

WETLAND MITIGATION SITE MONITORING REPORT

FAP 322 (U.S. 51) Jackson County

Introduction

This report details monitoring of the wetland mitigation sites created to compensate for approximately 0.8 ha (2 ac) of wetlands impacted as a result of FAP 322 (U.S. 51 relocation and improvement), Jackson County, Illinois. Three areas of wet meadow creation were proposed for the project. Two of these areas (Sites 4 and 5) were actually created for a total of approximately 0.40 ha (0.99 ac). Native grasses and cover crops were supposedly planted at these sites along with a few bald cypress (*Taxodium distichum*) trees. A third wetland meadow creation area (marked Site 9) was found to be unaltered. Besides the wet meadow creation areas, a backwater high flow channel/floodplain forest enhancement (east part of Site 2) was created. This area covers approximately 0.16 ha (0.38 ac). Native grasses and cover crops were planted in this area with the expectation that native hydrophytic tree species from surrounding areas will colonize this site. A second floodplain forest enhancement was not carried out (Site 7). Streambank restoration was proposed and carried out on an area covering approximately 0.19 ha (0.46 ac) (Site 1). At this site hydrophytic trees were planted. No apparent topographic, hydrologic, or vegetative modifications have been made to this area. 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.

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, IL. The legal location is W 1/2, SE 1/4, Section 28, T. 9 S., R. 1 W. The project area lies within the United States Geological Survey Mississippi River 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. On-site monitoring was conducted on 18 July 2002.

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 and the mesic floodplain forest).

Goals, Objectives, and Performance Standards

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

Project goal 1: 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 ac).

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 in the areas.

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: At least 75% of the mitigation areas must have 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. (honeysuckle).
- 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 streambank restoration (Site 1).

Objective: Floodplain forest should cover approximately 0.1 ha (0.2 ac). 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

Secondary hydrology indicators were noted during fieldwork on 18 July 2002. Illinois State Geological Survey (ISGS) personnel installed approximately nine ground water monitoring wells and one staff gauge at the site in 2002. Locations for these sites can be found in the ISGS document *Annual Water-level Report for Active IDOT Sites* (Fucciolo et al. 2002). Water-level data was collected monthly throughout the year from May 2002. The ISGS will report on the hydrology of this area in 2003.

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 typically 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. Full vegetative cover of the sites: Percent cover for each site was determined. After five years each of the sites should have at least 75% cover.

b. Predominance of non-weedy native vegetation: Species lists including dominant species was compiled for each site. All weedy or non-native species have been noted. After five years no weedy or non-native species should be dominant in any of the sites.

c. Predominance of herbaceous vegetation in wet meadow creations: Any dominant woody plant species for the wet meadow creations have been noted. After five years no woody species should be dominants in the wet meadow creations.

Project goal 3

a. Establishment of tree seedlings

In order to establish floodplain forest, 120 hydrophytic tree seedlings were to be planted at Site 1. All planted trees were counted and percent survival was calculated for each species. 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

A complete species list and list of dominants was compiled for each of the streambank restoration (Site 1). After five years the site should be dominated by hydrophytic woody species.

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 2

below. Since 67% of the dominant species at all 4 sites are rated OBL, FACW+, FAC+, or FAC, hydrophytic vegetation is present.

b. Presence of wetland hydrology

An area of sand and gravel outwash was observed in the middle of Site 4 (wet meadow creation) indicating that a large quantity of moving water came through this site. Most of the water apparently came from a small tributary stream coming from the east. The water left the site into adjacent Piles Fork Creek. Algal mats were observed covering some sections of Site 5 (wet meadow creation). Scour patterns and matted vegetation were observed in the backwater channel (Site 2a). Therefore, secondary indicators provide evidence that both the wet meadow creation sites and the backwater high flow channel probably had wetland hydrology for a sufficient duration during 2002. No secondary indicators were found in the floodplain forest enhancement area (Site 2b). This site is higher than both Piles Fork Creek and the high flow backwater channel (Site 2a). Therefore, the evidence indicates that Site 2b did not have wetland hydrology during 2002.

Because monitoring equipment was not installed until late spring 2002 the Illinois State Geological Survey (ISGS) did not report ground water-level data for this project for 2002. Locations of installed hydrology monitoring equipment are given in Fucciolo et al. (2002). Hydrology at these sites will be measured and reported by the ISGS in succeeding years. With this information, quantification of hydrology at the site will be possible.

c. Occurrence of hydric soils

Soils examined at both the wet meadow sites and the backwater channel 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 1).

Table 1. Description of the soils in the created wetlands.

<u>Depth</u>	<u>Matrix Color</u>	<u>Concrete-tions</u>	<u>Iron Masses</u>	<u>Pore linings</u>	<u>Iron Deplet.</u>	<u>Clay Deplet.</u>	<u>Texture</u>	<u>Structure</u>
0-15 in	5Y 5/1	none	mmp 7.5YR 4/6 cmp 10YR 5/6	none	none	none	Sil	Gr
15-40 in	5Y 5/1	none	mmp 7.5YR 4/6 cmp 10YR 5/6	none	none	none	Sic1	Sub Bl
40-45 in	5Y 5/1	none	mmp 7.5YR 4/6 cmp 10YR 5/6	none	none	none	cl	Pr

Project goal 2

a. Full vegetative cover of the sites: As of the time of the survey all sites had full (100%) vegetative cover except Site 4. In the middle of Site 4 is an area of sand and gravel where almost no vegetation is growing. This material has apparently been brought to the site by a small tributary of Piles Fork Creek flowing from the east. Site 4 is currently about 60% vegetated.

b. Predominance of non-weedy native vegetation: Dominant plant species at each site are listed by strata in Table 2.

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

Dominant Plant Species	Stratum	Indicator Status
Site 1.		
1. <i>Leersia oryzoides</i>	Herb	OBL
2. <i>Lolium perenne</i>	Herb (planted)	FACU
Site 2a.		
1. <i>Echinochloa muricata</i>	Herb	OBL
2. <i>Leersia oryzoides</i>	Herb	OBL
3. <i>Lolium perenne</i>	Herb (planted)	FACU
Site 2b.		
1. <i>Fraxinus pennsylvanica</i>	Tree	FACW
2. <i>Asimina triloba</i>	Sapling	FAC
3. <i>Lonicera japonica</i>	Herb	FACU
Site 4.		
1. <i>Bidens cernua</i>	Herb	OBL
2. <i>Leersia oryzoides</i>	Herb	OBL
3. <i>Lolium perenne</i>	Herb (planted)	FACU
Site 5.		
1. <i>Bidens cernua</i>	Herb	OBL
2. <i>Leersia oryzoides</i>	Herb	OBL
3. <i>Lolium perenne</i>	Herb (planted)	FACU
Site 9a (fill near road).		
1. <i>Lolium perenne</i>	Herb (planted)	FACU
Site 9b (unaltered upland forest).		
1. <i>Acer saccharum</i>	Tree	FACU
2. <i>Fraxinus pennsylvanica</i>	Tree	FACW
3. <i>Asimina triloba</i>	Sapling	FAC
4. <i>Lonicera maackii</i>	Shrub	UPL
5. <i>Lonicera japonica</i>	Herb	FACU

Since this complex of sites has been only recently established the quality of vegetation at all of the sites is low to moderate. Floristic quality index (FQI) values range from 9.0 (Site 2a) to 16.5 (Site 5) with mean C values (mCv) ranging from 1.9 (Site 2a) to 2.5 (Site 5). A number of non-native plants as well as several weedy native species are present at each site. The exotic rye grass, *Lolium perenne*, is currently among the three most dominant species at all the altered sites (Sites 1, 2a, 4, and 5). A mix of native grasses was said to have been planted in these sites. No individuals of any of the given grass species were found, however. Even so the quality of the dominant species and of the overall species composition at all the sites should improve and include a greater percentage of native, perennial plants over time. In particular *Lolium perenne* will probably disappear within several years. Species lists for each of the restoration/creation sites are given in Appendix A.

c. Predominance of herbaceous vegetation in wet meadow creations: Currently no woody species are dominant in either of the wet meadow creations sites (Sites 4 and 5). Seedling size individuals of several tree species (particularly cottonwood and willow) are present in both of these sites. Both areas are surrounded by forest which will be a source of propagules. Woody vegetation may, therefore, need to be controlled to maintain these sites as wet meadows.

Note: A few bald cypress (*Taxodium distichum*) individuals have been planted in each of the wet meadow restorations. These trees are generally not invasive and will probably not become dominant plants in either site.

Project goal 3

a. Establishment of tree seedlings

Table 3 shows the planted and surviving trees. The trees were planted in two rows between U.S. 51 and Piles Fork Creek except for 8 bald cypress, *Taxodium distichum*, planted in the wet meadows. A total of 69 live trees were counted. The total number of trees planted was said to be 120. This results in an overall survival rate of 58%.

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

Species	Common Name	Present	Planted	Percent Surviving
<i>Betula nigra</i>	river birch	9	20	45
<i>Fraxinus pennsylvanica</i>	green ash	8	20	40
<i>Quercus bicolor</i>	swamp white oak	19	20	95
<i>Quercus lyrata</i>	overcup oak	3	20	15
<i>Quercus palustris</i>	pin oak	19	20	95
<i>Taxodium distichum</i>	Bald cypress	11*	20	55
Total		69	120	58

*3 individuals of *Taxodium distichum* were planted at Site 1 and 8 individuals of this species were planted in the wet meadow creation areas (Sites 4 and 5).

No tree seedlings have been planted at backwater high flow channel (Site 2). However the site is bordered by floodplain forest dominated by *Fraxinus pennsylvanica* (green ash). This species along with other native trees will probably quickly colonize the area around the created high water channel in coming years.

b. Dominance of woody vegetation

At Site 1 after one year the surviving planted tree seedlings are small but healthy. Woody dominance at this site is will continue to expand as these trees get larger and natural regeneration progresses. In the area around the created high flow backwater channel (Site 2) no trees have been planted so there is no woody component at this time. Volunteer individuals of several tree species will probably quickly establish at this site as a result of propagules from nearby floodplain forest.

Discussion

After one monitoring season, the vegetation in the wetland creation areas (Sites 2a, 4, and 5) is of low to moderate quality, being very recently established. If these sites have wetland hydrology in the following years the quality of the vegetation should begin to improve in succeeding years to include more native, non-weedy species. The planted exotic, *Lolium perenne*, should decrease in abundance with time. Woody vegetation, however, may begin to

encroach (and eventually) dominate the wet meadow creation areas (Sites 4 and 5) if not controlled. Native woody species should quickly begin to invade the floodplain forest restoration/high flow channel area (Site 2a) since floodplain forest is nearby. Soils at all restoration sites have been seriously disturbed. Even so, they do contain some hydric soil indicators, and therefore can be characterized as hydric. The primary concern at this time for wetland establishment at these sites is continuing wetland hydrology. Hydrology will be monitored in succeeding years by the Illinois State Geological Survey who may suggest remedial work in the area to improve hydrology. In particular some type of earthen barrier constructed around Site 4 may serve to lengthen the duration of water on the site and may help to dissipate some of the scouring and sediment deposition which is currently occurring at that site.

It should also be noted that the created backwater channel (Site 2a) has not been constructed in a manner that will bring water to the adjacent mesic floodplain forest (Site 2b). This non-wetland forest cannot be expected to develop hydric soils or wetland hydrology with the current hydrologic and topographic conditions.

Large tree seedlings were planted at the floodplain forest restoration area (Site 1). 69 live trees were counted at the site. 120 trees were said to have been planted here. The natural quality of the vegetation at this site should improve over time. However, with continuing mortality, survival of the planted trees will likely soon fall below 50%.

Literature Cited

- Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Mississippi. Technical Report Y-87-1.
- 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. et al. 2002. Annual water-level report for active IDOT sites. 2002. 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. Soil Report #106.
- 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.

Appendix A
Wetland Determination Forms

ROUTINE ONSITE WETLAND DETERMINATION
Site 2a (page 1 of 3)

Field Investigators: Busemeyer, Keene, Larimore, Plocher
Date: 18 July 2002 **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/2, SE 1/4, Section 28, T. 9 S., R. 1 W.
Location: This high flow channel creation/floodplain forest enhancement is located
70 m (230 ft) east of U.S. 51, 320 m (1050 ft) north of the intersection of
U.S. 51 and Reservoir Rd.

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

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. <i>Echinochloa muricata</i>	OBL	herb
2. <i>Leersia oryzoides</i>	OBL	herb
3. <i>Lolium perenne</i>	FACU	herb (planted)

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 67%

Hydrophytic vegetation: Yes: No:

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

SOILS

Series and phase: Undetermined (soil excavated)

On Jackson County hydric soils list? Yes: No:

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

Redox concentrations: Yes: No:

Redox depletions: Yes: No:

Matrix color: 5Y 5/1

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

Hydric soils: Yes: No:

Rationale: This soil has been altered by excavation of the top soil horizons in order to create a wetland. There is a possibility that the soil colors may be relict in nature, but we believe the conditions now present reflect its depressional landscape position. This soil has iron masses and an iron depleted matrix. These characteristics are indicators of a hydric soil.

ROUTINE ONSITE WETLAND DETERMINATION
Site 2a (page 2 of 3)

Field Investigators: Busemeyer, Keene, Larimore, Plocher
Date: 18 July 2002 **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/2, SE 1/4, Section 28, T. 9 S., R. 1 W.
Location: This high flow channel creation/floodplain forest enhancement is located
70 m (230 ft) east of U.S. 51, 320 m (1050 ft) north of the intersection of
U.S. 51 and Reservoir Rd.

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: NA
Depth to saturated soil: > 1.2 m (48 in)
Overview of hydrological flow through the system: This site is hydrologically influenced
by overflow from Piles Fork Creek, sheet flow from adjacent higher ground, and by
precipitation. Water leaves the site via evapotranspiration and flow into nearby Piles Fork
Creek.
Size of Watershed: Approximately 10 km² (3.9 mi²)
Other field evidence observed: Scour patterns on ground and low landscape position

Wetland hydrology: Yes: X No:
Rationale: This site has been excavated to create a high flow (overflow)
oxbow. There is evidence that significant water has been in
this area since its recent creation.

DETERMINATION AND RATIONALE:

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

Determined by: Dan Busemeyer, Rick Larimore, and Allen Plocher
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ROUTINE ONSITE WETLAND DETERMINATION

Site 2a (page 3 of 3)

Field Investigators: Busemeyer, Keene, Larimore, Plocher

Date: 18 July 2002 **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/2, SE 1/4, Section 28, T. 9 S., R. 1 W.

Location: This high flow channel creation/floodplain forest enhancement is located 70 m (230 ft) east of U.S. 51, 320 m (1050 ft) north of the intersection of U.S. 51 and Reservoir Rd.

SPECIES LIST

Scientific Name	Common Name	Stratum	Wetland indicator status	C†
<i>Acalypha rhomboidea</i>	three-seeded mercury	herb	FACU	0
<i>Acer negundo</i>	box elder	herb	FACW-	1
<i>Alisma plantago-aquatica</i>	broad-leaf water-plantain	herb	OBL	2
<i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
<i>Bidens cernua</i>	nodding beggar-ticks	herb	OBL	2
<i>Bidens frondosa</i>	common beggar-ticks	herb	FACW	1
<i>Calystegia sepium</i>	American bindweed	herb	FAC	1
<i>Cassia fasciculata</i>	partridge pea	herb	FACU-	1
<i>Cassia nictitans</i>	wild sensitive plant	herb	FACU-	2
<i>Cyperus strigosus</i>	long scaled nut sedge	herb	FACW	0
<i>Digitaria ischaemum</i>	smooth crab grass	herb	FACU	*
<i>Echinochloa crus-galli</i>	barnyard grass	herb	FACW	*
<i>Eleocharis acicularis</i>	needle spike rush	herb	OBL	3
<i>Eleocharis obtusa</i>	blunt spike rush	herb	OBL	2
<i>Eupatorium perfoliatum</i>	common boneset	herb	FACW+	4
<i>Fraxinus pennsylvanica</i>	green ash	herb	FACW	2
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Lolium perenne</i>	crested rye grass	herb	FACU	*
<i>Lonicera japonica</i>	Japanese honeysuckle	herb	FACU	*
<i>Lycopus americanus</i>	common water horehound	herb	OBL	3
<i>Lycopus virginicus</i>	bugle weed	herb	OBL	5
<i>Melilotus officinalis</i>	yellow sweet clover	herb	FACU	*
<i>Mollugo verticillata</i>	carpetweed	herb	FAC	*
<i>Phyla lanceolata</i>	fog-fruit	herb	OBL	1
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Populus deltoides</i>	eastern cottonwood	herb	FAC+	2
<i>Rotala ramosior</i>	tooth-cup	herb	OBL	4
<i>Salix nigra</i>	black willow	herb	OBL	3
<i>Typha angustifolia</i>	narrow-leaved cattail	herb	OBL	*
<i>Xanthium strumarium</i>	cockle bur	herb	FAC	0

† Coefficient of Conservatism (Taft et al. 1997)

* Non-native species

$$mCv = \sum C/N = 43/23 = 1.9$$

$$FQI = \sum C/(\sqrt{N}) = 43/(\sqrt{23}) = 9.0$$

ROUTINE ONSITE WETLAND DETERMINATION

Site 2b (page 1 of 2)

Field Investigators: Busemeyer, Keene, Larimore, Plocher

Date: 18 July 2002 **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/2, SE 1/4, Section 28, T. 9 S., R. 1 W.

Location: This mesic floodplain forest (floodplain forest enhancement) is located 60 m (200 ft) east of U.S. 51, 320 m (1050 ft) north of the intersection of U.S. 51 and Reservoir Rd.

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

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. <i>Fraxinus pennsylvanica</i>	FACW	tree
2. <i>Asimina triloba</i>	FAC	sapling
3. <i>Lonicera japonica</i>	FACU	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 67%

Hydrophytic vegetation: Yes: No:

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

SOILS

Series and phase: Unknown

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

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

Histic epipedon present? Yes: No: Undetermined:

Redox concentrations: Yes: No: Undetermined:

Redox depletions: Yes: No: Undetermined:

Matrix color: 5Y 5/1

Other indicators: None.

Hydric soils: Yes: No: Undetermined:

Rationale: Soils in this unaltered floodplain forest were not checked in 2002.

ROUTINE ONSITE WETLAND DETERMINATION
Site 2b (page 2 of 2)

Field Investigators: Busemeyer, Keene, Larimore, Plocher
Date: 18 July 2002 **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/2, SE 1/4, Section 28, T. 9 S., R. 1 W.
Location: This mesic floodplain forest (floodplain forest enhancement) is located 60 m (200 ft) east of U.S. 51, 320 m (1050 ft) north of the intersection of U.S. 51 and Reservoir Rd.

HYDROLOGY

Inundated: Yes: No: X **Depth of standing water:** NA
Depth to saturated soil: > 1.2 m (48 in)
Overview of hydrological flow through the system: This site is hydrologically influenced by precipitation and, possibly, by overflow of Piles Fork Creek in large flood events. Water leaves the site via evapotranspiration and flow into nearby Piles Fork Creek.
Size of Watershed: Approximately 10 km² (3.9 mi²)
Other field evidence observed: None.

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 down toward these areas.

DETERMINATION AND RATIONALE:

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

Determined by: Dan Busemeyer, Rick Larimore, and Allen Plocher
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ROUTINE ONSITE WETLAND DETERMINATION
Site 4 (page 1 of 4)

Field Investigators: Busemeyer, Keene, Larimore, Plocher
Date: 18 July 2002 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Wet meadow creation
Legal Description: W/2, SE 1/4, Section 28, T. 9 S., R. 1 W.
Location: This wet meadow creation is located 60 m (200 ft) east of U.S. 51, 400 m (1300 ft) north of the intersection of U.S. 51 and Reservoir Rd.

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

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. <i>Bidens cernua</i>	OBL	herb
2. <i>Leersia oryzoides</i>	OBL	herb
3. <i>Lolium perenne</i>	FACU	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 67%

Hydrophytic vegetation: Yes: No:

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

SOILS

Series and phase: Undetermined (soil excavated)

On Jackson County hydric soils list? Yes: No:

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

Redox concentrations: Yes: No:

Redox depletions: Yes: No:

Matrix color: 5Y 5/1

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

Hydric soils: Yes: No:

Rationale: This soil has been altered by excavation of the top soil horizons in order to create a wetland. There is a possibility that the soil colors may be relict in nature, but we believe the conditions now present reflect its depressional landscape position. This soil has iron masses and an iron depleted matrix. These characteristics are indicators of a hydric soil.

ROUTINE ONSITE WETLAND DETERMINATION

Site 4 (page 2 of 4)

Field Investigators: Busemeyer, Keene, Larimore, Plocher

Date: 18 July 2002 **Project Name:** FAP 322 (US 51)

State: Illinois **County:** Jackson **Applicant:** IDOT District 9

Site Name: Wet meadow creation

Legal Description: W/2, SE 1/4, Section 28, T. 9 S., R. 1 W.

Location: This wet meadow creation is located 60 m (200 ft) east of U.S. 51, 400 m (1300 ft) north of the intersection of U.S. 51 and Reservoir Rd.

HYDROLOGY

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

Depth to saturated soil: > 1.2 m (48 in)

Overview of hydrological flow through the system: This site is hydrologically influenced by overflow from Piles Fork Creek, inflow from a small upland tributary of Piles Fork Creek, sheet flow from adjacent higher ground, and by precipitation. Water leaves the site via evapotranspiration and flow into nearby Piles Fork Creek.

Size of Watershed: Approximately 10 km² (3.9 mi²)

Other field evidence observed: Scour patterns and deposits on ground.

Wetland hydrology: Yes: X No:

Rationale: The site has evidence of the presence of significant water during the growing season.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: X No:

Rationale: Dominant hydrophytic vegetation, hydric soils, and wetland hydrology are present at the site; therefore, it is a wetland. The NWI codes this site partially as PFO1A (temporarily flooded, broad-leaved deciduous, forested, palustrine wetland).

Determined by: Dan Busemeyer, Rick Larimore, and Allen Plocher
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ROUTINE ONSITE WETLAND DETERMINATION
Site 4 (page 3 of 4)

Field Investigators: Busemeyer, Keene, Larimore, Plocher
Date: 18 July 2002 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Wet meadow creation
Legal Description: W/2, SE 1/4, Section 28, T. 9 S., R. 1 W.
Location: This wet meadow creation is located 60 m (200 ft) east of U.S. 51, 400 m (1300 ft) north of the intersection of U.S. 51 and Reservoir Rd.

SPECIES LIST

Scientific Name	Common Name	Stratum	Wetland indicator status	C†
<i>Abutilon theophrasti</i>	velvet-leaf	herb	FACU-	*
<i>Acalypha rhomboidea</i>	three-seeded mercury	herb	FACU	0
<i>Agrostis alba</i>	red top	herb	FACW	0
<i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
<i>Ammannia coccinea</i>	long-leaved ammannia	herb	OBL	5
<i>Bidens cernua</i>	nodding beggar-ticks	herb	OBL	2
<i>Bidens frondosa</i>	common beggar-ticks	herb	FACW	1
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
<i>Cyperus aristatus</i>	bearded flat sedge	herb	OBL	2
<i>Cyperus erythrorhizos</i>	red-rooted sedge	herb	OBL	1
<i>Echinochloa crus-galli</i>	barnyard grass	herb	FACW	*
<i>Eclipta prostrata</i>	yerba de tajo	herb	FACW	2
<i>Eleocharis obtusa</i>	blunt spike rush	herb	OBL	2
<i>Eragrostis hypnoides</i>	pony grass	herb	OBL	5
<i>Gratiola neglecta</i>	clammy hedge hyssop	herb	OBL	5
<i>Juncus dudleyi</i>	Dudley's rush	herb	FAC	4
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Lindernia dubia</i>	false pimpinell	herb	OBL	5
<i>Lolium perenne</i>	crested rye grass	herb (planted)	FACU	*
<i>Ludwigia peploides glabrescens</i>	creeping primrose willow	herb	OBL	5
<i>Lycopersicum esculentum</i>	tomato	herb	UPL	*
<i>Lycopus virginicus</i>	bugle weed	herb	OBL	5
<i>Melilotus officinalis</i>	yellow sweet clover	herb	FACU	*
<i>Mollugo verticillata</i>	carpetweed	herb	FAC	*
<i>Penthorum sedoides</i>	ditch stonecrop	herb	OBL	2
<i>Phytolacca americana</i>	pokeweed	herb	FAC-	1
<i>Polygonum lapathifolium</i>	pale smartweed	herb	FACW+	0
<i>Polygonum persicaria</i>	spotted lady's thumb	herb	FACW	*
<i>Populus deltoides</i>	eastern cottonwood	herb	FAC+	2
<i>Rotala ramosior</i>	tooth-cup	herb	OBL	4
<i>Salix nigra</i>	black willow	herb	OBL	3

Species list continued on next page.

ROUTINE ONSITE WETLAND DETERMINATION
Site 4 (page 4 of 4)

Field Investigators: Busemeyer, Keene, Larimore, Plocher
Date: 18 July 2002 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Wet meadow creation
Legal Description: W/2, SE 1/4, Section 28, T. 9 S., R. 1 W.
Location: This wet meadow creation is located 60 m (200 ft) east of U.S. 51, 400 m (1300 ft) north of the intersection of U.S. 51 and Reservoir Rd.

SPECIES LIST (continued)

Scientific Name	Common Name	Stratum	Wetland indicator status	C†
<i>Senecio glabellus</i>	butterweed	herb	OBL	0
<i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
<i>Solanum ptycanthum</i>	black nightshade	herb	FACU-	0
<i>Typha angustifolia</i>	narrow-leaved cattail	herb	OBL	*
<i>Verbascum thapsus</i>	woolly mullein	herb	UPL	*
<i>Verbena urticifolia</i>	white vervain	herb	FAC+	3

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

$$mCv = \sum C/N = 62/27 = 2.3$$

$$FQI = \sum C/(\sqrt{N}) = 62/(\sqrt{27}) = 11.9$$

PLANTED TREES

Scientific Name	Common Name	Stratum	Wetland indicator status	C†
<i>Taxodium distichum</i>	bald cypress	shrub	OBL	7

† Coefficient of Conservatism (Taft et al. 1997)
 * Non-native species
 **These calculations include native plants from the complete species list above together with the planted trees.

$$mCv = \sum C/N = 69/28 = 2.5^{**}$$

$$FQI = \sum C/(\sqrt{N}) = 69/(\sqrt{28}) = 13.0^{**}$$

ROUTINE ONSITE WETLAND DETERMINATION
Site 5 (page 1 of 5)

Field Investigators: Busemeyer, Keene, Larimore, Plocher
Date: 18 July 2002 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Wet meadow creation
Legal Description: W/2, SE 1/4, Section 28, T. 9 S., R. 1 W.
Location: This wet meadow creation is located 60 m (200 ft) east of U.S. 51, 480 m (1570 ft) north of the intersection of U.S. 51 and Reservoir Rd.

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

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. <i>Bidens cernua</i>	OBL	herb
2. <i>Leersia oryzoides</i>	OBL	herb
3. <i>Lolium perenne</i>	FACU	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 67%

Hydrophytic vegetation: Yes: No:

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

SOILS

Series and phase: Undetermined (soil excavated)

On Jackson County hydric soils list? Yes: No:

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

Redox concentrations: Yes: No:

Redox depletions: Yes: No:

Matrix color: 5Y 5/1

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

Hydric soils: Yes: No:

Rationale: This soil has been altered by excavation of the top soil horizons in order to create a wetland. There is a possibility that the soil colors may be relict in nature, but we believe the conditions now present reflect its depressional landscape position. Even though there were some small areas that had a high chroma soil color below ten inches, the majority of the site seems to satisfy the hydric soil criteria. This soil has iron masses, iron depletions, and an iron depleted matrix. These characteristics are indicators of a hydric soil.

ROUTINE ONSITE WETLAND DETERMINATION

Site 5 (page 2 of 5)

Field Investigators: Busemeyer, Keene, Larimore, Plocher

Date: 18 July 2002 **Project Name:** FAP 322 (US 51)

State: Illinois **County:** Jackson **Applicant:** IDOT District 9

Site Name: Wet meadow creation

Legal Description: W/2, SE 1/4, Section 28, T. 9 S., R. 1 W.

Location: This wet meadow creation is located 60 m (200 ft) east of U.S. 51, 480 m (1570 ft) north of the intersection of U.S. 51 and Reservoir Rd.

HYDROLOGY

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

Depth to saturated soil: > 1.2 m (48 in)

Overview of hydrological flow through the system: This site is hydrologically influenced by overflow from Piles Fork Creek, sheet flow from adjacent higher ground, and by precipitation. Water leaves the site via evapotranspiration and flow into nearby Piles Fork Creek.

Size of Watershed: Approximately 10 km² (3.9 mi²)

Other field evidence observed: Algal mats on ground and depressional landscape position.

Wetland hydrology: Yes: X No:

Rationale: The site has evidence of the presence of significant water during the growing season.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: X No:

Rationale: Dominant hydrophytic vegetation, hydric soils, and wetland hydrology are present at the site; therefore, the site is a wetland. The NWI codes this site partially as PFO1A (temporarily flooded, broad-leaved deciduous, forested, palustrine wetland).

Determined by: Dan Busemeyer, Rick Larimore, and Allen Plocher
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ROUTINE ONSITE WETLAND DETERMINATION

Site 5 (page 3 of 5)

Field Investigators: Busemeyer, Keene, Larimore, Plocher

Date: 18 July 2002 **Project Name:** FAP 322 (US 51)

State: Illinois **County:** Jackson **Applicant:** IDOT District 9

Site Name: Wet meadow creation

Legal Description: W/2, SE 1/4, Section 28, T. 9 S., R. 1 W.

Location: This wet meadow creation is located 60 m (200 ft) east of U.S. 51, 480 m (1570 ft) north of the intersection of U.S. 51 and Reservoir Rd.

SPECIES LIST

Scientific Name	Common Name	Stratum	Wetland indicator status	Ct
<i>Acalypha rhomboidea</i>	three-seeded mercury	herb	FACU	0
<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>Ammannia coccinea</i>	long-leaved ammannia	herb	OBL	5
<i>Bidens cernua</i>	nodding beggar-ticks	herb	OBL	2
<i>Calystegia sepium</i>	American bindweed	herb	FAC	1
<i>Carex annectens</i>	large yellow fox sedge	herb	FACW	3
<i>Carex frankii</i>	sedge	herb	OBL	4
<i>Cassia fasciculata</i>	partridge pea	herb	FACU-	1
<i>Cicuta maculata</i>	water hemlock	herb	OBL	4
<i>Cyperus aristatus</i>	bearded flat sedge	herb	OBL	2
<i>Echinochloa crus-galli</i>	barnyard grass	herb	FACW	*
<i>Eclipta prostrata</i>	yerba de tajo	herb	FACW	2
<i>Eleocharis acicularis</i>	needle spike rush	herb	OBL	3
<i>Eleocharis obtusa</i>	blunt spike rush	herb	OBL	2
<i>Erigeron annuus</i>	annual fleabane	herb	FAC-	1
<i>Eupatorium serotinum</i>	late boneset	herb	FAC+	1
<i>Gratiola neglecta</i>	clammy hedge hyssop	herb	OBL	5
<i>Helianthus tuberosus</i>	Jerusalem artichoke	herb	FAC	3
<i>Ipomoea lacunosa</i>	small white morning-glory	herb	FACW	1
<i>Iva annua</i>	marsh elder	herb	FAC	0
<i>Juncus effusus solutus</i>	common rush	herb	OBL	4
<i>Juncus torreyi</i>	Torrey's rush	herb	FACW	3
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Lindernia dubia</i>	false pimpernel	herb	OBL	5
<i>Lolium perenne</i>	crested rye grass	herb (planted)	FACU	*
<i>Ludwigia peploides glabrescens</i>	creeping primrose willow	herb	OBL	5
<i>Mimulus alatus</i>	winged monkey flower	herb	OBL	6
<i>Mimulus ringens</i>	monkey flower	herb	OBL	5
<i>Mollugo verticillata</i>	carpetweed	herb	FAC	*

Species list continued on next page.

ROUTINE ONSITE WETLAND DETERMINATION

Site 5 (page 4 of 5)

Field Investigators: Busemeyer, Keene, Larimore, Plocher

Date: 18 July 2002 **Project Name:** FAP 322 (US 51)

State: Illinois **County:** Jackson **Applicant:** IDOT District 9

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Legal Description: W/2, SE 1/4, Section 28, T. 9 S., R. 1 W.

Location: This wet meadow creation is located 60 m (200 ft) east of U.S. 51, 480 m (1570 ft) north of the intersection of U.S. 51 and Reservoir Rd.

SPECIES LIST (continued) **

Scientific Name	Common Name	Stratum	Wetland indicator status	C†
<i>Panicum rigidulum</i>	munro grass	herb	FACW	6
<i>Penthorum sedoides</i>	ditch stonecrop	herb	OBL	2
<i>Phyla lanceolata</i>	fog-fruit	herb	OBL	1
<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>Portulaca oleracea</i>	purslane	herb	FAC-	*
<i>Ranunculus sceleratus</i>	cursed crowfoot	herb	OBL	3
<i>Rotala ramosior</i>	tooth-cup	herb	OBL	4
<i>Salix exigua</i>	sandbar willow	herb	OBL	1
<i>Salix nigra</i>	black willow	herb	OBL	3
<i>Scirpus atrovirens</i>	dark green bulrush	herb	OBL	4
<i>Senecio glabellus</i>	butterweed	herb	OBL	0
<i>Sorghum halepense</i>	Egyptian millet	herb	FACU	*
<i>Typha angustifolia</i>	narrow-leaved cattail	herb	OBL	*
<i>Vernonia missurica</i>	Missouri ironweed	herb	FAC+	5
<i>Xanthium strumarium</i>	cockle bur	herb	FAC	0

† Coefficient of Conservatism (Taft et al. 1997)

* Non-native species

$$mCv = \sum C/N = 108/43 = 2.5$$

$$FQI = \sum C/(\sqrt{N}) = 108/(\sqrt{43}) = 16.5$$

**Planted species on next page.

ROUTINE ONSITE WETLAND DETERMINATION
Site 5 (page 5 of 5)

Field Investigators: Busemeyer, Keene, Larimore, Plocher
Date: 18 July 2002 **Project Name:** FAP 322 (US 51)
State: Illinois **County:** Jackson **Applicant:** IDOT District 9
Site Name: Wet meadow creation
Legal Description: W/2, SE 1/4, Section 28, T. 9 S., R. 1 W.
Location: This wet meadow creation is located 60 m (200 ft) east of U.S. 51, 480 m (1570 ft) north of the intersection of U.S. 51 and Reservoir Rd.

PLANTED TREES

Scientific Name	Common Name	Stratum	Wetland indicator status	C†
<i>Taxodium distichum</i>	bald cypress	shrub	OBL	7

† Coefficient of Conservatism (Taft et al. 1997)

* Non-native species

**These calculations include native plants from the complete species list above together with the planted trees.

$$mCv = \sum C/N = 115/44 = 2.6^{**}$$

$$FQI = \sum C/(\sqrt{N}) = 115/(\sqrt{44}) = 17.3^{**}$$

FAP 322 (U.S. 51) Monitoring



Floodplain Forest Reconstruction

 Site 1 - 0.457 acres, 0.185 hectares

Floodplain Forest Enhancement

 Site 2a - 0.382 acres, 0.155 hectares

 Site 2b - 0.482 acres, 0.195 hectares

Wet Meadow Creation

 Site 4 - 0.415 acres, 0.168 hectares

 Site 5 - 0.577 acres, 0.233 hectares

