

WETLAND MITIGATION SITE MONITORING REPORT

FAP 322 (US 51) Jackson County

Introduction

This report details monitoring of the wetland mitigation site created to compensate for impacts associated with FAP 322 (US 51) in Jackson County. The site consists of approximately 2.4 ha (6.0 ac) of wetland creation. The wetland creation site is located south of DeSoto, IL, northwest of the intersection of US 51 and Big Muddy River. The legal location is SW/4, SW/4, SW/4, Section 28, T. 8 S., R. 1 W. The project area lies within the United States Geological Survey Mississippi River hydrologic unit 07140106, Big Muddy River. No historical information was provided despite repeated requests, but the site was probably completed and trees planted sometime between spring 2000 and spring 2002. On-site monitoring was conducted on August 31, 2005.

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

Goals, Objectives, and Performance Standards

Goals, objectives, and performance standards follow those specified in the monitoring plan (J. Klamm, IDOT District 9 Environmental Coordinator, 2002) developed for this site. Performance criteria are based on those specified in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987), *Illinois Wetland Restoration and Creation Guide* (Admiraal et al., 1997), and in *Guidelines for Developing Mitigation Proposals* (USACE 1993). Each goal should be attained by the end of the 5-year monitoring period. Goals, objectives, and performance criteria are listed below.

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

Objective: The created wetland should compensate for the loss of 2.4 ha (6.0 ac) of scrub-shrub wetland at a 1:1 ratio.

Performance criteria:

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

Project goal 2: The created wetland plant community should meet standards for planted species survival and floristic composition.

Objectives: Planting seedling trees and a wetland grass mixture will create a wet meadow/forested wetland. Other herbaceous vegetation will be allowed to colonize the site naturally.

Performance criteria:

- a. Planted species survivorship: At least 80% of the planted trees and shrubs should be established and living.
- b. Native species composition: At least 70% of the plant species present should be non-weedy, native, perennial and annual species.
- c. Dominance of vegetation: None of the dominant plant species may be non-native or weedy species.

Methods

Project goal 1

a. Predominance of hydrophytic vegetation

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

b. Presence of wetland hydrology

Illinois State Geological Survey (ISGS) personnel installed eight soil-zone monitoring wells, a stage gauge, and an RDS data logger at the site in the autumn of 2002 (Fucciolo, et al., 2003). Locations for these sites can be found in the ISGS annual report for 2005 (Fucciolo, et al., 2005). Water-level data was collected beginning in October 2002.

c. Occurrence of hydric soils

The soil was sampled in order to monitor hydric soil development. Soil profile morphology including horizon color, texture, and structure was described at various points throughout the site. Additionally, the presence, type, size, and abundance of redoximorphic features were noted. Hydric soils may develop slowly, and characteristics may not be apparent during the first several years after project construction. In the absence of hydric soil indicators at 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. Planted species survivorship

In order to create floodplain forest, tree saplings were planted at the compensation site. According to the program development memorandum for this project (Karl Bartelsmeyer, IDOT District Engineer, memo to Steve Hamer, April 5, 2000), the following number of trees were to be planted at the site:

Table 1. Tree species planted in the created wetland (Planting date unknown).

Species	Common Name	Number
<i>Betula nigra</i>	River birch	1000
<i>Fraxinus pennsylvanica</i>	Green ash	1000
<i>Liquidambar styraciflua</i>	Sweetgum	1000
<i>Platanus occidentalis</i>	Sycamore	1000
<i>Quercus bicolor</i>	Swamp white oak	1000
<i>Quercus palustris</i>	Pin oak	1000
TOTAL		6000

Survivorship and density of planted trees was determined through a census of the created wetland. All live trees and shrubs were counted. Dead or cut-off trees were not counted due to the excessive numbers and the difficulty of identification by species.

Tree survival was calculated as a percentage of the number of stems reported to have been planted:
 $100 \times (\text{Total number of live planted stems counted} / \text{total number of planted stems reported})$.

b. Native Species Composition

A complete list of plant species present was compiled. This was used to determine the number and percentage of species present that are non-weedy, native, perennials and annuals.

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

c. Dominance of vegetation

Plant species dominance was determined as in project goal 1, a. Predominance of hydrophytic vegetation. The method for determining dominant vegetation at a wetland site is described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and further explained in the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (Federal Interagency Committee for Wetland Delineation 1989).

In addition, four permanent photography stations were established so that photographs could be used to document changes in plant community structure and composition. The photo stations were located essentially in the four corners of the site and will be indicated on an aerial photograph when received. Wetland boundaries were recorded using a Trimble Global Positioning System. The spatial data is included on a disc submitted with this report. Locations were overlaid on DOQ's and approximate wetland acreage was determined using ArcView 3.3 software (ESRI 2002). Printouts of this DOQ are included with this report.

Results

This year we separated out an area of the site that has consistently been drier than the rest as area 2. Area 1 is the majority of the site and is the area we believe to have hydrophytic vegetation, hydric soils, and wetland hydrology. Area 2 does not now nor do we believe it will in the future possess hydric soils, hydrology, or hydrophytic vegetation. All of the following discussion will be focused on area 1.

Project goal 1

a. Predominance of hydrophytic vegetation

Dominant plant species for the mitigation site in 2005 are shown in Table 2. Three of the four dominant species are rated OBL, FACW, FAC+, or FAC and are hydrophytic. The fourth species (*Lespedeza cuneata*) is not assigned a wetland indicator status.

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

Dominant Plant Species	Stratum	Indicator Status
<i>Bidens aristosa</i>	Herb	FACW
<i>Echinochloa muricata</i>	Herb	OBL
<i>Lespedeza cuneata</i>	Herb	NI
<i>Panicum virgatum</i>	Herb	FAC+

b. Presence of wetland hydrology

The ISGS estimated that “the total area of created wetland that conclusively satisfied wetland hydrology criteria in 2003 is 5.4 ac (2.2 ha)” (Fucciolo, et al. 2003). This year, a drier than average year (especially in the spring), only 1.6 ha (3.9 ac) satisfied the wetland hydrology criteria (Fig. 1, next page) (Fucciolo, et al. 2005). More information is available in the *US 51, Jackson County, DeSoto Wetland Compensation Site* report (Fucciolo, et al. 2005).

Based on field evidence observed during our on-site visits, the majority of this site exhibits wetland drainage patterns, water stained leaves, algal mats, and oxidized root channels, and

therefore may possess wetland hydrology. We suggest that the 2003 data is probably more representative of the actual wetland acreage at this site.

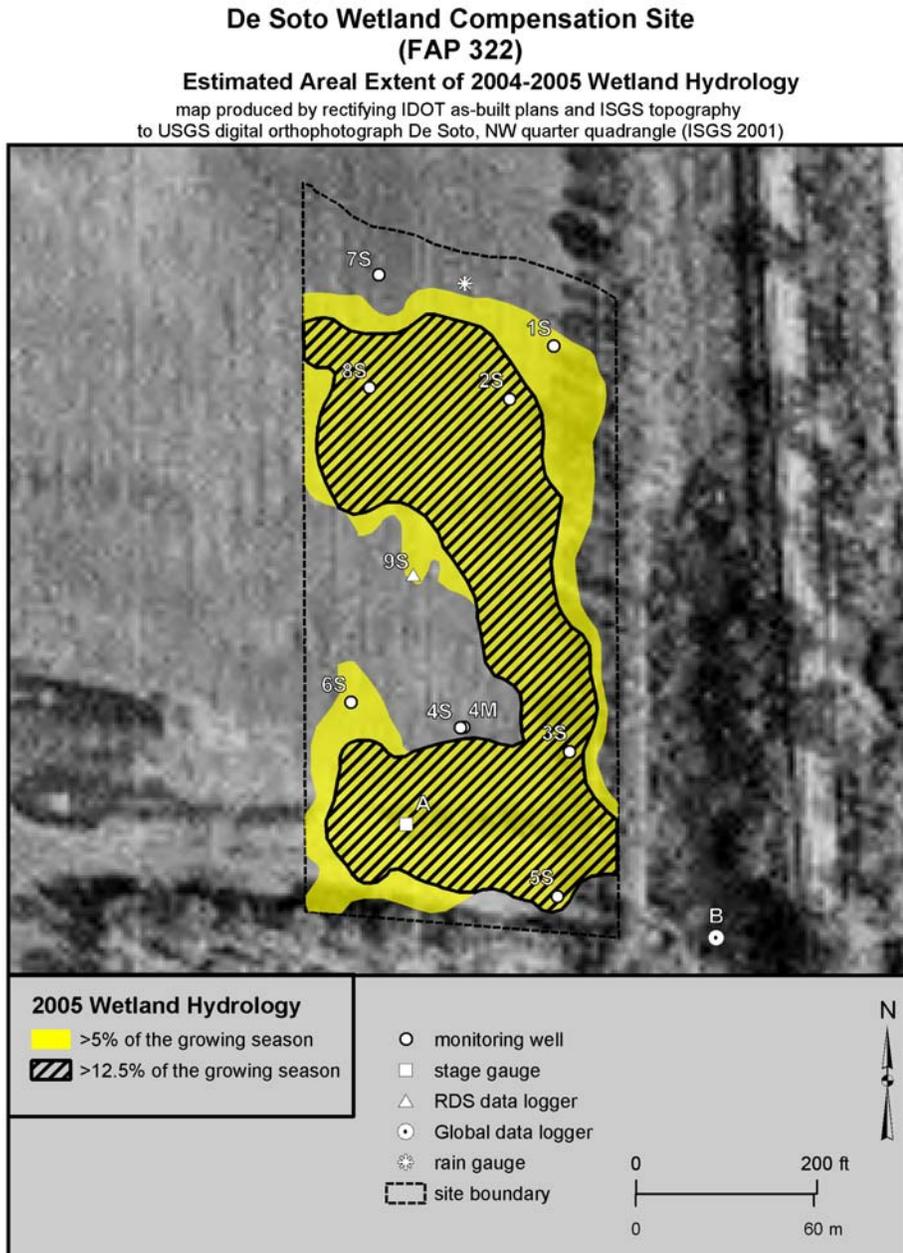


Figure 1.

c. Occurrence of hydric soils

Soils examined at the site were found to be only moderately disturbed. Excavation has been done and the sites lack an undisturbed A horizon. The existing soil at much of the site is a combination of the former A and E horizons. Topsoil was not replaced after excavation. Even though the soils are disturbed, hydric soil indicators are present. Table 3 below presents a soil description of a typical pedon located within this site:

Table 3. Description of the soils at the site.

Depth	Matrix Color	Concentrations	Depletions	Texture	Structure
0-15 cm (0-6 in)	10YR 4/2	7.5YR 5/6	None	Silt loam	Medium granular
15-38 cm (6-15 in)	10YR 5/2	7.5YR 5/6 and 10YR 5/6	None	Silt loam	Medium granular and weak platy
38-66+ cm (15-26+ in)	10YR 5/2	7.5YR 5/6 and 10YR 5/6	None	Silt loam	Weak granular and weak platy

The majority of this site satisfies the wetland criteria; therefore, we believe this site is a wetland. Current wetland acreage at this site is estimated to be 5.4 ac (2.2 ha), corresponding to that area determined by the ISGS in 2003 to possess wetland hydrology. This estimate will be refined in future years as more hydrologic data is gathered.

Project goal 2

a. Planted species survivorship

Table 4 shows the results of the census. There were serious discrepancies between the numbers of trees reported as planted and the number of live trees counted. Table 4 also shows the percent survival for the trees. These figures were calculated both by species and overall for all species in the entire site. Fewer than 30% of the trees reported planted were counted. These numbers are slightly down from last year, and show that this site cannot meet the criteria for planted species survivorship without remedial action being taken. However, natural regeneration of a fairly diverse assemblage of tree species is amply abundant within the project area. Natural regeneration is proceeding so well at this site that it is becoming difficult to determine with any certainty which trees were planted and which were not. This is complicated by the fact that in 2002 this site flooded, and it appears that many of the planted trees that were not counted as live that year have now resprouted from the ground and are indeed growing. The vigorous natural regeneration of tree species indicates that this criteria may not be important to determine the success of this site.

Table 4. Number of trees counted and percent tree survival (by species).

Species	Common Name	Number live	% of reported
<i>Betula nigra</i>	River birch	197	19.7
<i>Carya illinoensis</i>	Pecan	0	NA
<i>Fraxinus pennsylvanica</i>	Green ash	522	52.2
<i>Liquidambar styraciflua</i>	Sweetgum	123	12.3
<i>Platanus occidentalis</i>	Sycamore	401	40.1
<i>Quercus bicolor</i>	Swamp white oak	23	2.3
<i>Quercus lyrata</i>	Overcup oak	48	NA
<i>Quercus palustris</i>	Pin oak	435	43.5
TOTAL		1749	29.2

b. Native species composition

This site has only 54.7% non-weedy, native, annual and perennial species. Therefore, it does not meet the requirement for native species composition (70%). It is normal, however, for a site to begin very weedy and develop more native character over time, and this site was close to the project goals for native species composition last year (2004). This year the decrease may have been due to the predominance of *Lespedeza cuneata*, which was very dense and tall this year and probably shaded out some herbaceous species.

Two FQI values were calculated for this site from the species lists included in Appendix A. The first FQI value is calculated from only species which became established on the site naturally; the second FQI value includes the planted trees. The FQI value is 20.9 with a \bar{c} value of 2.7 when only naturally established vegetation is considered, and 22.6 and 2.8 respectively when the planted trees are included. Therefore this site is of good natural quality.

In addition the State Threatened *Eryngium prostratum* was found to have colonized the site this year.

c. Dominance of vegetation

This site does not meet the performance criteria for dominance of vegetation. Three of the dominant species (Table 2) are native; however, two of these are considered weedy. *Bidens aristosa* and *Echinochloa muricata* are weedy or undesirable, while *Panicum virgatum* is not. The fourth species at this site, *Lespedeza cuneata*, is non-native and weedy.

Photography stations were established in each corner of the site, with number 1 in the southeast, number 2 in the southwest, number 3 in the northeast, and number 4 in the northwest corner. Photographs were taken from the permanent photography stations established in 2002 and are in Appendix B of this report.

Discussion

After four monitoring seasons, this site shows progress toward wet meadow/forested wetland establishment. All standards for Project Goal 1 have been met, as this site is a jurisdictional wetland. As the vegetative succession proceeds, this site may not comply with Project Goal 2, by the end of the monitoring period. However, even if the standards are not met, we feel this site has very good potential for the eventual creation of wet meadow/forested wetland.

The vegetation is hydrophytic but does not meet the dominance criteria for native non-weedy species. Again this year the invasion of the aggressive exotic *Lespedeza cuneata* was seen, in a much larger area than last year. This plant may need to be controlled for this site to be successful. However, this species is not likely to remain dominant after the trees at this site close the canopy in the future. The planted tree seedlings experienced excessive mortality and the site will need to be replanted in order to meet the planted species performance criteria. However, the seemingly excellent natural regeneration of this site indicates that planted tree survivorship may not be of paramount importance. Four of the planted species (*Fraxinus pennsylvanica*, *Liquidambar styraciflua*, *Platanus occidentalis*, and *Quercus palustris*) have sufficient natural regeneration to compensate for the mortality of the original plantings. There are still a large number of species at each site that have very low coefficients of conservatism (C). This is common on disturbed and early successional sites and is not a cause for concern at this time. It is likely that as succession

progresses, more conservative species will become established on the site; this can be seen in the relative increase of both mean c and FQI values over the monitoring period (Table 5). Also, the FQI and mean C may have been lower this year due to the tremendous amount of the aggressive exotic *Lespedeza cuneata*, which is presumably shading out other, more desirable species. The establishment of the State Threatened *Eryngium prostratum* is an encouraging development.

Table 5.

Year	Without planted species		With planted species	
	FQI	\bar{c}	FQI	\bar{c}
2002	15.3	2.1	16.5	2.2
2003	20.7	2.5	22.9	2.7
2004	22.6	2.7	24.2	2.8
2005	20.9	2.7	22.6	2.8

Currently, the primary concerns for this site are possibly controlling the *Lespedeza cuneata*, establishing non-weedy, native dominant vegetation and adequate tree density. This site already has hydric soil characteristics, hydrophytic vegetation, and some areas of wetland hydrology. An estimate of current wetland acreage is 5.4 ac (2.2 ha), corresponding to that area determined by the ISGS to possess wetland hydrology in 2003.

Literature Cited

- Admiraal, A.N., M.J. Morris, T.C. Brooks, J.W. Olson, and M.V. Miller. 1997. Illinois wetland restoration and creation guide. Illinois Natural History Survey Special Publication 19. viii+188pp.
- Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi. Technical Report Y-87-1.
- Federal Interagency Committee for Wetland Delineation. 1989. Federal manual for identifying and delineating jurisdictional wetlands. U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and U.S.D.A. Soil Conservation Service, Washington, D.C. Cooperative technical publication.
- Fucciolo, C.S., S.E. Benton, K.W. Carr, K.L. Hart, M. Lake, M.V. Miller, J.J. Miner, G.E. Pociask, B.J. Robinson, P.J. Sabatini, B.A. Watson, and K.D. Weaver. 2003. Annual report for active IDOT wetland compensation and hydrologic monitoring sites. Report submitted to the Illinois Department of Transportation, Bureau of Design and Environment, Wetlands Unit.
- Fucciolo, C. S., S. E. Benton, K. W. Carr, M. V. Miller, J. J. Miner, E. T. Plankell, G. E. Pociask, B. J. Robinson, G. A. Shofner, and K. D. Weaver. 2005. Annual report for active IDOT wetland compensation and hydrologic monitoring sites. Report submitted to the Illinois Department of Transportation, Bureau of Design and Environment, Wetlands Unit.
- Herman, R.J., C.C. Miles, L.A. Dungan, B.E. Currie, and P.W. Ice. 1979. Soil Survey of Jackson County, Illinois. United States Department of Agriculture, Soil Conservation Service and Forest Service, in cooperation with Illinois Agricultural Experiment Station. IL. Ag. Exp. Sta. soil report #106. 192pp. + maps.
- Klamm, J. 2002. Project goals, objectives, monitoring tasks, and monitoring schedule for US 51 Jackson County, south of DeSoto wetland mitigation plan. 1p.
- Reed, P. B., Jr. 1988. National list of plant species that occur in wetlands: Illinois. U.S. Fish and Wildlife Service, National Wetlands Inventory. NERC-88/18.13.
- Swink, F., and G. Wilhelm. 1994. Plants of the Chicago region. Indiana Academy of Science, Indianapolis.
- Taft, J. B., G.S. Wilhelm, D. M. Ladd, and L.A. Masters. 1997. Floristic quality assessment for vegetation in Illinois - a method for assessing vegetation integrity. *Erigenia* 15:3-95.
- US Army Corps of Engineers. 1993. Guidelines for developing mitigation proposals. Chicago District. September 1.

Appendix A

Wetland Determination Forms

ROUTINE ONSITE WETLAND DETERMINATION

Area 1 (page 1 of 5)

Field Investigators: Wiesbrook and Busemeyer **Date:** August 31, 2005

Project Name: FAP 322 (US 51) **Section No.:** 2B-3

State: Illinois **County:** Jackson **Applicant:** IDOT Dist. 9

Area Name: Wet meadow

Legal Description: SW/4, SW/4, SW/4, Section 28, T. 8 S., R. 1 W

Location: This wetland occupies nearly the entire mitigation monitoring site, excepting a small area on the north edge of the site (Area 2).

Do normal environmental conditions exist at this area? Yes: X No:

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

VEGETATION

Dominant Plant Species	Stratum	Indicator Status
1. <i>Bidens aristosa</i>	Herb	FACW
2. <i>Echinochloa muricata</i>	Herb	OBL
3. <i>Lespedeza cuneata</i>	Herb	NI
4. <i>Panicum virgatum</i>	Herb	FAC+

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: Racoon silt loam (Typic Endoaqualf)

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

Is the soil a histosol? Yes: No: X

Histic epipedon present? Yes: No: X

Redox Concentrations? Yes: X No: Color: 7.5YR 5/6 and 10YR 5/6

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

Matrix color: 10YR 4/2 and 5/2 over 5/2 and 6/2

Other indicators: None.

Hydric soils? Yes: X No:

Rationale: The Natural Resources Conservation Service identifies Racoon silt loam as a Typic Endoaqualf which is poorly drained. This soil possesses redox concentrations within a low chroma matrix, which indicates saturated or reduced conditions for extended duration. Therefore, the soil at this site meets the hydric soil criterion. This soil meets NRCS hydric soil indicator F3 – Depleted matrix.

ROUTINE ONSITE WETLAND DETERMINATION

Area 1 (page 2 of 5)

Field Investigators: Wiesbrook and Busemeyer **Date:** August 31, 2005

Project Name: FAP 322 (US 51) **Section No.:** 2B-3

State: Illinois **County:** Jackson **Applicant:** IDOT Dist. 9

Area Name: Wet meadow

Legal Description: SW/4, SW/4, SW/4, Section 28, T. 8 S., R. 1 W

Location: This wetland occupies nearly the entire mitigation monitoring site, excepting a small area on the north edge of the site (Area 2).

HYDROLOGY

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

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

Overview of hydrological flow through the system: This area is hydrologically influenced by overflow from the Big Muddy River, sheet flow from surrounding uplands, and precipitation. Water leaves the area via evapotranspiration, groundwater recharge, and some surface drainage to the east.

Size of watershed: <1.3 km² (0.5 mi²) for the surrounding area; 277 km² (107 mi²) for the Big Muddy River at Murphysboro

Other field evidence observed: ISGS estimated 5.4 ac (2.2 ha) of this area met the wetland hydrology criteria (Fucciolo et al., 2003). This year, a drier than average year, only 1.6 ha (3.9 ac) satisfied the wetland hydrology criteria (Fucciolo, et al. 2005). We observed water-stained leaves, algal surface, and wetland drainage patterns.

Wetland hydrology: Yes: X No:

Rationale: Field evidence cited above and ISGS data indicate that at least a portion of this area is inundated or saturated for a sufficient duration to satisfy the wetland hydrology criterion.

DETERMINATION AND RATIONALE:

Is the area a wetland? Yes: X No:

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

ROUTINE ONSITE WETLAND DETERMINATION

Area 1 (page 3 of 5)

Field Investigators: Wiesbrook and Busemeyer **Date:** August 31, 2005

Project Name: FAP 322 (US 51) **Section No.:** 2B-3

State: Illinois **County:** Jackson **Applicant:** IDOT Dist. 9

Area Name: Wet meadow

Legal Description: SW/4, SW/4, SW/4, Section 28, T. 8 S., R. 1 W

Location: This wetland occupies nearly the entire mitigation monitoring site, excepting a small area on the north edge of the site (Area 2).

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	Coefficient of conservatism
+ <i>Acalypha rhomboidea</i>	three-seeded mercury	herb	FACU	0
+ <i>Acer negundo</i>	box elder	shrub	FACW-	1
+ <i>Agrostis alba</i>	red top	herb	FACW	0
<i>Alisma plantago-aquatica</i>	broad-leaf water-plantain	herb	OBL	2
+ <i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
+ <i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
<i>Apocynum cannabinum</i>	dogbane	herb	FAC	2
<i>Aster ontarionis</i>	Ontario aster	herb	FAC	4
<i>Aster simplex</i>	panicled aster	herb	FACW	3
+ <i>Bidens aristosa</i>	swamp marigold	herb	FACW	1
+ <i>Bidens frondosa</i>	common beggar-ticks	herb	FACW	1
<i>Boltonia asteroides</i>	false aster	herb	FACW	5
<i>Campsis radicans</i>	trumpet creeper	shrub	FAC	2
<i>Carex grayi</i>	bur sedge	herb	FACW+	6
<i>Carex muskingumensis</i>	sedge	herb	OBL	6
<i>Carex</i> sp.	sedge	herb	----	--
<i>Carex typhina</i>	sedge	herb	OBL	6
<i>Carex vulpinoidea</i>	fox sedge	herb	OBL	3
<i>Carya illinoensis</i>	pecan	shrub (pn)	-	6
+ <i>Cassia fasciculata</i>	partridge pea	herb	FACU-	1
<i>Celtis occidentalis</i>	hackberry	shrub	FAC-	3
<i>Cephalanthus occidentalis</i>	buttonbush	shrub	OBL	4
+ <i>Chamaesyce humistrata</i>	milk spurge	herb	FACW	1
<i>Chasmanthium latifolium</i>	sea oats	herb	FACW	4
+ <i>Conyza canadensis</i>	horseweed	herb	FAC-	0
<i>Crataegus</i> sp.	haw	shrub	---	--
+ <i>Cyperus erythrorhizos</i>	red-rooted sedge	herb	OBL	1
+ <i>Cyperus strigosus</i>	long scaled nut sedge	herb	FACW	0
<i>Desmanthus illinoensis</i>	Illinois bundle flower	herb	FAC-	4
<i>Diodia virginiana</i>	large buttonweed	herb	FACW	4
+ <i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Eclipta prostrata</i>	yerba de tajo	herb	FACW	2
<i>Elymus virginicus</i>	Virginia wild rye	herb	FACW-	4
<i>Eryngium prostratum</i>	eryngo	herb	OBL	5
<i>Eupatorium coelestinum</i>	blue boneset	herb	FAC+	3
+ <i>Eupatorium serotinum</i>	late boneset	herb	FAC+	1
<i>Fraxinus pennsylvanica</i>	green ash	shrub (pn)	FACW	2

Species list continued on next page.

ROUTINE ONSITE WETLAND DETERMINATION

Area 1 (page 4 of 5)

Field Investigators: Wiesbrook and Busemeyer **Date:** August 31, 2005

Project Name: FAP 322 (US 51) **Section No.:** 2B-3

State: Illinois **County:** Jackson **Applicant:** IDOT Dist. 9

Area Name: Wet meadow

Legal Description: SW/4, SW/4, SW/4, Section 28, T. 8 S., R. 1 W

Location: This wetland occupies nearly the entire mitigation monitoring site, excepting a small area on the north edge of the site (Area 2).

SPECIES LIST (cont.)

Scientific name	Common name	Stratum	Wetland indicator status	Coefficient of conservatism
<i>Gleditsia triacanthos</i>	honey locust	shrub	FAC	2
<i>Hibiscus laevis</i>	halberd-leaved rose mallow	herb	OBL	4
+ <i>Ipomoea hederacea</i>	ivy-leaved morning glory	herb	FAC	*
+ <i>Ipomoea lacunosa</i>	small white morning-glory	herb	FACW	1
+ <i>Iva annua</i>	marsh elder	herb	FAC	0
<i>Juncus acuminatus</i>	knotty-leaved rush	herb	OBL	4
+ <i>Juncus tenuis</i>	path rush	herb	FAC	0
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
+ <i>Lespedeza cuneata</i>	sericea lespedeza	herb	NI	*
<i>Liquidambar styraciflua</i>	sweet gum	shrub (pn)	FACW	6
<i>Lobelia cardinalis</i>	cardinal-flower	herb	OBL	6
<i>Ludwigia polycarpa</i>	false loosestrife	herb	OBL	5
+ <i>Melilotus officinalis</i>	yellow sweet clover	herb	FACU	*
<i>Mimulus ringens</i>	monkey flower	herb	OBL	5
<i>Panicum virgatum</i>	prairie switchgrass	herb	FAC+	4
+ <i>Phyla lanceolata</i>	fog-fruit	herb	OBL	1
<i>Platanus occidentalis</i>	sycamore	shrub(pn)	FACW	3
+ <i>Polygonum hydropiper</i>	common smartweed	herb	OBL	*
<i>Polygonum hydropiperoides</i>	water pepper	herb	OBL	4
+ <i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Polygonum punctatum</i>	dotted smartweed	herb	OBL	3
<i>Populus deltoides</i>	eastern cottonwood	herb	FAC+	2
+ <i>Prunella vulgaris</i>	self-heal	herb	FAC	*
<i>Quercus palustris</i>	pin oak	shrub (pn)	FACW	4
<i>Salix nigra</i>	black willow	shrub	OBL	3
<i>Scirpus cyperinus</i>	wool grass	herb	OBL	5
+ <i>Setaria glauca</i>	pigeon grass	herb	FAC	*
+ <i>Sida spinosa</i>	prickly sida	herb	FACU	*
+ <i>Solanum carolinense</i>	horse-nettle	herb	FACU-	0
<i>Spermacoce glabra</i>	smooth buttonweed	herb	FACW+	4
+ <i>Toxicodendron radicans</i>	poison ivy	shrub	FAC+	1
<i>Ulmus americana</i>	American elm	shrub	FACW-	5
+ <i>Xanthium strumarium</i>	cockle bur	herb	FAC	0

= Coefficient of Conservatism (Taft et al. 1997) + weedy native or non-native species, (pn) both planted and naturally occurring species, *non-native species

$$FQI = \sum C/\sqrt{N} = 163/\sqrt{61} = 20.9 \quad \bar{C} = \sum C/N = 163/61 = 2.7$$

ROUTINE ONSITE WETLAND DETERMINATION

Area 1 (page 5 of 5)

Field Investigators: Wiesbrook and Busemeyer **Date:** August 31, 2005

Project Name: FAP 322 (US 51) **Section No.:** 2B-3

State: Illinois **County:** Jackson **Applicant:** IDOT Dist. 9

Area Name: Wet meadow

Legal Description: SW/4, SW/4, SW/4, Section 28, T. 8 S., R. 1 W

Location: This wetland occupies nearly the entire mitigation monitoring site, excepting a small area on the north edge of the site (Area 2).

Planted Shrubs (that are not also naturally occurring)

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	Coefficient of conservatism
<i>Betula nigra</i>	river birch	shrub(p)	FACW	4
<i>Quercus bicolor</i>	swamp white oak	shrub(p)	FACW+	7
<i>Quercus lyrata</i>	overcup oak	shrub(p)	OBL	7

= Coefficient of Conservatism (Taft et al. 1997) (p) planted species

$$*FQI = \sum C/\sqrt{N} = 181/\sqrt{64} = 22.6 \quad * \bar{C} = \sum C/N = 181/64 = 2.8$$

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

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ROUTINE ONSITE WETLAND DETERMINATION

Area 2 (page 1 of 4)

Field Investigators: Wiesbrook and Busemeyer **Date:** August 31, 2005
Project Name: FAP 322 (US 51) **Section No.:** 2B-3
State: Illinois **County:** Jackson **Applicant:** IDOT Dist. 9
Area Name: Non-native forbland
Legal Description: SW/4, SW/4, SW/4, Section 28, T. 8 S., R. 1 W
Location: This non-wetland occupies a small area on the north edge of the site.

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

VEGETATION

Dominant Plant Species	Stratum	Indicator Status
1. <i>Agrostis alba</i>	Herb	FACW
2. <i>Lespedeza cuneata</i>	Herb	NI

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: Hurst silt loam (Aeric Chromic Vertic Epiaqualf)

On Jackson 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 5/6 and 10YR 5/6

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

Matrix color: 10YR 4/2 and 6/2 over 5/2 and 5/3

Other indicators: None.

Hydric soils? Yes: No: X

Rationale: The Natural Resources Conservation Service identifies Hurst silt loam as an Aeric Chromic Vertic Epiaqualf which is somewhat poorly drained. This soil possesses redox concentrations within a medium chroma matrix, which indicates saturated or reduced conditions for brief duration. Therefore, the soil at this site does not meet the hydric soil criterion. This soil meets none of the NRCS hydric soil indicators.

ROUTINE ONSITE WETLAND DETERMINATION

Area 2 (page 2 of 4)

Field Investigators: Wiesbrook and Busemeyer **Date:** August 31, 2005
Project Name: FAP 322 (US 51) **Section No.:** 2B-3
State: Illinois **County:** Jackson **Applicant:** IDOT Dist. 9
Area Name: Non-native forbland
Legal Description: SW/4, SW/4, SW/4, Section 28, T. 8 S., R. 1 W
Location: This non-wetland occupies a small area on the north edge of the site.

HYDROLOGY

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

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

Overview of hydrological flow through the system: This area is hydrologically influenced by overflow from the Big Muddy River, sheet flow from surrounding uplands, and precipitation. Water leaves the area via evapotranspiration, groundwater recharge, and some surface drainage to the east.

Size of watershed: <1.3 km² (0.5 mi²) for the surrounding area; 277 km² (107 mi²) for the Big Muddy River at Murphysboro

Other field evidence observed: During every year of monitoring, ISGS estimated that this area did not meet the wetland hydrology criteria (for a normal year, see Fucciolo et al., 2003). This site is on a slope and has no hydrologic indicators.

Wetland hydrology: Yes: No: X

Rationale: Field evidence cited above and ISGS data indicate that this area is not inundated or saturated for a sufficient duration to satisfy the wetland hydrology criterion.

DETERMINATION AND RATIONALE:

Is the area a wetland? Yes: No: X

Rationale: While, dominant hydrophytic vegetation is present, hydric soils and wetland hydrology are absent at this area; therefore, we determined that this area is not a wetland.

ROUTINE ONSITE WETLAND DETERMINATION

Area 2 (page 3 of 4)

Field Investigators: Wiesbrook and Busemeyer **Date:** August 31, 2005
Project Name: FAP 322 (US 51) **Section No.:** 2B-3
State: Illinois **County:** Jackson **Applicant:** IDOT Dist. 9
Area Name: Non-native forbland
Legal Description: SW/4, SW/4, SW/4, Section 28, T. 8 S., R. 1 W
Location: This non-wetland occupies a small area on the north edge of the site.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	Coefficient of conservatism
+ <i>Agrostis alba</i>	red top	herb	FACW	0
+ <i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
+ <i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
+ <i>Andropogon virginicus</i>	broom sedge	herb	FAC-	1
<i>Betula nigra</i>	river birch	shrub(pn)	FACW	4
+ <i>Bidens aristosa</i>	swamp marigold	herb	FACW	1
+ <i>Bidens frondosa</i>	common beggar's ticks	herb	FACW	1
<i>Boltonia asteroides</i>	false aster	herb	FACW	5
<i>Campsis radicans</i>	trumpet creeper	shrub	FAC	2
+ <i>Cassia fasciculata</i>	partridge pea	herb	FACU-	1
+ <i>Chamaesyce humistrata</i>	milk spurge	herb	FACW	1
<i>Chasmanthium latifolium</i>	sea oats	herb	FACW	4
+ <i>Conyza canadensis</i>	horseweed	herb	FAC-	0
+ <i>Cyperus strigosus</i>	straw-colored flatsedge	herb	FACW	0
+ <i>Dactylis glomerata</i>	orchard grass	herb	FACU	*
<i>Elymus virginicus</i>	Virginia wild rye	herb	FACW-	4
+ <i>Eupatorium serotinum</i>	late boneset	herb	FAC+	1
<i>Fraxinus pennsylvanica</i>	green ash	shrub(pn)	FACW	2
<i>Gleditsia triacanthos</i>	honey locust	shrub	FAC	2
+ <i>Ipomoea hederacea</i>	ivy-leaved morning glory	herb	FAC	*
+ <i>Ipomoea lacunosa</i>	small white morning-glory	herb	FACW	1
+ <i>Iva annua</i>	marsh elder	herb	FAC	0
+ <i>Lespedeza cuneata</i>	sericea lespedeza	herb	NI	*
<i>Liquidambar styraciflua</i>	sweet gum	shrub(pn)	FACW	6
<i>Panicum virgatum</i>	prairie switchgrass	herb	FAC+	4
<i>Platanus occidentalis</i>	sycamore	shrub(pn)	FACW	3
+ <i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Quercus palustris</i>	pin oak	shrub(pn)	FACW	4
+ <i>Setaria glauca</i>	pigeon grass	herb	FAC	*
+ <i>Sida spinosa</i>	prickly sida	herb	FACU	*
+ <i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
+ <i>Toxicodendron radicans</i>	poison ivy	shrub	FAC+	1
<i>Ulmus americana</i>	American elm	shrub	FACW-	5
<i>Vitis cinerea</i>	winter grape	vine	FACW-	4

= Coefficient of Conservatism (Taft et al. 1997) + weedy native or non-native species, (pn) both planted and naturally occurring species, *non-native species

$$FQI = \sum C / \sqrt{N} = 59 / \sqrt{29} = 11.0 \quad \bar{C} = \sum C / N = 59 / 29 = 2.0$$

ROUTINE ONSITE WETLAND DETERMINATION

Area 2 (page 4 of 4)

Field Investigators: Wiesbrook and Busemeyer **Date:** August 31, 2005
Project Name: FAP 322 (US 51) **Section No.:** 2B-3
State: Illinois **County:** Jackson **Applicant:** IDOT Dist. 9
Area Name: Non-native forbland
Legal Description: SW/4, SW/4, SW/4, Section 28, T. 8 S., R. 1 W
Location: This non-wetland occupies a small area on the north edge of the site.

Planted Shrubs (that are not also naturally occurring)

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	Coefficient of conservatism
<i>Betula nigra</i>	river birch	shrub(p)	FACW	4
<i>Quercus bicolor</i>	swamp white oak	shrub(p)	FACW+	7
<i>Quercus lyrata</i>	overcup oak	shrub(p)	OBL	7

= Coefficient of Conservatism (Taft et al. 1997) (p) planted species

$$*FQI = \sum C/\sqrt{N} = 77/\sqrt{32} = 13.6 \quad *C = \sum C/N = 77/32 = 2.4$$

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

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Appendix B

Photographs of Wetland Mitigation Sites



Picture 1A. Facing north from photostation 1.



Picture 1B. Facing northwest from photostation 1.



Picture 1C. Facing west from photostation 1.



Picture 2A. Facing northeast from photostation 2.



Picture 3A. Facing southwest from photostation 3.



Picture 4A. Facing east from photostation 4.



Picture 4B. Facing southeast from photostation 4.



Picture 4C. Facing south from photostation 4.

**De Soto Wetland Compensation Site
FAP 322
Jackson County**



0 400 800 Feet



0 100 200 Meters



-  **Mitigation site**
- area 1 - wet
- area 2 - not wet

scale 1:4800
1 inch=400 ft



01/06