bonnie silt loam; revised to Belknap silt loam (Fluvaquentic Endoaquept)

On county hydric soils list?	Yes:	No: X	
Is the soil a histosol?	Yes:	No: X	
Histic epipedon present?	Yes:	No: X	
Redox Concentrations?	Yes: X	No:	Color: 7.5YR 4/6 and 10YR 4/6
Redox Depletions?	Yes: X	No:	Color: 10YR 5/1
Matrix color: 10YR 4/3	Other indicators: None		

Hydric soils? Yes: No: X
Rationale: The Natural Resources Conservation Service identifies Belknap as a Fluvaquentic Endoaquept that is somewhat poorly drained. This soil possesses redox concentrations and depletions within a high chroma matrix, which indicates saturated or reduced conditions for only brief duration during the growing season. Therefore, the soil at this site does not meet the hydric soil criterion. This soil meets none of the NRCS hydric soil indicators.

ROUTINE ON-SITE WETLAND DETERMINATION
Site 2b (page 2 of 4)

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Mesic floodplain forest (floodplain forest enhancement)
Legal Description: W 1/2, SE 1/4, Sec. 28, T9S, R1W
Location: 50 m (165 ft) east of U. S. Route 51 and 390 m (1283 ft) north of the intersection of U. S. Route 51 and Pleasant Hill Road

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: NA
Depth to saturated soil: > 1.3 m (50 inches)
Overview of hydrological flow through the system: This site receives water through precipitation and possibly by overflow of Piles Fork Creek on rare occasions. Water leaves the site via evapotranspiration and sheet flow into Piles Fork Creek and onto adjacent lower ground (Site 2a).
Size of Watershed: approximately 10 km^2 (3.9 mi^2)
Other field evidence observed: This site is approximately 1.2 - 1.5 m (4 - 5 ft) above the level of Piles Fork Creek and approximately 0.9 m (3 ft) above the level of Site 2a. Well data collected in 2006 by the Illinois State Geological Survey indicates that none of this site was inundated or saturated for even 5% of the growing season (Fucciolo *et al*. 2006).

Wetland hydrology: Yes: No: X
Rationale: This site is considerably higher than the adjacent constructed high flow channel (Site 2a) and Piles Fork Creek, and is sloping toward these areas. Any floodwater this site receives appears to rapidly drain away. In our opinion, this site is not flooded or saturated long enough to meet the wetland hydrology criterion.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: No: X
Rationale: Although dominant hydrophytic vegetation is present at the site, hydric soils and wetland hydrology are lacking; therefore, the site is not a wetland. The NWI did not code this site as a wetland.

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ROUTINE ON-SITE WETLAND DETERMINATION
Site 2b (page 3 of 4)

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Mesic floodplain forest (floodplain forest enhancement)
Legal Description: W 1/2, SE 1/4, Sec. 28, T9S, R1W
Location: 50 m (165 ft) east of U. S. Route 51 and 390 m (1283 ft) north of the intersection of U. S. Route 51 and Pleasant Hill Road

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	C*
Acer negundo	box elder	tree	FACW-	1
Agrostis alba	red top	herb	FACW	0
Anemone virginiana	tall anemone	herb	UPL	4
Asimina triloba	pawpaw	tree, sapling, shrub	FAC	4
Botrychium virginianum	rattlesnake fern	herb	FACU	4
Bromus inermis	awnless brome grass	herb	UPL	**
Campsis radicans	trumpet creeper	shrub, woody vine	FAC	2
Carex sp.	sedge	herb	------	--
Carya cordiformis	bitternut hickory	shrub	FAC	4
Cercis canadensis	eastern redbud	sapling, shrub	FACU	3
Chasmanthium latifolium	sea oats	herb	FACW	4
Clematis virginiana	virgin's bower	herb	FAC	3
Corylus americana	hazelnut	shrub	FACU-	4
Cynanchum laeve	blue vine	herb	FAC	1
Desmodium paniculatum	panicled tick trefoil	herb	FACU	2
Dichanthelium clandestinum	broad-leaved panic grass	herb	FACW	4
Dioscorea villosa	wild yam	herb	FAC-	4
Elaeagnus umbellata	autumn olive	shrub	UPL	**
Elymus villosus	hairy wild rye	herb	FACU	4
Elymus virginicus	Virginia wild rye	herb	FACW-	4
Erigeron annuus	annual fleabane	herb	FAC-	1
Fraxinus americana	white ash	tree, sapling, shrub	FACU	4
Geum canadense	white avens	herb	FAC	2
Gleditsia triacanthos	honey locust	herb	FAC	2
Juglans nigra	black walnut	tree, shrub	FACU	4
Juniperus virginiana	eastern red cedar	herb	FACU	1
Lonicera japonica	Japanese honeysuckle	woody vine, herb	FACU	**
Lonicera maackii	Amur honeysuckle	shrub	UPL	**
Ostrya virginiana	hop hornbeam	sapling	FACU-	4
Parthenocissus quinquefolia	Virginia creeper	woody vine	FAC-	2
Physalis heterophylla	ground cherry	herb	UPL	2
Platanus occidentalis	sycamore	tree	FACW	3

Species list continued on the following page.

ROUTINE ON-SITE WETLAND DETERMINATION
Site 2b (page 4 of 4)

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Mesic floodplain forest (floodplain forest enhancement)
Legal Description: W 1/2, SE 1/4, Sec. 28, T9S, R1W
Location: 50 m (165 ft) east of U. S. Route 51 and 390 m (1283 ft) north of the intersection of U. S. Route 51 and Pleasant Hill Road

SPECIES LIST (continued)

Scientific name	Common name	Stratum	Wetland indicator status	C*
Polygonum virginianum	Virginia knotweed	herb	FAC	3
Populus deltoides	eastern cottonwood	tree	FAC+	2
Quercus imbricaria	shingle oak	shrub	FAC-	2
Quercus rubra	red oak	shrub	FACU	5
Rosa multiflora	multiflora rose	shrub	FACU	**
Rosa setigera	prairie rose	woody vine	FACU+	5
Rubus allegheniensis	common blackberry	shrub	FACU+	2
Smilax hispida	bristly greenbrier	woody vine	FAC	3
Solidago canadensis	Canada goldenrod	herb	FACU	1
Toxicodendron radicans	poison ivy	woody vine, herb	FAC+	1
Ulmus americana	American elm	tree, sapling	FACW-	5
Verbesina alternifolia	wing stem	herb	FACW	4
Vitis aestivalis	summer grape	woody vine	FACU	4

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

FQI = R/√N = 114/√39 = 18.3
mCv = R/N = 114/39 = 2.9

ROUTINE ON-SITE WETLAND DETERMINATION
Site 4 (page 1 of 5)

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Wet meadow creation
Legal Description: NW 1/4, SE 1/4, Sec. 28, T9S, R1W
Location: 60 m (197 ft) east of U. S. Route 51 and 550 m (1810 ft) north of the intersection of U. S. Route 51 and Pleasant Hill Road

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

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. *Salix nigra*	OBL	shrub
2. *Echinochloa muricata*	OBL	herb
3. *Leersia oryzoides*	OBL	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 100%
Hydrophytic vegetation: Yes: X No:
Rationale: More than 50% of the dominants are OBL, FACW, FAC+, or FAC.

SOILS

Series and phase: Undetermined (soil excavated)

On county hydric soils list?	Yes:	No: X	
Is the soil a histosol?	Yes:	No: X	
Histic epipedon present?	Yes:	No: X	
Redox Concentrations?	Yes: X	No:	Color: 7.5YR 4/6 and 10YR4/6
Redox Depletions?	Yes: X	No:	Color: 10YR 5/1

Matrix color: 10YR 4/1, 5/1, 5/2, and 4/3
Other indicators: This soil was found in a depressional area.

Hydric soils? Yes: X No:
Rationale: This soil has been altered by excavation of the surface soil layers in order to create a wetland. The soil colors present at this site are indicative of a hydric soil, but it is impossible to determine for certain whether these colors are indicative of past or current conditions at this site. However, we believe at this time that the colors reflect the current depressional landscape position. Therefore, the soil at this site meets the hydric soil criterion. This soil meets NRCS hydric soil indicator F3 - Depleted matrix.

ROUTINE ON-SITE WETLAND DETERMINATION
Site 4 (page 2 of 5)

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Wet meadow creation
Legal Description: NW 1/4, SE 1/4, Sec. 28, T9S, R1W
Location: 60 m (197 ft) east of U. S. Route 51 and 550 m (1810 ft) north of the intersection of U. S. Route 51 and Pleasant Hill Road

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: NA
Depth to saturated soil: at surface to > 1.3 m (50 inches)
Overview of hydrological flow through the system: This site receives water from precipitation, sheet flow from adjacent higher ground, from overflow of Piles Fork Creek, and from overflow of a small tributary of Piles Fork Creek that flows through the site. Water leaves the site via evapotranspiration and sheet flow into Piles Fork Creek and the small tributary.
Size of Watershed: approximately 10 km^2 (3.9 mi^2)
Other field evidence observed: Drift lines and wetland drainage patterns were observed at this site. This site is a low excavated area adjacent to Piles Fork Creek. Well data collected by the Illinois State Geological Survey in 2006 indicates that this entire site was inundated or saturated for >5% of the growing season, and parts of the site were inundated or saturated for >12.5% of the growing season (Fucciolo *et al*. 2006).

Wetland hydrology: Yes: X No:
Rationale: Well data, secondary indicators, and the relatively low topography indicate that wetland hydrology may be present at this site. In our opinion, at least part of this site is flooded or saturated long enough to meet the wetland hydrology criterion.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: X No:
Rationale: Dominant hydrophytic vegetation and hydric soils are present, and wetland hydrology is present in at least part of the site. The NWI codes part of this site as PFO1A (temporarily flooded, broad-leaved deciduous, forested, palustrine wetland).

Determined by: David Ketzner and Brian Wilm (vegetation and hydrology)
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ROUTINE ON-SITE WETLAND DETERMINATION
Site 4 (page 3 of 5)

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Wet meadow creation
Legal Description: NW 1/4, SE 1/4, Sec. 28, T9S, R1W
Location: 60 m (197 ft) east of U. S. Route 51 and 550 m (1810 ft) north of the intersection of U. S. Route 51 and Pleasant Hill Road

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	C*
Acalypha rhomboidea	three-seeded mercury	herb	FACU	0
Acer negundo	box elder	herb	FACW-	1
Acer saccharinum	silver maple	herb	FACW	1
Agrostis alba	red top	herb	FACW	0
Ambrosia artemisiifolia	common ragweed	herb	FACU	0
Ambrosia trifida	giant ragweed	herb	FAC+	0
Ammannia coccinea	long-leaved ammannia	herb	OBL	5
Amorpha fruticosa	false indigo bush	shrub	FACW+	6
Andropogon virginicus	broom sedge	herb	FAC-	1
Asclepias incarnata	swamp milkweed	herb	OBL	4
Aster simplex	panicled aster	herb	FACW	3
Betula nigra	river birch	shrub	FACW	4
Bidens cernua	nodding beggar-ticks	herb	OBL	2
Bidens frondosa	common beggar-ticks	herb	FACW	1
Boehmeria cylindrica	false nettle	herb	OBL	3
Carex cristatella	sedge	herb	FACW+	3
Carex frankii	sedge	herb	OBL	4
Carex lurida	sedge	herb	OBL	7
Cephalanthus occidentalis	buttonbush	shrub	OBL	4
Cyperus erythrorhizos	red-rooted sedge	herb	OBL	1
Cyperus esculentus	yellow nut-sedge	herb	FACW	0
Daucus carota	Queen-Anne's-lace	herb	UPL	**
Desmanthus illinoensis	Illinois bundleflower	herb	FAC-	4
Diospyros virginiana	persimmon	herb	FAC	2
Echinochloa muricata	barnyard grass	herb	OBL	0
Eclipta prostrata	yerba de tajo	herb	FACW	2
Erechtites hieracifolia	fire weed	herb	FACU	2
Erigeron annuus	annual fleabane	herb	FAC-	1
Eupatorium perfoliatum	common boneset	herb	FACW+	4
Eupatorium serotinum	late boneset	herb	FAC+	1
Festuca arundinacea	tall fescue	herb	FACU+	**

Species list continued on the following page.

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

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Wet meadow creation
Legal Description: NW 1/4, SE 1/4, Sec. 28, T9S, R1W
Location: 60 m (197 ft) east of U. S. Route 51 and 550 m (1810 ft) north of the intersection of U. S. Route 51 and Pleasant Hill Road

SPECIES LIST (continued)

Scientific name	Common name	Stratum	Wetland indicator status	C*
Fraxinus pennsylvanica	green ash	herb	FACW	2
Gratiola neglecta	clammy hedge hyssop	herb	OBL	5
Hibiscus lasiocarpus	hairy rose mallow	herb	FACW+	5
Impatiens capensis	jewelweed	herb	FACW	2
Ipomoea hederacea	ivy-leaved morning glory	herb	FAC	**
Iva annua	marsh elder	herb	FAC	0
Juncus effusus solutus	common rush	herb	OBL	4
Juncus tenuis	path rush	herb	FAC	0
Juncus torreyi	Torrey's rush	herb	FACW	3
Leersia oryzoides	rice cutgrass	herb	OBL	3
Lespedeza cuneata	sericea lespedeza	herb	NI	**
Lindernia dubia	false pimpernel	herb	OBL	5
Ludwigia peploides	creeping primrose willow	herb	OBL	5
Lycopus americanus	water horehound	herb	OBL	3
Lysimachia nummularia	moneywort	herb	FACW+	**
Mimulus alatus	winged monkey flower	herb	OBL	6
Morus alba	white mulberry	herb	FAC	**
Oxalis stricta	yellow wood sorrel	herb	FACU	0
Panicum virgatum	prairie switchgrass	herb	FAC+	4
Perilla frutescens	beefsteak plant	herb	FAC	**
Phleum pratense	Timothy	herb	FACU	**
Phyla lanceolata	fog-fruit	herb	OBL	1
Pilea pumila	clearweed	herb	FACW	3
Plantago rugelii	Rugel's plantain	herb	FAC	0
Platanus occidentalis	sycamore	shrub	FACW	3
Polygonum cespitosum	creeping smartweed	herb	UPL	**
Polygonum lapathifolium	curttop lady's thumb	herb	FACW+	0
Polygonum persicaria	spotted lady's thumb	herb	FACW	**
Populus deltoides	eastern cottonwood	shrub	FAC+	2
Rotala ramosior	tooth-cup	herb	OBL	4
Rumex crispus	curly dock	herb	FAC+	**

Species list continued on the following page.

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

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Wet meadow creation
Legal Description: NW 1/4, SE 1/4, Sec. 28, T9S, R1W
Location: 60 m (197 ft) east of U. S. Route 51 and 550 m (1810 ft) north of the intersection of U. S. Route 51 and Pleasant Hill Road

SPECIES LIST (continued)

Scientific name	Common name	Stratum	Wetland indicator status	C*
Salix exigua	sandbar willow	herb	OBL	1
Salix nigra	black willow	shrub	OBL	3
Scirpus atrovirens	bulrush	herb	OBL	4
Setaria faberi	giant foxtail	herb	FACU+	**
Trifolium repens	white clover	herb	FACU+	**
Typha angustifolia	narrow-leaved cattail	herb	OBL	**
Typha latifolia	cattail	herb	OBL	1
Verbena urticifolia	white vervain	herb	FAC+	3
Veronica peregrina	purslane speedwell	herb	FACW+	0
Xanthium strumarium	cockle bur	herb	FAC	0

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

FQI = R/√N = 138/√58 = 18.1
mCv = R/N = 138/58 = 2.4

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

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Wet meadow creation
Legal Description: NW 1/4, SE 1/4, Sec. 28, T9S, R1W
Location: 60 m (197 ft) east of U. S. Route 51 and 607 m (1997 ft) north of the intersection of U. S. Route 51 and Pleasant Hill Road

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

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. *Salix nigra*	OBL	shrub
2. *Leersia oryzoides*	OBL	herb
3. *Phyla lanceolata*	OBL	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 100%
Hydrophytic vegetation: Yes: X No:
Rationale: More than 50% of the dominants are OBL, FACW, FAC+, or FAC.

SOILS

Series and phase: Undetermined (soil excavated)

On county hydric soils list?	Yes:	No: X	
Is the soil a histosol?	Yes:	No: X	
Histic epipedon present?	Yes:	No: X	
Redox Concentrations?	Yes: X	No:	Color: 7.5YR 4/6 and 10YR4/6
Redox Depletions?	Yes: X	No:	Color: 10YR 5/1

Matrix color: 10YR 4/1, 5/1, 5/2, and 4/3
Other indicators: This soil was found in a depressional area.
Hydric soils? Yes: X No:
Rationale: This soil has been altered by excavation of the surface soil layers in order to create a wetland. The soil colors present at this site are indicative of a hydric soil, but it is impossible to determine for certain whether these colors are indicative of past or current conditions at this site. However, we believe at this time that the colors reflect the current depressional landscape position. Therefore, the soil at this site meets the hydric soil criterion. This soil meets NRCS hydric soil indicator F3 - Depleted matrix.

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

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Wet meadow creation
Legal Description: NW 1/4, SE 1/4, Sec. 28, T9S, R1W
Location: 60 m (197 ft) east of U. S. Route 51 and 607 m (1997 ft) north of the intersection of U. S. Route 51 and Pleasant Hill Road

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: NA
Depth to saturated soil: at surface to > 1.3 m (50 inches)
Overview of hydrological flow through the system: This site receives water from precipitation, sheet flow from adjacent higher ground, and from overflow of Piles Fork Creek. Water leaves the site via evapotranspiration, groundwater recharge, and flow into nearby Piles Fork Creek.
Size of Watershed: approximately 10 km^2 (3.9 mi^2)
Other field evidence observed: Drift was observed in shrubs at approximately 0.5 m (18 in) above ground level. Much of this site is approximately 0.3 - 0.6 m (1 - 2 ft) below the level of Piles Fork Creek. Well data collected by the Illinois State Geological Survey in 2006 indicates that this entire site was inundated or saturated for >5% of the growing season, and parts of the site were inundated or saturated for >12.5% of the growing season (Fucciolo *et al*. 2006).

Wetland hydrology: Yes: X No:
Rationale: Well data, secondary indicators, and the relatively low topography indicate that wetland hydrology may be present at this site. In our opinion, at least part of this site is flooded or saturated long enough to meet the wetland hydrology criterion.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: X No:
Rationale: Dominant hydrophytic vegetation and hydric soils are present, and wetland hydrology is present in at least part of the site. The NWI codes part of this site as PFO1A (temporarily flooded, broad-leaved deciduous, forested, palustrine wetland).

Determined by: David Ketzner and Brian Wilm (vegetation and hydrology)
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Illinois State Geological Survey
Wetlands Geology Section
615 East Peabody Drive
Champaign, Illinois 61820

ROUTINE ON-SITE WETLAND DETERMINATION
Site 5 (page 3 of 5)

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Wet meadow creation
Legal Description: NW 1/4, SE 1/4, Sec. 28, T9S, R1W
Location: 60 m (197 ft) east of U. S. Route 51 and 607 m (1997 ft) north of the intersection of U. S. Route 51 and Pleasant Hill Road

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	C*
Acalypha rhomboidea	three-seeded mercury	herb	FACU	0
Acer negundo	box elder	herb	FACW-	1
Acer saccharinum	silver maple	herb	FACW	1
Agrostis alba	red top	herb	FACW	0
Alisma plantago-aquatica	water-plantain	herb	OBL	2
Ambrosia artemisiifolia	common ragweed	herb	FACU	0
Ambrosia trifida	giant ragweed	herb	FAC+	0
Ammannia coccinea	long-leaved ammannia	herb	OBL	5
Asclepias incarnata	swamp milkweed	herb	OBL	4
Aster simplex	panicled aster	herb	FACW	3
Betula nigra	river birch	shrub	FACW	4
Bidens frondosa	common beggar-ticks	herb	FACW	1
Boehmeria cylindrica	false nettle	herb	OBL	3
Calystegia sepium	American bindweed	herb	FAC	1
Carex crus-corvi	sedge	herb	OBL	6
Carex frankii	sedge	herb	OBL	4
Carex sp.	sedge	herb	------	--
Carex vulpinoidea	fox sedge	herb	OBL	3
Cassia fasciculata	partridge pea	herb	FACU-	1
Catalpa sp.	catalpa	shrub	------	--
Cephalanthus occidentalis	buttonbush	shrub	OBL	4
Chamaesyce sp.	milk spurge	herb	------	--
Chasmanthium latifolium	sea oats	herb	FACW	4
Cicuta maculata	water hemlock	herb	OBL	4
Cyperus esculentus	yellow nut-sedge	herb	FACW	0
Desmanthus illinoensis	Illinois bundleflower	herb	FAC-	4
Dichanthelium clandestinum	broad-leaved panic grass	herb	FACW	4
Diodia virginiana	large buttonweed	herb	FACW	4
Echinochloa muricata	barnyard grass	herb	OBL	0
Eclipta prostrata	yerba de tajo	herb	FACW	2
Eleocharis acicularis	needle spike rush	herb	OBL	3

Species list continued on the following page.

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

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Wet meadow creation
Legal Description: NW 1/4, SE 1/4, Sec. 28, T9S, R1W
Location: 60 m (197 ft) east of U. S. Route 51 and 607 m (1997 ft) north of the intersection of U. S. Route 51 and Pleasant Hill Road

SPECIES LIST (continued)

Scientific name	Common name	Stratum	Wetland indicator status	C*
Elymus virginicus	Virginia wild rye	herb	FACW-	4
Equisetum arvense	common horsetail	herb	FAC	0
Equisetum hyemale affine	scouring rush	herb	FACW-	2
Eupatorium coelestinum	mist flower	herb	FAC+	3
Eupatorium perfoliatum	common boneset	herb	FACW+	4
Eupatorium serotinum	late boneset	herb	FAC+	1
Festuca arundinacea	tall fescue	herb	FACU+	**
Fraxinus pennsylvanica	green ash	shrub	FACW	2
Hibiscus laevis	rose mallow	herb	OBL	4
Hibiscus lasiocarpus	hairy rose mallow	herb	FACW+	5
Impatiens capensis	jewelweed	herb	FACW	2
Ipomoea lacunosa	white morning-glory	herb	FACW	1
Iva annua	marsh elder	herb	FAC	0
Juncus biflorus	two-flowered rush	herb	FACW	5
Juncus diffusissimus	rush	herb	FACW	7
Juncus effusus solutus	common rush	herb	OBL	4
Juncus interior	inland rush	herb	FAC+	3
Juncus tenuis	path rush	herb	FAC	0
Leersia oryzoides	rice cutgrass	herb	OBL	3
Leucospora multifida	leucospora	herb	FACW+	3
Lindernia dubia	false pimpernel	herb	OBL	5
Lycopus americanus	water horehound	herb	OBL	3
Lycopus virginicus	bugle weed	herb	OBL	5
Lysimachia nummularia	moneywort	herb	FACW+	**
Medicago lupulina	black medic	herb	FAC-	**
Mimulus alatus	winged monkey flower	herb	OBL	6
Mollugo verticillata	carpetweed	herb	FAC	**
Panicum virgatum	switchgrass	herb	FAC+	4
Paspalum laeve	smooth lens grass	herb	FACW-	2
Phyla lanceolata	fog-fruit	herb	OBL	1
Platanus occidentalis	sycamore	shrub	FACW	3

Species list continued on the following page.

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

Field Investigators: Ketzner, Wiesbrook, Wilm and Draheim
Date: 28 June 2006 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Wet meadow creation
Legal Description: NW 1/4, SE 1/4, Sec. 28, T9S, R1W
Location: 60 m (197 ft) east of U. S. Route 51 and 607 m (1997 ft) north of the intersection of U. S. Route 51 and Pleasant Hill Road

SPECIES LIST (continued)

Scientific name	Common name	Stratum	Wetland indicator status	C*
Polygonum sp.	smartweed	herb	------	--
Populus deltoides	eastern cottonwood	shrub	FAC+	2
Pycnanthemum tenuifolium	slender mountain mint	herb	FAC	4
Rosa multiflora	multiflora rose	herb	FACU	**
Rumex crispus	curly dock	herb	FAC+	**
Salix exigua	sandbar willow	shrub	OBL	1
Salix nigra	black willow	shrub	OBL	3
Samolus valerandii	brookweed	herb	OBL	5
Scirpus atrovirens	bulrush	herb	OBL	4
Scirpus pendulus	red bulrush	herb	OBL	3
Scirpus tabernaemontanii	great bulrush	herb	OBL	4
Solidago canadensis	Canada goldenrod	herb	FACU	1
Solidago gigantea	late goldenrod	herb	FACW	3
Teucrium canadense	American germander	herb	FACW-	3
Typha angustifolia	narrow-leaved cattail	herb	OBL	**
Typha latifolia	cattail	herb	OBL	1
Ulmus americana	American elm	herb	FACW-	5
Vernonia missurica	missouri ironweed	herb	FAC+	5
Xanthium strumarium	cockle bur	herb	FAC	0

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

FQI = R/√N = 194/√70 = 23.2
mCv = R/N = 194/70 = 2.8

Appendix B

Photographs of Sites 2a, 2b, 4 and 5

Site 2a - south end facing northeast.

Site 2a - north end facing southeast.

Site 2b, from 2a facing west.

Site 4.

Site 5.

Appendix C

Wetland Hydrology (Figure 1) & Project Area (Figure 2)

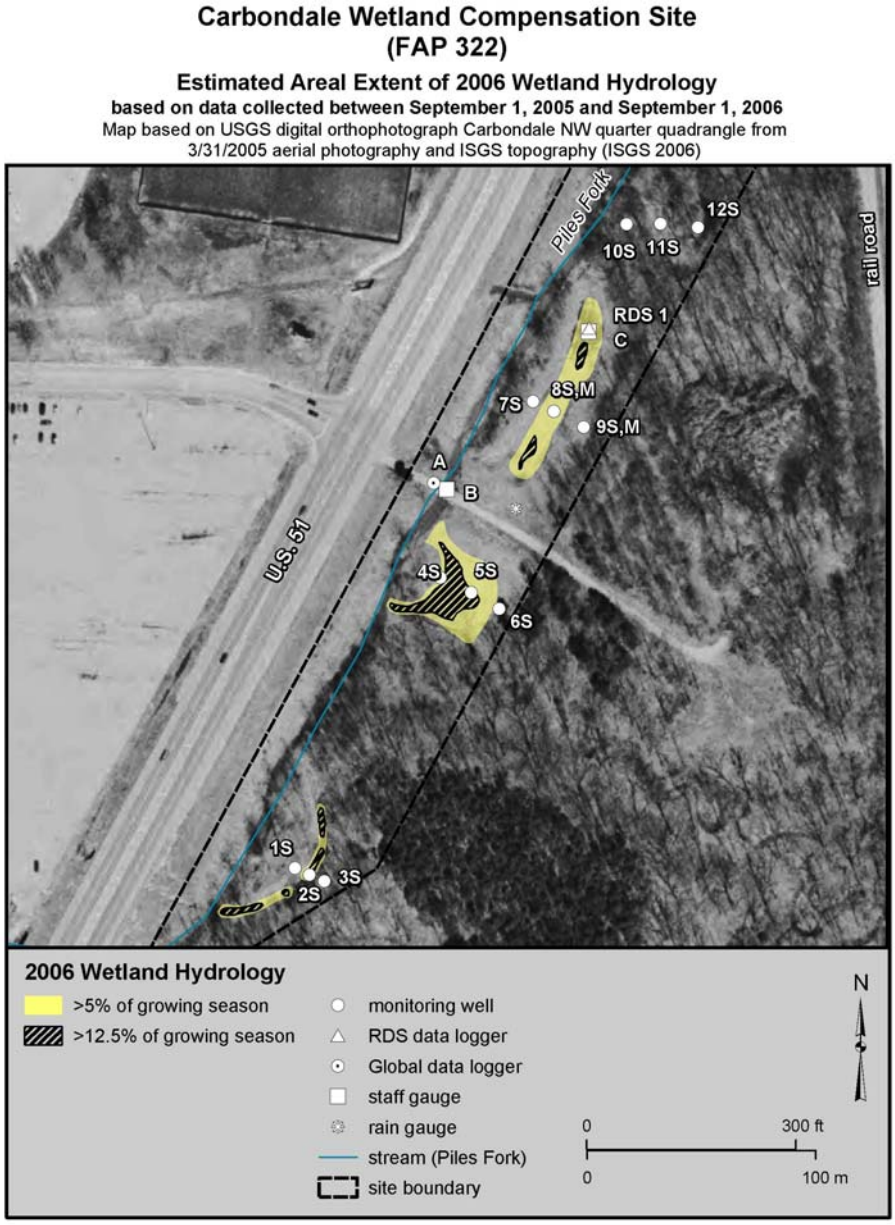
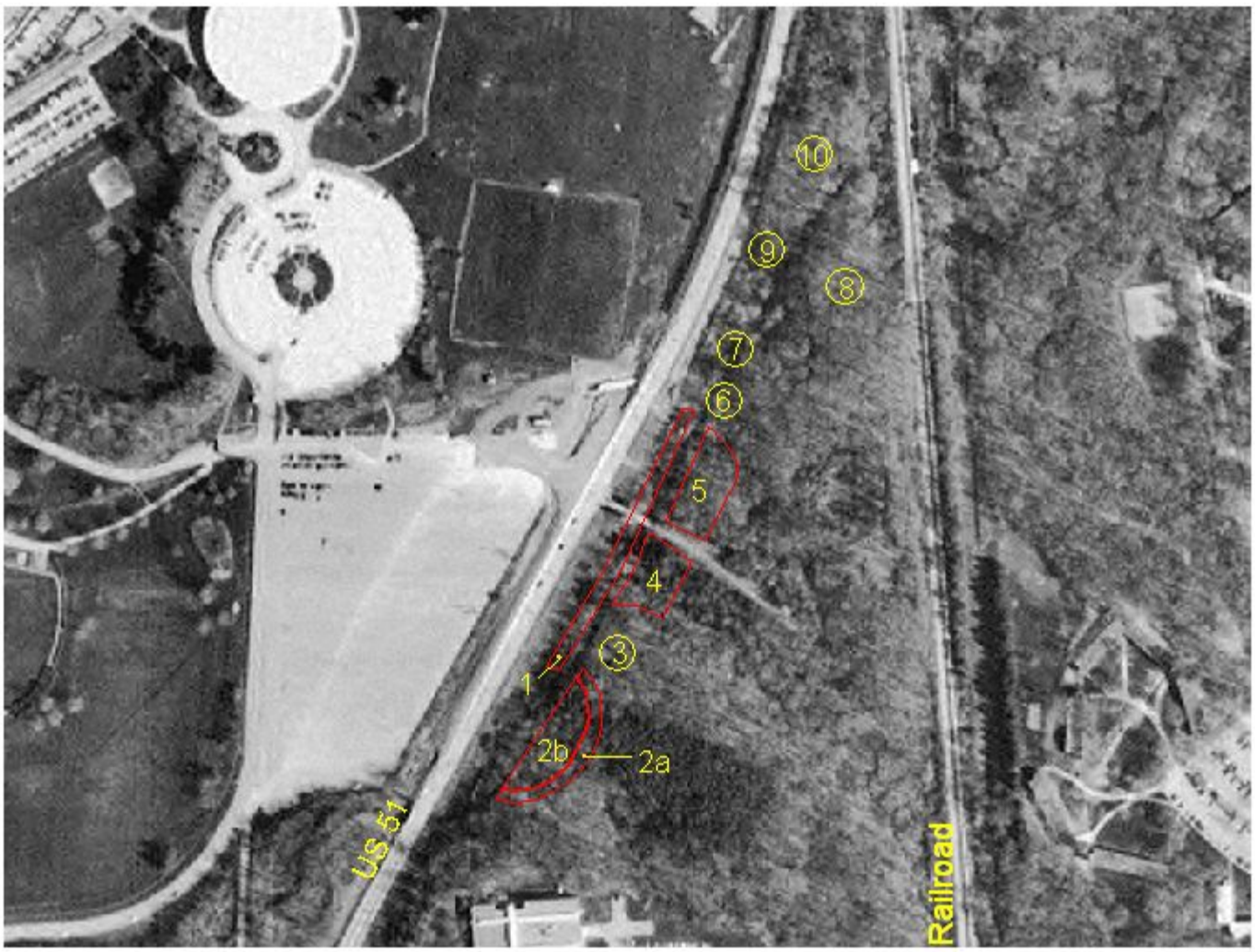

Carbondale Wetland Compensation Site
(FAP 322)
Estimated Areal Extent of 2006 Wetland Hydrology
based on data collected between September 1, 2005 and September 1, 2006
Map based on USGS digital orthophotograph Carbondale NW quarter quadrangle from
3/31/2005 aerial photography and ISGS topography (ISGS 2006)
Piles Fork
railroad
U.S. 51
12S
10S
11S
RDS 1
C
8S,M
7S
9S,M
A
B
4S
5S
6S
1S
2S
3S
2006 Wetland Hydrology
>5% of growing season
>12.5% of growing season
monitoring well
RDS data logger
Global data logger
staff gauge
rain gauge
stream (Piles Fork)
site boundary
N
0
300 ft
0
100 m

Figure 1.

FAP 322 (U.S. 51)
Mitigation Site Monitoring
Jackson county



0 400 800 Feet

scale 1:4800
1 inch=400 ft

0 100 200 Meters

Figure 2
Sites 1 - 10

01/07