

WETLAND MITIGATION SITE MONITORING REPORT-2002

FAP 310 (US 67) Mercer County

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Introduction

This report details monitoring of the wetland mitigation site created to compensate for impact to wetlands by construction on FAP 310 (US 67) in Mercer County. The site consists of approximately 0.69 ha (1.7 ac) of wetland creation (Site 1) and 0.28 ha (0.7 ac) of wetland restoration (Site 2). The wetland creation is located in the southeast quarter of the intersection of U S Route 67 and the Edwards River; the restoration is located in the northeast quarter. The legal location is NE 1/4, SW 1/4, Section 35, T. 15 N., R. 2 W. The Illinois Department of Transportation (IDOT) completed construction of the site on 12 August 1997. Trees were planted during the fall of 1998 (T. Brooks, IDOT Wetlands Unit, memo to Allen Plocher, 10 February 1999). The fourth year of onsite monitoring was conducted on 30 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.

Goals, Objectives, and Performance Standards

Goals, objectives, and performance standards follow those specified in the monitoring plan (T. Brooks, IDOT Wetlands Unit, 1999) and the wetland compensation plan (C. 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: 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 0.31 ha (0.76 ac) of floodplain forest and 0.09 ha (0.23 ac) of emergent wetland at a 1.5:1 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 floristic composition and vegetation cover.

Objectives: A floodplain forest will be created by planting native woody species. Herbaceous vegetation will be allowed to colonize the site naturally.

Performance criteria:

a. Establishment of tree seedlings: Planted or volunteer tree seedlings should be established at each site.

b. Floristic Quality Assessment: The floristic quality index (FQI) and mean coefficient of conservatism (\bar{c}) for both sites should meet or exceed the FQI and \bar{c} values of the filled wetlands, 7.0 and 2.0, respectively.

c. Dominance of vegetation: None of the three most dominant plant species in either site may be non-native species, cattails (*Typha* sp.), or reed canary grass (*Phalaris arundinacea*).

Project goal 3: The created wetland should function to remove sediments from the floodwaters of the Edwards River.

Objectives: The wetland creation site should retain floodwater and allow sediments to settle out of suspension.

Performance criteria:

a. Sediment removal: Sediments in the wetland should accumulate at a rate of 0.3 to 1.1 in/yr.

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 seven ground water monitoring wells and one stage gauge at the created wetland site (site 1) in 1999. In 2001, one RDS surface-water data logger, one stage gauge, and three very shallow (VS) soil zone wells were added. In April 2002 three soil-zone monitoring wells were added along the base of the US 67 embankment. Locations for these sites are shown in Figure 1 (Appendix A). Water-level data was collected monthly throughout the year and biweekly during April and May. Methods are further described in the ISGS document *Annual report for active IDOT wetland compensation and hydrologic monitoring sites: September 1, 2001 to September 1, 2002* (Fucciolo et al. 2002). No wells or other monitoring devices were installed at the restored wetland (site 2).

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 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. Establishment of trees (five foot-whips)

In order to help create and restore floodplain forest, five foot-whips were planted at both compensation sites. According to the tasking order for this project (T. Brooks, IDOT Wetlands Unit, memo to Allen Plocher, 10 February 1999), the following number of trees were planted at the sites in Fall 1998:

Table 1. Species planted in the created wetland (Site 1).

Species	Common Name	Number
<i>Acer rubrum</i>	red maple	60
<i>Betula nigra</i>	river birch	60
<i>Quercus bicolor</i>	swamp white oak	60
<i>Quercus palustris</i>	pin oak	60

Table 2. Species planted in the restored wetland (Site 2).

Species	Common Name	Number
<i>Acer rubrum</i>	red maple	25
<i>Betula nigra</i>	river birch	25
<i>Quercus bicolor</i>	swamp white oak	25
<i>Quercus palustris</i>	pin oak	25

Survivorship and density of planted trees was determined by censusing. All live planted trees were counted for both the created and restored wetlands. Volunteer seedlings were designated as occasional or abundant by species.

Density of live planted trees is given as the number of live planted trees/ha for each site. Survival was calculated as a percentage of the number of expected live individuals: (Total number of live planted trees/the number of known planted trees) x 100.

b. Floristic Quality Assessment

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 premise 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. 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. These values provide a measure of site floristic quality. Floristic quality index values (FQI values) less than 5 indicate that the area is extremely weedy or in an early successional stage (Swink and Wilhelm 1994). FQI values greater 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, three permanent photography stations were established so that photographs could be used to document changes in plant community size and composition. The locations of the photo stations are indicated on the enclosed aerial photograph. Arrows indicate the direction in which the photos were taken.

Project goal 3

a. Sediment removal

ISGS personnel installed 12 sediment traps in the wetland creation site (Site 1) in Fall 1999. Trap locations are shown on Figure 1 in Appendix A.

Results

Project goal 1

a. Predominance of hydrophytic vegetation

Dominant plant species for the mitigation sites in 2002 are shown in Table 3 and Table 4. 100% of the dominant species at both sites are rated OBL, FACW+, FAC+, or FAC and, therefore, are hydrophytic.

Table 3. Dominant plant species by stratum and wetland indicator status for the created wetland (Site 1).

Dominant Plant Species	Stratum	Indicator Status
1. <i>Populus deltoides</i>	shrub	FAC+
2. <i>Aster praealtus</i>	herb	FACW
3. <i>Aster simplex</i>	herb	FACW
4. <i>Eupatorium serotinum</i>	herb	FAC+

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

Dominant Plant Species	Stratum	Indicator Status
1. <i>Aster simplex</i>	herb	FACW
2. <i>Aster praealtus</i>	herb	FACW

b. Presence of wetland hydrology

Figure 1 (Appendix A) shows the areal extent of wetland hydrology at Site 1 in 2002. According to Weaver and Carr (2002) approximately 0.16 ha (0.39 ac) of the 0.61 ha (1.51 ac) excavated basin conclusively satisfied the criteria for wetland hydrology in 2002. Water levels measured in wells 1S, 3S, 3VS, 5VS, 9S, and 11S conclusively satisfied the wetland hydrology criteria. Water levels in well 6S and at RDS 1 may have satisfied wetland hydrology criteria (Weaver and Carr 2002). Three separate surface-water inundation events were recorded in the wetland basin in 2002, with a maximum duration of approximately three days. For a more detailed account of the hydrology of this site, see *Edwards River/Mercer County Wetland Compensation Site, I.S.G.S. #50* (Weaver and Carr 2002).

No monitoring wells were placed in the restored area (Site 2) and no indicators of wetland hydrology were observed. The position of this site between the Edwards River and a levee, suggests that the area floods for some period of time each year. At this time, however, it is uncertain as to whether this site is inundated or saturated for a sufficient duration to satisfy the wetland hydrology criteria.

c. Occurrence of hydric soils

Soils examined at both of the mitigation sites still show signs of disturbance while developing under their new pedogenic conditions. Much cutting and filling had been done at both sites within the top twenty inches and the sites lack a true undisturbed A horizon.

At the wetland creation site (Site 1), gravel was found in the upper twenty inches confirming that a roadbed once occurred on the site. Even though the soils are disturbed, hydric soil indicators are present. A soil description of a typical pedon for the majority of the site is given below (Table 5).

Table 5. Description of the soils at the created wetland (Site 1).

<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>
0-14 in	10YR 2/1	none	7.5YR 4/6 7.5YR 3/4	none	none	none	SiL	Gr
14-24 in	2.5Y 4/2	5Y 2.5/1 5% small round	7.5YR 4/6 7.5YR 3/4	none	none	none	SiCL	Sub B1 – Massive

Soil materials are beginning to accumulate at the restoration site (site 2) due to deposition of sediments during flooding events. The compacted old surface of the soil is still present under these sediments and could eventually become a water restricting layer within the profile. Due to the very young nature of these soils a thorough description could not be completed and no determination was made concerning the hydric nature of these soils.

Project goal 2

a. Establishment of tree seedlings

Tables 6 and 7 show the results of the censusing of trees at Site 1 and Site 2 for the years 2000, 2001, and 2002. Since 1999 data was gathered by random sampling rather than by censusing it is not included here. No *Acer rubrum* were ever found at the created wetland site and only two were found at the restored wetland. I assumed, therefore, that the reported number of red maples had never been planted and have not included them in my calculations.

Both planted tree seedlings and volunteers are becoming established at the two sites. A total of 121 live planted trees were present at the wetland creation site (Site 1) for a survival rate of approximately 67.2% and a mean density of 175 live planted trees/ha. Volunteer silver maple seedlings and shrubs were scattered throughout the site. Volunteer cottonwood shrubs occurred in dense patches in several locations and volunteer sandbar willow and black willow shrubs were present along the borders of the site.

A total of 22 live planted trees were present at Site 2 for a survival rate of 29.3% and density of 79 live planted trees/ha. Volunteer seedlings of silver maples and cottonwoods were occasional throughout the site.

Table 6. Tree seedling establishment in the created wetland (Site 1) for the years 2000 to 2002.

Species	Number planted	Number live trees			Percent survival		
		Year 2000	Year 2001	Year 2002	Year 2000	Year 2001	Year 2002
<i>Acer rubrum</i>	60	0	0	0	0%	0%	0%
<i>Betula nigra</i>	60	54	60	59	90%	100%	98.3%
<i>Quercus bicolor</i>	60	56	47	40	93%	78.3%	66.7%
<i>Quercus palustris</i>	60	23	27	22	38%	45%	36.7%

Table 7. Tree seedling establishment in the restored wetland (Site 2) for the years 2000 to 2002.

Species	Number planted	Number live trees			Percent survival		
		Year 2000	Year 2001	Year 2002	Year 2000	Year 2001	Year 2002
<i>Acer rubrum</i>	25	2	1	0	8%	4%	0%
<i>Betula nigra</i>	25	22	23	3	88%	92%	12%
<i>Quercus bicolor</i>	25	19	21	15	76%	84%	60%
<i>Quercus palustris</i>	25	13	16	4	52%	64%	16%

b. Floristic Quality Assessment

Two FQI values were calculated for each site from the species lists included in Appendix B. The first FQI value is calculated from only species that became established on the site naturally; the second FQI value includes the planted tree species. The created wetland has an FQI value of 13.9 and a \bar{c} of 1.9 when only natural vegetation is included. When the planted tree species are added, the FQI value is raised to 15.5 with a \bar{c} value of 2.0. The FQI value for the restored wetland is 14.5 with a \bar{c} value of 1.9 when only naturally established vegetation is considered, and 16.0 and 2.0 when the planted tree species are included. In all cases, the FQI values exceed the requirement of 7.0, however, for both sites when only natural vegetation is included, the \bar{c} values are slightly lower than the required 2.0.

c. Dominance of vegetation

Both sites 1 and 2 meet the performance criteria for dominance of vegetation. None of the three most dominant species are non-native species, cattails, or reed canary grass. All of the dominant species (Table 3, Table 4) are native. Cattails occur at site 1, but only in small numbers. Reed canary grass occurs at both sites. It is not a dominant, however, the amount of it has increased significantly over the past four years and it should be monitored closely.

Photographs were taken from the permanent photography stations and are included in Appendix C of this report.

Project goal 3

a. Sediment removal

Sediment traps were examined by ISGS personnel in April 2002. They reported that, on average, each trap held 18 g of silty material (Weaver and Carr 2002). This represents a total period of 8.1 days that the traps were inundated.

Discussion

After the fourth year of monitoring, it seems probable that at least a portion of the created wetland site (Site 1) will comply with project goals, objectives, and performance standards by the end of the monitoring period. The planted trees and other hydrophytic vegetation are becoming established and hydric soil indicators were found. In addition, the criteria for wetland hydrology were met for the entire excavated basin in 2001 and for a portion (26%) of the basin in 2002. In 2000, however, only a small area around one well met the criteria and in 1999 no portion of the site did. Since hydrology fluctuates through time, several years data will need to be considered when estimating what portion of the site qualifies as wetland. The problem with wetland hydrology at this site continues to be the inlet/outlet located at the northwest corner of the site. The elevation of this inlet/outlet allows the site to drain too quickly after flooding events. We concur with the recommendation of Weaver and Carr (2002) that the elevation of this inlet/outlet be raised to approximately 194.0 m (636.5 ft) so that water will be retained for a longer period in the excavated basin.

It is unlikely that the restored wetland (Site 2) will comply with project goals, objectives, and performance standards by the end of the monitoring period. Although planted trees and hydrophytic vegetation are becoming established, no hydric soil indicators and no signs of wetland hydrology were found. In addition, there was a significant drop in the number of live planted trees between 2001 and 2002.

The dominant vegetation is hydrophytic at both sites 1 and 2. No non-native or invasive species occur among the dominants at either site, however, a non-native invasive, reed canary grass, is becoming more abundant. This invasive grass has the potential to dominate sites and its progress should be monitored carefully. Volunteer and planted tree seedlings are becoming well established at both sites. The FQI values are above the required level, however the \bar{c} values are low for the both sites when the planted trees are not included in the calculations. This means that there are a large number of species 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, as long as aggressive invasive species are kept in check.

Soils at both sites have been seriously disturbed. Even so, the soils at the created wetland site contain hydric soil indicators, and therefore can be characterized as hydric. Soils at the wetland restoration site are very compacted and contain gravel and rock. This may be a detriment to the establishment and survival of vegetation at the site. It may also impede the development of hydric soils at the site. Water is not able to readily penetrate the soil but runs off more quickly.

Literature Cited

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- Weaver K. D. and K. W. Carr. 2002. Annual report for active IDOT wetland compensation and hydrological monitoring sites: September 1, 2001 to September 1, 2002. ISGS #50: Edwards River/Mercer County wetland compensation site. Illinois State Geological Survey, Champaign, Illinois.

Appendix A
Hydrologic Information

Figure 1. Well locations and estimated areal extent of 2002 wetland hydrology.

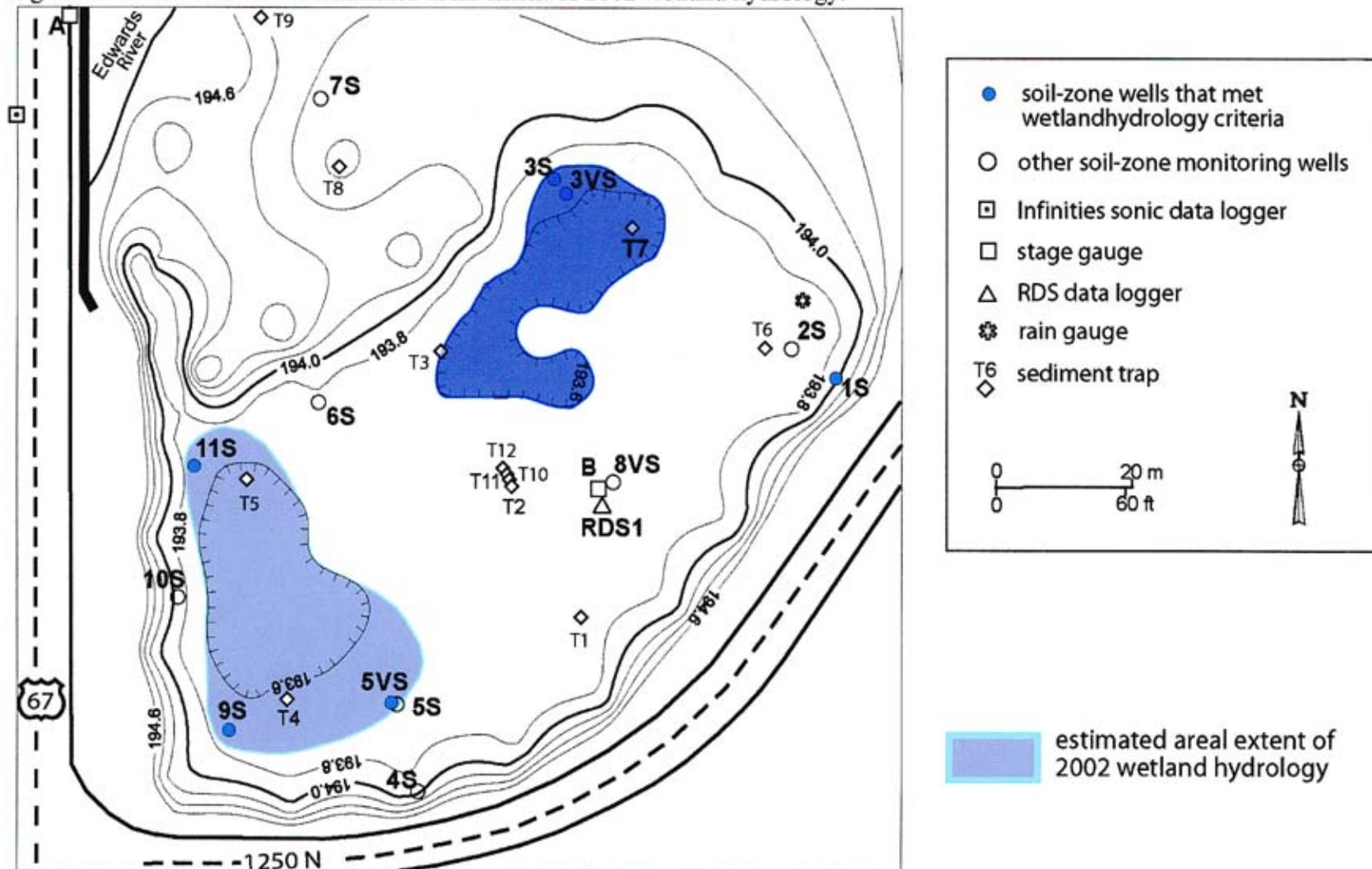


Figure prepared by ISGS

estimated areal extent of 2002 wetland hydrology

Appendix B
Wetland Determination Forms

ROUTINE ONSITE WETLAND DETERMINATION

Site 1 (page 1 of 5)

Field Investigators: Feist, Kurylo, Tessene, Wilm

Date: 30 July 2002

Project Name: FAP 310 (US 67)

Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2

State: Illinois **County:** Mercer **Applicant:** IDOT District 4

Site Name: Wetland creation

Legal Description: NE 1/4, SW 1/4, Sec. 35, T. 15 N., R. 2 W

Location: This wetland creation site is located 38.1 m (125 ft) south of the Edwards River and 15.2 m (50 ft) east of US 67.

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>Populus deltoides</i>	FAC+	shrub
2. <i>Aster praealtus</i>	FACW	herb
3. <i>Aster simplex</i>	FACW	herb
4. <i>Eupatorium serotinum</i>	FAC+	herb

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

Hydrophytic vegetation: Yes: No:

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

SOILS

Series and phase: Undetermined.

On county hydric soils list? Yes: No: Undetermined:

Is the soil a histosol? Yes: No:

Histic epipedon present? Yes: No:

Redox concentrations: Yes: No: Color: 7.5YR 5/6 and 7.5YR 3/4

Redox depletions: Yes: No:

Matrix color: 10YR 2/1 over 2.5Y 4/2

Other indicators: The soil is found in an excavated depression.

Hydric soils: Yes: No:

Rationale: The soil surface has been altered somewhat because of cut and fill activities. This soil has a low chroma matrix and redox concentrations. Therefore this is a hydric soil. This soil also meets the hydric soil indicator from NRCS of F3.

ROUTINE ONSITE WETLAND DETERMINATION

Site 1 (page 2 of 5)

Field Investigators: Feist, Kurylo, Tessene, Wilm

Date: 30 July 2002 **Project Name:** FAP 310 (US 67)

Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2

State: Illinois **County:** Mercer **Applicant:** IDOT District 4

Site Name: Wetland creation

Legal Description: NE 1/4, SW 1/4, Sec. 35, T. 15 N., R. 2 W

Location: This wetland creation site is located 38.1 m (125 ft) south of the Edwards River and 15.2 m (50 ft) east of US 67.

HYDROLOGY

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

Depth to saturated soil: > 0.46 m (18 in)

Overview of hydrological flow through the system: This site is hydrologically influenced by overflow from the Edwards River and by precipitation. Water leaves the site via evapotranspiration, sheet flow, soil infiltration, and through an inlet/outlet at the northwest corner of the site leading into the nearby Edwards River.

Size of Watershed: 699 km² (270 mi²)

Other field evidence observed: This site is a low area in the floodplain of a fairly large river.

Wetland hydrology: Yes: No: In part: X

Rationale: Water level data collected from six of the wells installed at the site conclusively satisfied the wetland hydrology criterion. Data from six other wells did not and data from another well was inconclusive.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: X No: In part: X

Rationale: Dominant hydrophytic vegetation and hydric soils are present throughout this site, however, wetland hydrology occurs over just a part of the site. Approximately 0.16 ha (0.39 ac) of the 0.61 ha (1.51 ac) excavated basin satisfied the wetland hydrology criteria in 2002, therefore only this portion of the site is a wetland. The NWI did not code this site as a wetland.

ROUTINE ONSITE WETLAND DETERMINATION

Site 1 (page 3 of 5)

Field Investigators: Feist, Kurylo, Tessene, Wilm

Date: 30 July 2002 **Project Name:** FAP 310 (US 67)

Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2

State: Illinois **County:** Mercer **Applicant:** IDOT District 4

Site Name: Wetland creation

Legal Description: NE 1/4, SW 1/4, Sec. 35, T. 15 N., R. 2 W

Location: This wetland creation site is located 38.1 m (125 ft) south of the Edwards River and 15.2 m (50 ft) east of US 67.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	C†
<i>Abutilon theophrasti</i>	velvet-leaf	herb	FACU-	*
<i>Acalypha rhomboidea</i>	three-seeded mercury	herb	FACU	0
<i>Acer negundo</i>	box elder	tree	FACW-	1
<i>Acer saccharinum</i>	silver maple	tree	FACW	1
<i>Agropyron repens</i>	quack grass	herb	FACU	*
<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>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
<i>Asclepias syriaca</i>	common milkweed	herb	UPL	0
<i>Aster lateriflorus</i>	side-flowered aster	herb	FACW-	2
<i>Aster pilosus</i>	hairy aster	herb	FACU+	0
<i>Aster praealtus</i>	willow-leaved aster	herb	FACW	4
<i>Aster simplex</i>	panicled aster	herb	FACW	3
<i>Bidens cernua</i>	nodding beggar-ticks	herb	OBL	2
<i>Bidens tripartita</i>	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>Carex annectens</i>	large yellow fox sedge	herb	FACW	3
<i>Carex stipata</i>	prickly sedge	herb	OBL	2
<i>Carex vulpinoidea</i>	fox sedge	herb	OBL	3
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
<i>Cyperus esculentus</i>	yellow nut-sedge	herb	FACW	0
<i>Cyperus strigosus</i>	straw colored flatsedge	herb	FACW	0
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Eleocharis erythropoda</i>	spike rush	herb	OBL	3
<i>Elymus virginicus</i>	Virginia wild rye	herb	FACW-	4
<i>Eupatorium serotinum</i>	late boneset	herb	FAC+	1
<i>Helianthus tuberosus</i>	Jerusalem artichoke	herb	FAC	3
<i>Hordeum jubatum</i>	squirrel-tail	herb	FAC+	*

Species list continued on next page.

ROUTINE ONSITE WETLAND DETERMINATION
Site 1 (page 4 of 5)

Field Investigators: Feist, Kurylo, Tessene, Wilm
Date: 30 July 2002 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland creation
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Location: This wetland creation site is located 38.1 m (125 ft) south of the Edwards River and 15.2 m (50 ft) east of US 67.

SPECIES LIST *continued*

Scientific name	Common name	Stratum	Wetland indicator status	C†
<i>Juncus torreyi</i>	Torrey's rush	herb	FACW	3
<i>Laportea canadensis</i>	wood nettle	herb	FACW	2
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Lotus corniculatus</i>	birdsfoot-trefoil	herb	FAC-	*
<i>Lycopus americanus</i>	common water horehound	herb	OBL	3
<i>Lysimachia ciliata</i>	fringed loosestrife	herb	FACW	4
<i>Meniha arvensis villosa</i>	field mint	herb	FACW	4
<i>Oxalis dillenii</i>	yellow wood sorrel	herb	FACU	0
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Physostegia virginiana</i>	false dragonhead	herb	FACW	6
<i>Plantago rugelii</i>	red-stalked plantain	herb	FAC	0
<i>Poa pratensis</i>	Kentucky bluegrass	herb	FAC-	*
<i>Polygonum amphibium</i>	water smartweed	herb	OBL	3
<i>Polygonum hydropiper</i>	water pepper	herb	OBL	*
<i>Polygonum lapathifolium</i>	currtop lady's thumb	herb	FACW+	0
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Polygonum punctatum</i>	dotted smartweed	herb	OBL	3
<i>Populus deltoides</i>	eastern cottonwood	shrub, herb	FAC+	2
<i>Potentilla norvegica</i>	rough cinquefoil	herb	FAC	0
<i>Rorippa islandica</i>	marsh yellow cress	herb	OBL	4
<i>Rudbeckia laciniata</i>	cut-leaf coneflower	herb	FACW+	3
<i>Rumex altissimus</i>	pale dock	herb	FACW-	2
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
<i>Salix exigua</i>	sandbar willow	shrub	OBL	1
<i>Salix nigra</i>	black willow	tree	OBL	3
<i>Scirpus atrovirens</i>	dark green bulrush	herb	OBL	4
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Solidago gigantea</i>	late goldenrod	herb	FACW	3
<i>Typha latifolia</i>	cattail	herb	OBL	1
<i>Verbena hastata</i>	blue vervain	herb	FACW+	3
<i>Xanthium strumarium</i>	cocklebur	herb	FAC	0

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

$$\bar{C} = \sum C/N = 101/53 = 1.9$$

$$FQI = \bar{C} / \sqrt{N} = 101/\sqrt{53} = 13.9$$

ROUTINE ONSITE WETLAND DETERMINATION

Site 1 (page 5 of 5)

Field Investigators: Feist, Kurylo, Tessene, Wilm
Date: 30 July 2002 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland creation
Legal Description: NE 1/4, SW 1/4, Sec. 35, T. 15 N., R. 2 W
Location: This wetland creation site is located 38.1 m (125 ft) south of the Edwards River and 15.2 m (50 ft) east of US 67.

PLANTED TREES

Scientific name	Common name	Stratum	Wetland indicator status	C†
<i>Quercus palustris</i>	pin oak	tree	FACW	4
<i>Quercus bicolor</i>	swamp white oak	tree	FACW+	7
<i>Betula nigra</i>	red birch	tree	FACW	4

†Coefficient of Conservatism (Taft et al. 1997) $\bar{C} = \sum C/N = 116/56 = 2.1^{**}$
 Non-native species $FQI = \bar{C}/\sqrt{N} = 116/\sqrt{56} = 15.5^{**}$
 **These calculations include the complete species list above, as well as the planted trees.

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ROUTINE ONSITE WETLAND DETERMINATION
Site 2 (page 1 of 6)

Field Investigators: Feist, Kurylo, Tessene, Wilm
Date: 30 July 2002 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland restoration
Legal Description: SE 1/4, NW 1/4, Sec. 35, T. 15 N., R. 2 W
Location: This wetland restoration site is located just north of the Edwards River and just east of US 67.

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. <i>Aster simplex</i>	FACW	herb
2. <i>Aster praealtus</i>	FACW	herb

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

Hydrophytic vegetation: Yes: X No:

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

SOILS

Series and phase: Undetermined entisol.

On county hydric soils list? Yes: No: Undetermined: X

Is the soil a histosol? Yes: No: X

Histic epipedon present? Yes: No: X

Redox concentrations: Yes: No: X (at this time)

Redox depletions: Yes: No: X (at this time)

Matrix color: 10YR 2/1

Other indicators: This site is within the active floodplain of the Edwards River.

Hydric soils: Yes: No: Undetermined: X

Rationale: Over the past year, flooding events have left deposits of soil material at this site. It can only be assumed that with future flooding events more accumulation will occur. At this time, soil characteristics on this site are not discernable enough to make a hydric/non-hydric determination. The old compacted surface is still easily recognized at an average depth of 0.15 m (6 in).

ROUTINE ONSITE WETLAND DETERMINATION

Site 2 (page 2 of 6)

Field Investigators: Feist, Kurylo, Tessene, Wilm

Date: 30 July 2002 **Project Name:** FAP 310 (US 67)

Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2

State: Illinois **County:** Mercer **Applicant:** IDOT District 4

Site Name: Wetland restoration

Legal Description: SE 1/4, NW 1/4, Sec. 35, T. 15 N., R. 2 W

Location: This wetland restoration site is located just north of the Edwards River and just east of US 67.

HYDROLOGY

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

Depth to saturated soil: NA

Overview of hydrological flow through the system: This site is hydrologically influenced by precipitation and overflow from the Edwards River. Water leaves the site via evapotranspiration and sheet flow into the adjacent Edwards River.

Size of Watershed: 699 km² (270 mi²)

Other field evidence observed: None

Wetland hydrology: Yes: No: Undetermined: X

Rationale: No indicators of wetland hydrology were observed. The position of this site between the Edwards River and a levee, suggests that the area floods for some period of time each year. At this time, it is uncertain as to whether this site is inundated or saturated for a sufficient duration to satisfy 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 or undetermined at this time; thus, we determined that this site is currently not a wetland. The NWI coded this site as a temporarily flooded, broad-leaved deciduous, forested, palustrine wetland (PFO1A).

ROUTINE ONSITE WETLAND DETERMINATION
Site 2 (page 3 of 6)

Field Investigators: Feist, Kurylo, Tessene, Wilm
Date: 30 July 2002 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland restoration
Legal Description: SE 1/4, NW 1/4, Sec. 35, T. 15 N., R. 2 W
Location: This wetland restoration site is located just north of the Edwards River and just east of US 67.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	C†
<i>Acalypha rhomboidea</i>	three-seeded mercury	herb	FACU	0
<i>Acer saccharinum</i>	silver maple	shrub, herb	FACW	1
<i>Acer negundo</i>	box elder	shrub, herb	FACW-	1
<i>Agropyron repens</i>	quack grass	herb	FACU	*
<i>Agrostis alba</i>	red top	herb	FACW	0
<i>Amaranthus tuberculatus</i>	tall waterhemp	herb	OBL	1
<i>Ambrosia artemisiifolia</i>	bitterweed	herb	FACU	0
<i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
<i>Asclepias syriaca</i>	common milkweed	herb	UPL	0
<i>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
<i>Apios americana</i>	groundnut	herb	FACW	4
<i>Aster pilosus</i>	hairy aster	herb	FACU+	0
<i>Aster praealtus</i>	willow-leaved aster	herb	FACW	4
<i>Aster simplex</i>	panicked aster	herb	FACW	3
<i>Bidens aristosa</i>	swamp marigold	herb	FACW	1
<i>Bidens connata</i>	purplestem beggar-ticks	herb	OBL	2
<i>Bidens frondosa</i>	common beggar-ticks	herb	FACW	1
<i>Bidens tripartita</i>	beggar-tick	herb	OBL	2
<i>Bromus inermis</i>	awnless brome grass	herb	UPL	*
<i>Calystegia sepium</i>	American bindweed	herb	FAC	1
<i>Carex frankii</i>	sedge	herb	OBL	4
<i>Carex vulpinoidea</i>	fox sedge	herb	OBL	3
<i>Cinna arundinacea</i>	stout wood reed	herb	FACW	5
<i>Cirsium vulgare</i>	bull thistle	herb	FACU-	*
<i>Conium maculatum</i>	poison hemlock	herb	FACW	*
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
<i>Coronilla varia</i>	crown vetch	herb	UPL	*
<i>Cryptotaenia canadensis</i>	honestwort	herb	FAC	1
<i>Dactylis glomerata</i>	orchard grass	herb	FACU	*
<i>Daucus carota</i>	Queen-Anne's-lace	herb	UPL	*
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Elymus canadensis</i>	Canada wild rye	herb	FAC-	4

Species list continued on the next page.

ROUTINE ONSITE WETLAND DETERMINATION
Site 2 (page 4 of 6)

Field Investigators: Feist, Kurylo, Tessene, Wilm
Date: 30 July 2002 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland restoration
Legal Description: SE 1/4, NW 1/4, Sec. 35, T. 15 N., R. 2 W
Location: This wetland restoration site is located just north of the Edwards River and just east of US 67.

SPECIES LIST *continued*

Scientific name	Common name	Stratum	Wetland indicator status	Ct
<i>Elymus virginicus</i>	Virginia wild rye	herb	FACW-	4
<i>Erigeron annuus</i>	annual fleabane	herb	FAC-	1
<i>Eupatorium serotinum</i>	late boneset	herb	FAC+	1
<i>Festuca pratensis</i>	meadow fescue	herb	FACU-	*
<i>Geum canadense</i>	white avens	herb	FAC	2
<i>Helianthus grosseserratus</i>	sawtooth sunflower	herb	FACW-	2
<i>Helianthus tuberosus</i>	Jerusalem artichoke	herb	FAC	3
<i>Hordeum jubatum</i>	squirrel-tail	herb	FAC+	*
<i>Impatiens capensis</i>	jewelweed	herb	FACW	2
<i>Juncus tenuis</i>	path rush	herb	FAC	0
<i>Lactuca serriola</i>	prickly lettuce	herb	FAC	*
<i>Laportea canadensis</i>	wood nettle	herb	FACW	2
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Leersia virginica</i>	white grass	herb	FACW	4
<i>Lepidium virginicum</i>	common peppergrass	herb	FACU-	0
<i>Leptochloa fascicularis</i>	bearded sprangle top	herb	OBL	0
<i>Lolium perenne</i>	crested rye grass	herb	FACU	*
<i>Lotus corniculatus</i>	birdsfoot-trefoil	herb	FAC-	*
<i>Melilotus alba</i>	white sweet clover	herb	FACU	*
<i>Muhlenbergia frondosa</i>	common satin grass	herb	FACW	3
<i>Myosoton aquaticum</i>	giant chickweed	herb	FAC+	*
<i>Oenothera biennis</i>	evening primrose	herb	FACU	1
<i>Oxalis stricta</i>	yellow wood sorrel	herb	FACU	0
<i>Pastinaca sativa</i>	parsnip	herb	UPL	*
<i>Penthorum sedoides</i>	ditch stonecrop	herb	OBL	2
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Phleum pratense</i>	Timothy	herb	FACU	*
<i>Plantago rugelii</i>	red-stalked plantain	herb	FAC	0
<i>Poa pratensis</i>	Kentucky bluegrass	herb	FAC-	*
<i>Poa compressa</i>	Canadian bluegrass	herb	FACU+	*
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Populus deltoides</i>	eastern cottonwood	shrub, herb	FAC+	2

Species list continued on next page.

ROUTINE ONSITE WETLAND DETERMINATION

Site 2 (page 5 of 6)

Field Investigators: Feist, Kurylo, Tessene, Wilm
Date: 30 July 2002 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland restoration
Legal Description: SE 1/4, NW 1/4, Sec. 35, T. 15 N., R. 2 W
Location: This wetland restoration site is located just north of the Edwards River and just east of US 67.

SPECIES LIST *continued*

Scientific name	Common name	Stratum	Wetland indicator status	C†
<i>Potentilla norvegica</i>	rough cinquefoil	herb	FAC	0
<i>Rorippa islandica fernaldiana</i>	marsh yellow cress	herb	OBL	4
<i>Rosa multiflora</i>	multiflora rose	shrub	FACU	*
<i>Rudbeckia laciniata</i>	cut-leaf coneflower	herb	FACW+	3
<i>Rumex altissimus</i>	pale dock	herb	FACW-	2
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
<i>Salix exigua</i>	sandbar willow	shrub	OBL	1
<i>Sambucus canadensis</i>	common elder	shrub	FACW-	2
<i>Scirpus atrovirens</i>	dark green bulrush	herb	OBL	4
<i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Solidago gigantea</i>	late goldenrod	herb	FACW	3
<i>Stachys tenuifolia</i>	slenderleaf betony	herb	OBL	5
<i>Taraxacum officinale</i>	dandelion	herb	FACU	*
<i>Trifolium repens</i>	white clover	herb	FACU+	*
<i>Trifolium pratense</i>	red clover	herb	FACU+	*
<i>Ulmus americana</i>	American elm	shrub	FACW-	5
<i>Urtica dioica</i>	stinging nettle	herb	FAC+	2
<i>Verbena urticifolia</i>	white vervian	herb	FAC+	3
<i>Viola pratensis</i>	common blue violet	herb	FAC	1
<i>Vitis riparia</i>	riverbank grape	woody vine	FACW-	2
<i>Xanthium strumarium</i>	cocklebur	herb	FAC	0

†Coefficient of Conservatism (Taft et al. 1997)

*Non-native species

$$\bar{C} = \sum C/N = 113/61 = 1.9$$

$$FQI = \bar{C}/\sqrt{N} = 113/\sqrt{61} = 14.5$$

ROUTINE ONSITE WETLAND DETERMINATION

Site 2 (page 6 of 6)

Field Investigators: Feist, Kurylo, Tessene, Wilm
Date: 30 July 2002 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland restoration
Legal Description: SE 1/4, NW 1/4, Sec. 35, T. 15 N., R. 2 W
Location: This wetland restoration site is located just north of the Edwards River and just east of US 67.

PLANTED TREES

Scientific name	Common name	Stratum	Wetland indicator status	C†
<i>Quercus palustris</i>	pin oak	shrub	FACW	4
<i>Quercus bicolor</i>	swamp white oak	shrub	FACW+	7
<i>Betula nigra</i>	red birch	shrub	FACW	4

†Coefficient of Conservatism (Taft et al. 1997)

Non-native species

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

$$\bar{C} = \sum C/N = 128/64 = 2.0^{**}$$

$$FQI = \bar{C}/\sqrt{N} = 128/\sqrt{64} = 16.0^{**}$$

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Appendix C

Photographs of Wetland Mitigation Sites



Photo Station 1. View of wetland creation (site 1) facing northeast.



Photo Station 2. View of wetland creation (site 1) facing north.



Photo Station 3. View of wetland restoration (site 2) facing south.

WETLAND MITIGATION SITE MONITORING REPORT-2003

FAP 310 (US 67) Mercer County

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Introduction

This report details the fifth and final monitoring of the wetland mitigation site created to compensate for impact to wetlands by construction on FAP 310 (US 67) in Mercer County. Details of the first four years of monitoring can be found in the four previously submitted reports (Feist et al. 1999, Feist et al. 2000, Feist et al. 2001, Feist et al. 2002). The site consists of approximately 0.69 ha (1.7 ac) of wetland creation (Site 1) and 0.28 ha (0.7 ac) of wetland restoration (Site 2). The wetland creation is located in the southeast quarter of the intersection of U S Route 67 and the Edwards River; the proposed restoration is located in the northeast quarter. The legal location is NE 1/4, SW 1/4, Section 35, T. 15 N., R. 2 W. The Illinois Department of Transportation (IDOT) completed construction of the site on 12 August 1997. Trees were planted during the fall of 1998 (T. Brooks, IDOT Wetlands Unit, memo to Allen Plocher, 10 February 1999). The fifth year of onsite monitoring was conducted on 12 August 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.

Goals, Objectives, and Performance Standards

Goals, objectives, and performance standards follow those specified in the monitoring plan (T. Brooks, IDOT Wetlands Unit, 1999) and the wetland compensation plan (C. 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: 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 0.31 ha (0.76 ac) of floodplain forest and 0.09 ha (0.23 ac) of emergent wetland at a 1.5:1 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 floristic composition and vegetation cover.

Objectives: A floodplain forest will be created by planting native woody species. Herbaceous vegetation will be allowed to colonize the site naturally.

Performance criteria:

a. Establishment of tree seedlings: Planted or volunteer tree seedlings should be established at each site.

b. Floristic Quality Assessment: The floristic quality index (FQI) and mean coefficient of conservatism (\bar{c}) for both sites should meet or exceed the FQI and \bar{c} values of the filled wetlands, 7.0 and 2.0, respectively.

c. Dominance of vegetation: None of the three most dominant plant species in either site may be non-native species, cattails (*Typha* sp.), or reed canary grass (*Phalaris arundinacea*).

Project goal 3: The created wetland should function to remove sediments from the floodwaters of the Edwards River.

Objectives: The wetland creation site should retain floodwater and allow sediments to settle out of suspension.

Performance criteria:

a. Sediment removal: Sediments in the wetland should accumulate at a rate of 0.3 to 1.1 in/yr.

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 seven ground water monitoring wells and one stage gauge at the created wetland site (Site 1) in 1999. In 2001, one RDS surface-water data logger, one stage gauge, and three very shallow (VS) soil zone wells were added. In April 2002 three soil-zone monitoring wells were added along the base of the US 67 embankment. Locations for these sites are shown in Figure 1 (Appendix A). Water-level data was collected monthly throughout the year and biweekly during April and May. Methods are further described in the ISGS document *Annual report for active IDOT wetland compensation and hydrologic monitoring sites: September 1, 2002 to September 1, 2003* (Fucciolo et al. 2003). No wells or other monitoring devices were installed at the restored wetland (Site 2).

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 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. Establishment of trees (five-foot whips)

In order to help create and restore floodplain forest, five-foot whips were planted at both compensation sites. According to the tasking order for this project (T. Brooks, IDOT Wetlands Unit, memo to Allen Plocher, 10 February 1999), the following number of trees were planted at the sites in Fall 1998:

Table 1. Species planted in the wetland creation (Site 1).

Species	Common Name	Number
<i>Acer rubrum</i>	red maple	60
<i>Betula nigra</i>	river birch	60
<i>Quercus bicolor</i>	swamp white oak	60
<i>Quercus palustris</i>	pin oak	60

Table 2. Species planted in the wetland restoration (Site 2).

Species	Common Name	Number
<i>Acer rubrum</i>	red maple	25
<i>Betula nigra</i>	river birch	25
<i>Quercus bicolor</i>	swamp white oak	25
<i>Quercus palustris</i>	pin oak	25

Survivorship and density of planted trees was determined by censusing. All live planted trees were counted for both the created and restored wetlands. Volunteer seedlings were designated as occasional or abundant by species.

Density of live planted trees is given as the number of live planted trees/ha for each site. Survival was calculated as a percentage of the number of expected live individuals: (Total number of live planted trees/the number of known planted trees) x 100.

b. Floristic Quality Assessment

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 premise 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. 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. These values provide a measure of site floristic quality. Floristic quality index values (FQI values) less than 5 indicate that the area is extremely weedy or in an early successional stage (Swink and Wilhelm 1994). FQI values greater 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, three permanent photography stations were established so that photographs could be used to document changes in plant community size and composition. The locations of the

photo stations are indicated on the enclosed aerial photograph. Arrows indicate the direction in which the photos were taken.

Project goal 3

a. Sediment removal

ISGS personnel installed 12 sediment traps in the wetland creation site (Site 1) in Fall 1999. Trap locations are shown in Figure 1 in Appendix A.

Results

Project goal 1

a. Predominance of hydrophytic vegetation

Dominant plant species for the mitigation sites in 2003 are shown in Table 3 and Table 4. At Site 1, 100% of the dominant species are rated OBL, FACW+, FAC+, or FAC and, therefore, are hydrophytic. At Site 2, 80% of the dominant species are hydrophytic.

Table 3. Dominant plant species by stratum and wetland indicator status for the wetland creation (Site 1).

Dominant Plant Species	Indicator Status	Stratum
1. <i>Populus deltoides</i>	FAC+	shrub
2. <i>Acer saccharinum</i>	FACW	shrub
3. <i>Aster praealtus</i>	FACW	herb
4. <i>Eupatorium serotinum</i>	FAC+	herb

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

Dominant Plant Species	Indicator Status	Stratum
1. <i>Aster simplex</i>	FACW	herb
2. <i>Helianthus tuberosus</i>	FAC	herb
3. <i>Phalaris arundinacea</i>	FACW+	herb
4. <i>Rumex crispus</i>	FAC+	herb
5. <i>Solidago canadensis</i>	FACU	herb

b. Presence of wetland hydrology

Figure 1 (Appendix A) shows the areal extent of wetland hydrology at Site 1 in 2003. According to Weaver and Carr (2003) no significant portion of the wetland creation area conclusively satisfied the criteria for wetland hydrology in 2003. Water levels measured in only one well (3S) conclusively satisfied the wetland hydrology criteria and no significant area around this well could be included based on adjacent well and stream gauge data (Weaver and Carr 2003). Three separate surface-water inundation events were recorded in the wetland basin in 2003, with a maximum duration of approximately six days. This period of time was insufficient to satisfy the wetland hydrology criteria. For a more detailed account of the hydrology of this site, see *Edwards River/Mercer County Wetland Compensation Site, I.S.G.S. #50* (Weaver and Carr 2003).

No monitoring wells were placed in the restored area (Site 2) and no indicators of wetland hydrology were observed. The position of this site between the Edwards River and a levee, suggests that the area floods for some period of time each year, however, it appears to drain quickly. There is no evidence to suggest that this site is inundated or saturated for a sufficient duration to satisfy the wetland hydrology criteria.

c. Occurrence of hydric soils

Soils examined at both of the mitigation sites continue to show signs of disturbance while developing and changing under their new pedogenic conditions. Much cutting and filling had been done in the past within the top twenty inches and the sites lack a true undisturbed A horizon.

At the wetland creation (Site 1), the soils were very hard and therefore difficult to probe through. Even so, the soils were found to contain hydric soil indicators, and therefore can be characterized as hydric. Following is a soil description of a typical pedon for the majority of the site.

Table 5. Description of the soils at the wetland creation (Site 1).

<u>Depth</u>	<u>Matrix Color</u>	<u>Concre-tions</u>	<u>Iron Masses</u>	<u>Pore linings</u>	<u>Iron Deplet.</u>	<u>Clay Deplet.</u>	<u>Tex-ture</u>	<u>Structure</u>
0-2 in	2.5Y 3/2	none	10YR 3/3	none	none	none	SiL	Gr - Platy
2-10 in	10YR 2/1	none	10YR 5/8 10YR 5/3	none	none	none	SiCL	Sub B1 - Massive

Soils materials have begun to accumulate on the restoration site (Site 2). This is due to deposition of sediments during flooding events. The compacted surface of the soil is present under these sediments and could eventually become a water restricting layer within the profile. Due to the very young nature of these soils, a thorough description could not be completed and no determination was made concerning the hydric nature of these soils.

Project goal 2

a. Establishment of tree seedlings

Tables 6 and 7 show the results of the censusing of trees at Site 1 and Site 2 for the years 2000, 2001, 2002, and 2003. Since 1999 data was gathered by random sampling rather than by censusing it is not included here. No *Acer rubrum* were ever found at the created wetland site and only two were found at the restored wetland. I assumed, therefore, that the reported number of red maples had never been planted and have not included them in my calculations.

Both planted tree seedlings and volunteers are becoming established at the two sites. A total of 125 live planted trees are present at the wetland creation site (Site 1) for a survival rate of approximately 69.4% and a mean density of 181 live planted trees/ha. Volunteer silver maple

and cottonwood shrubs are now dominant at this site. Volunteer sandbar willow and black willow shrubs are present in thick patches along the borders of the site.

A total of 20 live planted trees are present at Site 2 for a survival rate of 29.3% and density of 71 live planted trees/ha. Volunteer seedlings of silver maples and cottonwoods are occasional throughout the site.

Table 6. Tree establishment at the wetland creation (Site 1) for the years 2000 to 2003.

Species	Number planted	Number live trees				Percent survival			
		2000	2001	2002	2003	2000	2001	2002	2003
<i>Acer rubrum</i>	60	0	0	0	0	0%	0%	0%	0%
<i>Betula nigra</i>	60	54	60	59	56	90%	100%	98.3%	93.3%
<i>Quercus bicolor</i>	60	56	47	40	49	93%	78.3%	66.7%	81.7%
<i>Quercus palustris</i>	60	23	27	22	20	38%	45%	36.7%	33.3%

Table 7. Tree establishment at the wetland restoration (Site 2) for the years 2000 to 2003.

Species	Number planted	Number live trees				Percent survival			
		2000	2001	2002	2003	2000	2001	2002	2003
<i>Acer rubrum</i>	25	2	1	0	1	8%	4%	0%	4.0%
<i>Betula nigra</i>	25	22	23	3	1	88%	92%	12%	4.0%
<i>Quercus bicolor</i>	25	19	21	15	10	76%	84%	60%	40.0%
<i>Quercus palustris</i>	25	13	16	4	8	52%	64%	16%	32.0%

b. Floristic Quality Assessment

Two FQI values were calculated for each site from the species lists included in Appendix B. The first FQI value is calculated from only species that became established on the site naturally; the second FQI value includes the planted tree species. The created wetland has an FQI value of 13.9 and a \bar{c} of 1.9 when only natural vegetation is included. When the planted tree species are added, the FQI value is raised to 15.5 with a \bar{c} value of 2.1. The FQI value for the restored wetland is 17.7 with a \bar{c} value of 2.1 when only naturally established vegetation is considered, and 19.1 and 2.2 when the planted tree species are included. In all cases, the FQI values exceed the requirement of 7.0, and the \bar{c} values are slightly higher than the required 2.0.

c. Dominance of vegetation

Site 1 meets the performance criteria for dominance of vegetation. None of the three most dominant species are non-native species, cattails, or reed canary grass. All of the dominant species (Table 3) are native. Cattails occur at Site 1 but only in small numbers. Reed canary grass also occurs. Although it is not a dominant, the amount of it has increased steadily over the past five years and it should be monitored closely.

Site 2 does not meet the performance criteria for dominance of vegetation. Reed canary grass is now one of the three most dominant species at this site. Also, another non-native species, *Rumex crispus* (curly dock), is the fifth most dominant species at the site (Table 4).

Photographs were taken from the permanent photography stations and are included in Appendix C of this report.

Project goal 3

a. Sediment removal

Sediment traps at Site 1 were examined by ISGS personnel in April 2003. They reported that the traps on the site accumulated between 0.18 and 0.97 cm of sediment (Weaver and Carr 2003). According to stage records, this represents a total period of 5.7 days that the traps were inundated.

Discussion

After the fifth year of monitoring, the created wetland site (Site 1) does not comply with all of the project goals, objectives, and performance standards. Although the planted trees and other hydrophytic vegetation are becoming established and hydric soil indicators were found, the wetland hydrology criteria have not been met in most years. The criteria for wetland hydrology were met for the entire excavated basin in 2001 (Weaver and Carr 2001) and for a portion (26%) of the basin in 2002 (Weaver and Carr 2002). However, in 2000 and 2003 only a small area around one well (1S and 3S respectively) met the criteria (Carr and Weaver 2000, Weaver and Carr 2003), and in 1999 no portion of the site did (Miner 1999). Since hydrology fluctuates through time, several years of data need to be considered when estimating what portion of the site qualifies as wetland. No well or portion of the site met the wetland hydrology criteria for more than two out of five years.

The problem with wetland hydrology at this site continues to be the inlet/outlet located at the northwest corner of the site. The elevation of this inlet/outlet allows the site to drain too quickly after flooding events. We concur with the recommendation of Weaver and Carr (2003) that the elevation of this inlet/outlet be raised to approximately 194.0 m (636.5 ft) so that water will be retained for a longer period in the excavated basin.

The restored wetland site (Site 2) has not complied with project goals, objectives, and performance standards within the five-year monitoring period. Although planted trees and hydrophytic vegetation are becoming established, no hydric soil indicators and no signs of wetland hydrology were found. In addition, there was a significant drop in the number of live planted trees between 2001 and 2002 and the numbers continued to drop in 2003.

The dominant vegetation is hydrophytic at both sites 1 and 2 and the FQI and \bar{c} values are above the required level. No non-native or invasive species occur among the three most dominant species at Site 1, however, a non-native invasive, reed canary grass, is among the top three dominants at Site 2. This invasive grass has the potential to take over sites and exclude other species and its progress should be monitored carefully. Volunteer and planted tree seedlings are becoming well established at both sites.

Soils at both sites have been seriously disturbed. Even so, the soils at the created wetland (Site 1) contain hydric soil indicators, and therefore can be characterized as hydric. Soils at the wetland restoration (Site 2) are very compacted and the area closest to the bridge abutment contains rock. The compaction of the soils may be a detriment to the establishment

and survival of trees at the site. The survival rate of planted trees was just 20% at this site. It may also impede the development of hydric soils at the site. Water is not able to readily penetrate the compacted surface and runs off quickly from the sloped areas and perches in the depression areas (i.e. under the bridge).

Unless otherwise instructed, this will be the last year of field monitoring for this project.

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Appendix A
Hydrologic Information

Figure 1. Areal extent of hydrology at the wetland creation (Site1).

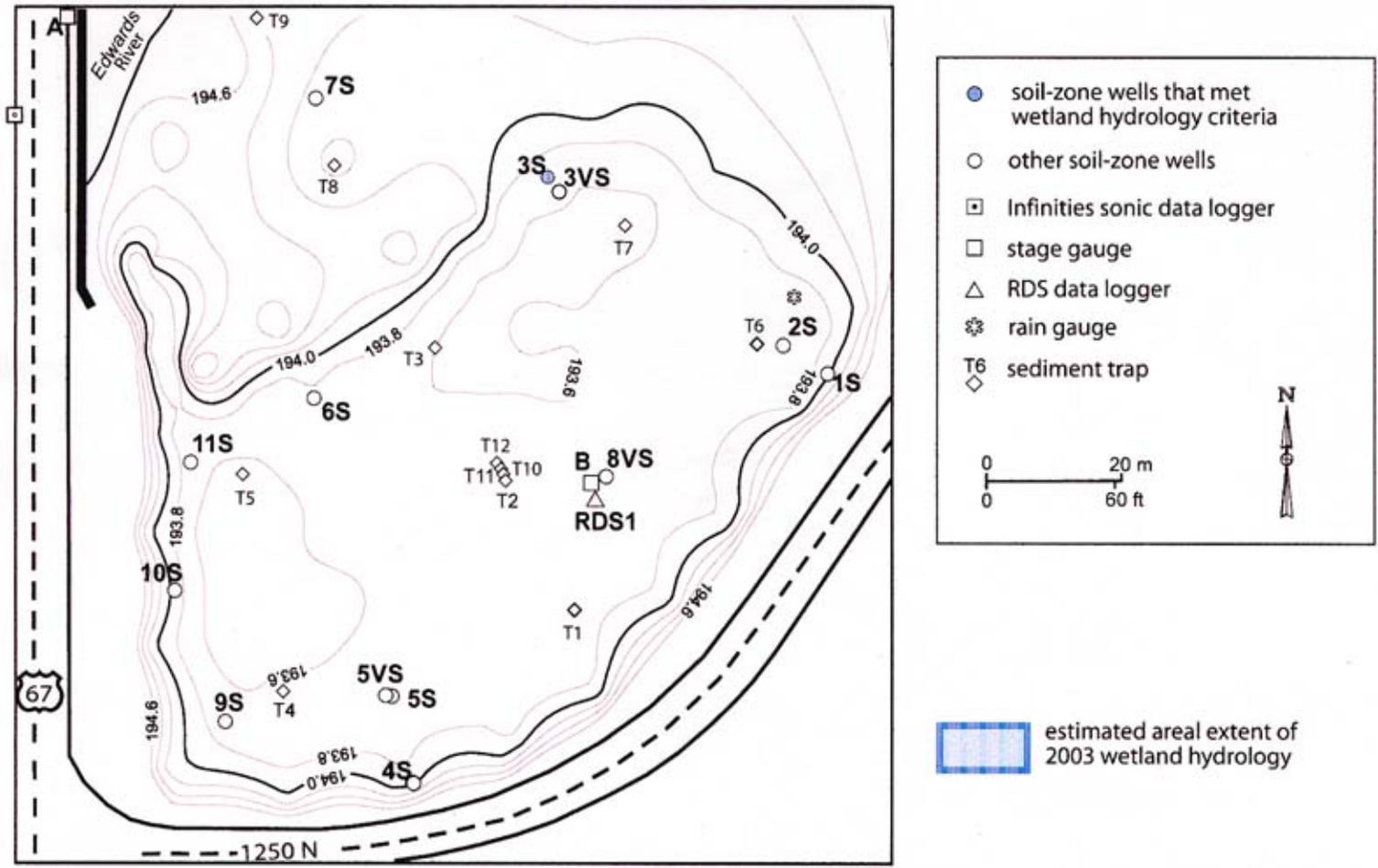


Figure prepared by ISGS

Appendix B
Wetland Determination Forms

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

Field Investigators: Feist, Kurylo, Tessene, Wilm
Date: 12 August 2003 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland creation
Legal Description: NE 1/4, SW 1/4, Sec. 35, T. 15 N., R. 2 W
Location: This wetland creation site is located 38.1 m (125 ft) south of the Edwards River and 15.2 m (50 ft) east of US 67.

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>Populus deltoides</i>	FAC+	shrub
2. <i>Acer saccharinum</i>	FACW	shrub
3. <i>Aster praealtus</i>	FACW	herb
4. <i>Eupatorium serotinum</i>	FAC+	herb

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

Hydrophytic vegetation: Yes: No:

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

SOILS

Series and phase: Undetermined.

On county hydric soils list? Yes: No: Undetermined:

Is the soil a histosol? Yes: No:

Histic epipedon present? Yes: No:

Redox concentrations: Yes: No: Color: 10YR 3/3 and 10YR 5/8

Redox depletions: Yes: No:

Matrix color: 2.5Y 3/2 over 10YR 2/1

Other indicators: Soil surface is dry and deeply cracked.

Hydric soils: Yes: No:

Rationale: The soil surface has been altered somewhat because of cut and fill activities associated with an old roadbed. This soil has a low chroma matrix and redox concentrations. Therefore, this is a hydric soil. This soil also meets the hydric soil indicator from the NRCS of F3.

ROUTINE ONSITE WETLAND DETERMINATION
Site 1 (page 2 of 5)

Field Investigators: Feist, Kurylo, Tessene, Wilm
Date: 12 August 2003 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland creation
Legal Description: NE 1/4, SW 1/4, Sec. 35, T. 15 N., R. 2 W
Location: This wetland creation site is located 38.1 m (125 ft) south of the Edwards River and 15.2 m (50 ft) east of US 67.

HYDROLOGY

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

Depth to saturated soil: > 0.46 m (18 in)

Overview of hydrological flow through the system: This site is hydrologically influenced by overflow from the Edwards River and by precipitation. Water leaves the site via evapotranspiration, sheet flow, soil infiltration, and through an inlet/outlet at the northwest corner of the site leading into the nearby Edwards River.

Size of Watershed: 699 km² (270 mi²)

Other field evidence observed: This site is a low area in the floodplain of a fairly large river.

Wetland hydrology: Yes: No: X

Rationale: Over five years of monitoring, no well or portion of this site met the wetland hydrology criteria for more than two out of five years.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: No: X

Rationale: Although dominant hydrophytic vegetation and hydric soils are present throughout this site, wetland hydrology is not. The NWI did not code this site as a wetland.

ROUTINE ONSITE WETLAND DETERMINATION

Site 1 (page 3 of 5)

Field Investigators: Feist, Kurylo, Tessene, Wilm
Date: 12 August 2003 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland creation
Legal Description: NE 1/4, SW 1/4, Sec. 35, T. 15 N., R. 2 W
Location: This wetland creation site is located 38.1 m (125 ft) south of the Edwards River and 15.2 m (50 ft) east of US 67.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	Ct
<i>Abutilon theophrasti</i>	velvet-leaf	herb	FACU-	*
<i>Acalypha rhomboidea</i>	three-seeded mercury	herb	FACU	0
<i>Acer negundo</i>	box elder	shrub, seedling	FACW-	1
<i>Acer saccharinum</i>	silver maple	shrub, seedling	FACW	1
<i>Agropyron repens</i>	quack grass	herb	FACU	*
<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>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
<i>Asclepias syriaca</i>	common milkweed	herb	UPL	0
<i>Aster lateriflorus</i>	side-flowered aster	herb	FACW-	2
<i>Aster pilosus</i>	hairy aster	herb	FACU+	0
<i>Aster praealtus</i>	willow-leaved aster	herb	FACW	4
<i>Aster simplex</i>	panicked aster	herb	FACW	3
<i>Bidens cernua</i>	nodding beggar-ticks	herb	OBL	2
<i>Bidens tripartita</i>	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>Carex annectens</i>	large yellow fox sedge	herb	FACW	3
<i>Carex stipata</i>	prickly sedge	herb	OBL	2
<i>Carex vulpinoidea</i>	fox sedge	herb	OBL	3
<i>Cirsium vulgare</i>	bull thistle	herb	FACU-	*
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
<i>Cyperus esculentus</i>	yellow nut-sedge	herb	FACW	0
<i>Cyperus strigosus</i>	straw colored flatsedge	herb	FACW	0
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Eleocharis erythropoda</i>	spike rush	herb	OBL	3
<i>Elymus virginicus</i>	Virginia wild rye	herb	FACW-	4
<i>Eupatorium serotinum</i>	late boneset	herb	FAC+	1
<i>Helianthus tuberosus</i>	Jerusalem artichoke	herb	FAC	3
<i>Hordeum jubatum</i>	squirrel-tail	herb	FAC+	*

Species list continued on next page.

ROUTINE ONSITE WETLAND DETERMINATION
Site 1 (page 4 of 5)

Field Investigators: Feist, Kurylo, Tessene, Wilm
Date: 12 August 2003 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland creation
Legal Description: NE 1/4, SW 1/4, Sec. 35, T. 15 N., R. 2 W
Location: This wetland creation site is located 38.1 m (125 ft) south of the Edwards River and 15.2 m (50 ft) east of US 67.

SPECIES LIST *continued*

Scientific name	Common name	Stratum	Wetland indicator status	C†
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Lotus corniculatus</i>	birdsfoot-trefoil	herb	FAC-	*
<i>Lycopus americanus</i>	common water horehound	herb	OBL	3
<i>Lysimachia ciliata</i>	fringed loosestrife	herb	FACW	4
<i>Mentha arvensis villosa</i>	field mint	herb	FACW	4
<i>Oxalis dillenii</i>	yellow wood sorrel	herb	FACU	0
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Physostegia virginiana</i>	false dragonhead	herb	FACW	6
<i>Poa pratensis</i>	Kentucky bluegrass	herb	FAC-	*
<i>Polygonum amphibium</i>	water smartweed	herb	OBL	3
<i>Polygonum hydropiper</i>	water pepper	herb	OBL	*
<i>Polygonum lapathifolium</i>	currtop lady's thumb	herb	FACW+	0
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Polygonum punctatum</i>	dotted smartweed	herb	OBL	3
<i>Populus deltoides</i>	eastern cottonwood	shrub, herb	FAC+	2
<i>Potentilla norvegica</i>	rough cinquefoil	herb	FAC	0
<i>Robinia pseudoacacia</i>	black locust	shrub	FACU-	*
<i>Rorippa islandica</i>	marsh yellow cress	herb	OBL	4
<i>Rudbeckia laciniata</i>	cut-leaf coneflower	herb	FACW+	3
<i>Rumex altissimus</i>	pale dock	herb	FACW-	2
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
<i>Salix exigua</i>	sandbar willow	shrub	OBL	1
<i>Salix nigra</i>	black willow	tree	OBL	3
<i>Scirpus atrovirens</i>	dark green bulrush	herb	OBL	4
<i>Sicyos angulatus</i>	bur cucumber	vine	FACW-	3
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Solidago gigantea</i>	late goldenrod	herb	FACW	3
<i>Trifolium repens</i>	white clover	herb	FACU+	*
<i>Typha latifolia</i>	cattail	herb	OBL	1
<i>Verbena hastata</i>	blue vervain	herb	FACW+	3
<i>Xanthium strumarium</i>	cocklebur	herb	FAC	0

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

$$\bar{C} = \sum C/N = 99/51 = 1.9$$

$$FQI = \bar{C} / \sqrt{N} = 99/\sqrt{51} = 13.9$$

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

Field Investigators: Feist, Kurylo, Tessene, Wilm
Date: 12 August 2003 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland creation
Legal Description: NE 1/4, SW 1/4, Sec. 35, T. 15 N., R. 2 W
Location: This wetland creation site is located 38.1 m (125 ft) south of the Edwards River and 15.2 m (50 ft) east of US 67.

PLANTED TREES

Scientific name	Common name	Stratum	Wetland indicator status	C†
<i>Quercus palustris</i>	pin oak	tree	FACW	4
<i>Quercus bicolor</i>	swamp white oak	tree	FACW+	7
<i>Betula nigra</i>	red birch	tree	FACW	4

†Coefficient of Conservatism (Taft et al. 1997)

Non-native species

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

$$\bar{C} = \sum C/N = 114/54 = 2.1^{**}$$

$$FQI = \bar{C}/\sqrt{N} = 114/\sqrt{54} = 15.5^{**}$$

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ROUTINE ONSITE WETLAND DETERMINATION

Site 2 (page 1 of 6)

Field Investigators: Feist, Kurylo, Tessene, Wilm
Date: 12 August 2003 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland restoration
Legal Description: SE 1/4, NW 1/4, Sec. 35, T. 15 N., R. 2 W
Location: This wetland restoration site is located just north of the Edwards River and just east of US 67.

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. <i>Aster simplex</i>	FACW	herb
2. <i>Helianthus tuberosus</i>	FAC	herb
3. <i>Phalaris arundinacea</i>	FACW+	herb
4. <i>Rumex crispus</i>	FAC+	herb
5. <i>Solidago canadensis</i>	FACU	herb

Percentage of dominant species that are OBL, FACW, FAC+, or FAC: 80%

Hydrophytic vegetation: Yes: X No:

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

SOILS

Series and phase: Undetermined entisol.

On county hydric soils list? Yes: No: Undetermined: X

Is the soil a histosol? Yes: No: X

Histic epipedon present? Yes: No: X

Redox concentrations: Yes: No: X (at this time)

Redox depletions: Yes: No: X (at this time)

Matrix color: 10YR 2/1

Other indicators: This site is within the active floodplain of the Edwards River.

Hydric soils: Yes: No: Undetermined: X

Rationale: Over the past year, flooding events have left deposits of soil material at this site. It can only be assumed that with future flooding events more accumulation will occur. At this time, soil characteristics on this site are not discernable enough to make a hydric/non-hydric determination. The old compacted surface is still easily recognized at an average depth of 0.15 m (6 in).

ROUTINE ONSITE WETLAND DETERMINATION
Site 2 (page 2 of 6)

Field Investigators: Feist, Kurylo, Tessene, Wilm
Date: 12 August 2003 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland restoration
Legal Description: SE 1/4, NW 1/4, Sec. 35, T. 15 N., R. 2 W
Location: This wetland restoration site is located just north of the Edwards River and just east of US 67.

HYDROLOGY

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

Depth to saturated soil: NA

Overview of hydrological flow through the system: This site is hydrologically influenced by precipitation and overflow from the Edwards River. Water leaves the site via evapotranspiration and sheet flow into the adjacent Edwards River.

Size of Watershed: 699 km² (270 mi²)

Other field evidence observed: None

Wetland hydrology: Yes: No: X

Rationale: No indicators of wetland hydrology were observed. There is no evidence to suggest that this site is inundated or saturated for a sufficient duration to satisfy the wetland hydrology criteria.

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 or undetermined at this time; thus, we determined that this site is currently not a wetland. The NWI coded this site as a temporarily flooded, broad-leaved deciduous, forested, palustrine wetland (PFO1A).

ROUTINE ONSITE WETLAND DETERMINATION

Site 2 (page 3 of 6)

Field Investigators: Feist, Kurylo, Tessene, Wilm
Date: 12 August 2003 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland restoration
Legal Description: SE 1/4, NW 1/4, Sec. 35, T. 15 N., R. 2 W
Location: This wetland restoration site is located just north of the Edwards River and just east of US 67.

SPECIES LIST

Scientific name	Common name	Stratum	Wetland indicator status	Ct
<i>Acalypha rhomboidea</i>	three-seeded mercury	herb	FACU	0
<i>Acer saccharinum</i>	silver maple	shrub, herb	FACW	1
<i>Acer negundo</i>	box elder	shrub, herb	FACW-	1
<i>Agropyron repens</i>	quack grass	herb	FACU	*
<i>Agrostis alba</i>	red top	herb	FACW	0
<i>Amaranthus tuberculatus</i>	tall waterhemp	herb	OBL	1
<i>Ambrosia artemisiifolia</i>	bitterweed	herb	FACU	0
<i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
<i>Asclepias syriaca</i>	common milkweed	herb	UPL	0
<i>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
<i>Apios americana</i>	groundnut	herb	FACW	4
<i>Aster pilosus</i>	hairy aster	herb	FACU+	0
<i>Aster praealtus</i>	willow-leaved aster	herb	FACW	4
<i>Aster simplex</i>	panicked aster	herb	FACW	3
<i>Bidens aristosa</i>	swamp marigold	herb	FACW	1
<i>Bidens connata</i>	purplestem beggar-ticks	herb	OBL	2
<i>Bidens frondosa</i>	common beggar-ticks	herb	FACW	1
<i>Bidens tripartita</i>	beggar-tick	herb	OBL	2
<i>Bromus inermis</i>	awnless brome grass	herb	UPL	*
<i>Calystegia sepium</i>	American bindweed	herb	FAC	1
<i>Carex frankii</i>	sedge	herb	OBL	4
<i>Carex stipata</i>	prickly sedge	herb	OBL	2
<i>Carex vulpinoidea</i>	fox sedge	herb	OBL	3
<i>Cinna arundinacea</i>	stout wood reed	herb	FACW	5
<i>Cirsium vulgare</i>	bull thistle	herb	FACU-	*
<i>Conium maculatum</i>	poison hemlock	herb	FACW	*
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
<i>Coronilla varia</i>	crown vetch	herb	UPL	*
<i>Cryptotaenia canadensis</i>	honestwort	herb	FAC	1
<i>Dactylis glomerata</i>	orchard grass	herb	FACU	*
<i>Daucus carota</i>	Queen-Anne's-lace	herb	UPL	*
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Elymus canadensis</i>	Canada wild rye	herb	FAC-	4

Species list continued on the next page.

ROUTINE ONSITE WETLAND DETERMINATION
Site 2 (page 4 of 6)

Field Investigators: Feist, Kurylo, Tessene, Wilm
Date: 12 August 2003 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland restoration
Legal Description: SE 1/4, NW 1/4, Sec. 35, T. 15 N., R. 2 W
Location: This wetland restoration site is located just north of the Edwards River and just east of US 67.

SPECIES LIST *continued*

Scientific name	Common name	Stratum	Wetland indicator status	C†
<i>Elymus virginicus</i>	Virginia wild rye	herb	FACW-	4
<i>Erigeron annuus</i>	annual fleabane	herb	FAC-	1
<i>Eupatorium serotinum</i>	late boneset	herb	FAC+	1
<i>Festuca pratensis</i>	meadow fescue	herb	FACU-	*
<i>Fraxinus pennsylvanica</i>	green ash	shrub, seedling	FACW	2
<i>Geum canadense</i>	white avens	herb	FAC	2
<i>Gleditsia triacanthos</i>	honey locust	seedling	FAC	2
<i>Glyceria striata</i>	fowl manna grass	herb	OBL	4
<i>Helianthus grosseserratus</i>	sawtooth sunflower	herb	FACW-	2
<i>Helianthus tuberosus</i>	Jerusalem artichoke	herb	FAC	3
<i>Hordeum jubatum</i>	squirrel-tail	herb	FAC+	*
<i>Impatiens capensis</i>	jewelweed	herb	FACW	2
<i>Juncus tenuis</i>	path rush	herb	FAC	0
<i>Juncus torreyi</i>	Torrey's rush	herb	FACW	3
<i>Lactuca biennis</i>	biennial lettuce	herb	FAC	4
<i>Lactuca serriola</i>	prickly lettuce	herb	FAC	*
<i>Laportea canadensis</i>	wood nettle	herb	FACW	2
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Leersia virginica</i>	white grass	herb	FACW	4
<i>Leptochloa fascicularis</i>	bearded sprangle top	herb	OBL	0
<i>Lobelia siphilitica</i>	great blue lobelia	herb	FACW+	4
<i>Lolium perenne</i>	crested rye grass	herb	FACU	*
<i>Lotus corniculatus</i>	birdsfoot-trefoil	herb	FAC-	*
<i>Lycopus uniflorus</i>	nothern bugle weed	herb	OBL	7
<i>Melilotus alba</i>	white sweet clover	herb	FACU	*
<i>Muhlenbergia frondosa</i>	common satin grass	herb	FACW	3
<i>Myosoton aquaticum</i>	giant chickweed	herb	FAC+	*
<i>Oenothera biennis</i>	evening primrose	herb	FACU	1
<i>Oxalis stricta</i>	yellow wood sorrel	herb	FACU	0
<i>Pastinaca sativa</i>	parsnip	herb	UPL	*
<i>Penthorum sedoides</i>	ditch stonecrop	herb	OBL	2
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Phleum pratense</i>	Timothy	herb	FACU	*

Species list continued on next page.

ROUTINE ONSITE WETLAND DETERMINATION
Site 2 (page 5 of 6)

Field Investigators: Feist, Kurylo, Tessene, Wilm
Date: 12 August 2003 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland restoration
Legal Description: SE 1/4, NW 1/4, Sec. 35, T. 15 N., R. 2 W
Location: This wetland restoration site is located just north of the Edwards River
and just east of US 67.

SPECIES LIST *continued*

Scientific name	Common name	Stratum	Wetland indicator status	C†
<i>Poa pratensis</i>	Kentucky bluegrass	herb	FAC-	*
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Polygonum scandens</i>	climbing buckwheat	herb	FAC	2
<i>Populus deltoides</i>	eastern cottonwood	shrub, herb	FAC+	2
<i>Potentilla norvegica</i>	rough cinquefoil	herb	FAC	0
<i>Prunus serotina</i>	wild black cherry	shrub	FACU	1
<i>Rorippa islandica fernaldiana</i>	marsh yellow cress	herb	OBL	4
<i>Rosa multiflora</i>	multiflora rose	shrub	FACU	*
<i>Rudbeckia laciniata</i>	cut-leaf coneflower	herb	FACW+	3
<i>Rumex altissimus</i>	pale dock	herb	FACW-	2
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
<i>Salix exigua</i>	sandbar willow	shrub	OBL	1
<i>Sambucus canadensis</i>	common elder	shrub	FACW-	2
<i>Sanicula odorata</i>	common snakeroot	herb	FAC+	2
<i>Scirpus atrovirens</i>	dark green bulrush	herb	OBL	4
<i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
<i>Setaria glauca</i>	pigeon grass	herb	FAC	*
<i>Solanum dulcamara</i>	false bittersweet	herb	FAC	*
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
<i>Solidago gigantea</i>	late goldenrod	herb	FACW	3
<i>Stachys tenuifolia</i>	slenderleaf betony	herb	OBL	5
<i>Taraxacum officinale</i>	dandelion	herb	FACU	*
<i>Trifolium repens</i>	white clover	herb	FACU+	*
<i>Trifolium pratense</i>	red clover	herb	FACU+	*
<i>Ulmus americana</i>	American elm	shrub	FACW-	5
<i>Urtica dioica</i>	stinging nettle	herb	FAC+	2
<i>Verbena urticifolia</i>	white vervian	herb	FAC+	3
<i>Viola pratensis</i>	common blue violet	herb	FAC	1
<i>Viola sororia</i>	woolly blue violet	herb	FAC-	3
<i>Vitis riparia</i>	riverbank grape	woody vine	FACW-	2
<i>Xanthium strumarium</i>	cocklebur	herb	FAC	0

†Coefficient of Conservatism (Taft et al. 1997)

*Non-native species

$$\bar{C} = \sum C/N = 149/71 = 2.1$$

$$FQI = \bar{C}/\sqrt{N} = 149/\sqrt{71} = 17.7$$

ROUTINE ONSITE WETLAND DETERMINATION
Site 2 (page 6 of 6)

Field Investigators: Feist, Kurylo, Tessene, Wilm
Date: 12 August 2003 **Project Name:** FAP 310 (US 67)
Section No.: 104RS-2, (104)BR, (104-1)BR, 105RS-2
State: Illinois **County:** Mercer **Applicant:** IDOT District 4
Site Name: Wetland restoration
Legal Description: SE 1/4, NW 1/4, Sec. 35, T. 15 N., R. 2 W
Location: This wetland restoration site is located just north of the Edwards River and just east of US 67.

PLANTED TREES

Scientific name	Common name	Stratum	Wetland indicator status	C†
<i>Quercus palustris</i>	pin oak	shrub	FACW	4
<i>Quercus bicolor</i>	swamp white oak	shrub	FACW+	7
<i>Betula nigra</i>	red birch	shrub	FACW	4

†Coefficient of Conservatism (Taft et al. 1997)

Non-native species

$$\bar{C} = \sum C/N = 164/74 = 2.2 \text{ **}$$

$$FQI = \bar{C}/\sqrt{N} = 164/\sqrt{74} = 19.1 \text{ **}$$

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

Determined by: Mary Ann Feist, Paul Tessene, and Brian Wilm
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 (soils and hydrology)
 Illinois Natural History Survey
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 (217) 244-6858 (Feist)

Appendix C

Photographs of Wetland Mitigation Sites



Photo Station 1. View of wetland creation (Site 1) facing northeast.



Photo Station 2. View of wetland creation (Site 1) facing north.



Photo Station 3. View of wetland restoration (Site 2) facing south.



WETLAND RESTORATION (SITE 2)

EDWARDS RIVER

TR 103

EDWARDS RIVER

US ROUTE 67

US ROUTE 67

WETLAND CREATION (SITE 1)

Legend

FAP 310 (US 67)
Section 104RS-2
Mercer County
Mitigation Site Monitoring

Wetland Mitigation Sites 1 & 2

Scale 1:4800

1 in = 400 ft

400 ft



N

Photography station:



Baseline starting point:

