Wetland Mitigation Monitoring Report for the FAP 301 (US 20 – Freeport bypass) site near the Jane Addams Trail (ISGS Site 6W), Stephenson County, Illinois (fourth monitoring year--2010)

Introduction

This report describes the fourth year of monitoring of a wetland mitigation site created to mitigate for wetlands affected by the construction of another set of lanes for the FAP 301 (US 20) bypass around Freeport (Figure 1, Appendix 1). The entire compensation site is 9.6 ha (23.6 acre) and the majority of that area is monitored for wetland creation. Trees were planted on former agricultural fields in the floodplain of the Pecatonica River on 25 May 2006. A drainage-way was plugged with dirt and rocks near its outlet into the oxbow at the west edge of the site on 27 September 2006. Its purpose was to hold water on the site for longer periods.

This report discusses the goals, objectives, and performance criteria for the mitigation project, the methods used for monitoring the site, and monitoring results. Methods and results are discussed for performance criteria for each goal. Wetland determination forms are in Appendix 2 and a map of the mitigation site can be found on Figure 2 in Appendix 1. Photo stations were established and photos can be found in Appendix 3.

Goals, Objectives, and Performance Criteria

The goals, objectives, and performance criteria described below follow those listed in the request to monitor the site (Sunderland 2006). Each goal should be attained by the end of a five-year monitoring period.

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

Objective: The created wetland will be formed through plugging a ditch that drained former crop fields on the site.

Performance criteria:

a. Predominance of hydrophytic vegetation: More than 50% of the dominant plant species must be hydrophytic.

b. Presence of hydric soils: Hydric soil characteristics should be present, or conditions favorable for hydric soil formation should persist at the site.

c. Presence of wetland hydrology: The area must be either permanently or periodically inundated at average depths of less than 2 m (6.6 ft) or be saturated to the surface for at least 5% of the growing season when the site also meets the soils and vegetation criteria or 12.5% of the growing season if the other two criteria are not met.

Project Goal 2: The created wetland community should meet standards for floristic composition and vegetation cover.

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

Performance criteria:

a. Planted species survivorship: At the end of the five-year monitoring period, at least 55 planted trees per acre will be present and healthy in the created wetland site.

b. Native species composition: At the end of the five-year monitoring period, at least 50% of total species should be non-weedy, native perennial species.

c. Dominant plant species: None of the three most dominant plant species in the planned wetland should be non-native or weedy species, such as cattail, sandbar willow, or reed canary grass.

Methods

Project Goal 1

a) Predominance of hydrophytic vegetation

The method for determining dominant hydrophytic vegetation at a wetland site is described in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987), based on areal coverage estimates for individual plant species. Each of the dominant plant species is assigned its wetland indicator rating (Reed 1988). A plant species that is rated facultative or wetter (FAC, FAC+, FACW, or OBL) is considered to be hydrophytic. If more than 50% of the dominant species present are hydrophytic, this criterion of wetlands is met.

b) Occurrence of hydric soils

To monitor hydric soil development, the soil was sampled at various locations within each cover type. Soil profile morphology, including horizon color, texture, and structure was analyzed at representative points throughout the site. Additionally, the presence, type, size, and abundance of redoximorphic features were recorded. In the absence of hydric soil indicators, hydrologic data can be used to confirm that conditions favorable for hydric soil formation persist at the site (Environmental Laboratory 1987).

c) Presence of wetland hydrology

The extent of wetland hydrology at the Freeport Bypass West Potential Wetland Compensation Site 6W was monitored by the Illinois State Geological Survey and is shown on the accompanying figure (Figure 3, Appendix 1) (Miner et al. 2010). The following methods are adapted from that ISGS report and communications with Eric Plankell of the ISGS. An area must be inundated or saturated for no less than 5% of the growing season (9 days at this site) in order to satisfy wetland hydrology criteria using the 1987 Manual, or a minimum of 14 consecutive days when using the 2010 Midwest Region supplement. These areas will be determined to be jurisdictional wetlands if vegetation and soils criteria mentioned above are also met. Areas that are inundated or saturated for greater than 12.5% of the growing season (23 days at this site) satisfy wetland hydrology criteria in a conclusive manner, and strongly indicate wetland conditions, especially where soil and/or vegetation data are inconclusive or slow to respond after site construction activities. To assist in proper characterization of wetland mitigation sites, the ISGS report shows areas that are inundated or saturated for greater than 5% and greater than 12.5% of the growing season. Areas satisfying wetland hydrology criteria

in the 2010 Midwest Region supplement (14 consecutive days during the growing season) are also shown for comparison. Inundation occurs when surface water is present at depths no greater than 2 m (6.6 ft). Saturation occurs when the water table is no deeper than 30 cm (1 ft) below land surface.

Inundation and saturation at the site were monitored using a combination of 15 monitoring wells and 2 staff gauges. Water levels were measured biweekly during April and May, and monthly during the remainder of the year. Manual readings were supplemented by 1 datalogger, which measures surface- and ground-water levels at regular intervals to document all hydrologic events. Additional details regarding site conditions and monitoring results for wetland hydrology in 2010 are summarized in ISGS Annual Report for Active IDOT Wetland Compensation and Hydrologic Monitoring Sites, September 1, 2009 to August 31, 2010 (Miner et al. 2010).

Project Goal 2

a) Planted species survivorship

In May 2006, saplings were planted on the two former crop fields within the wetland mitigation site at the rate of 100 per acre (Illinois Department of Transportation 2005). All living planted trees were counted and identified to species. Apparent dead stems of the planted species were also counted. Planted tree species tallied on the site were *Carya illinoensis, Fraxinus pennsylvanica*, *Platanus occidentalis, Quercus bicolor*, and *Q. palustris. Juglans cinerea* saplings had also been planted on the site as a grouping, but all have died.

b) Native species composition, and

c) Dominant plant species

The entire wetland mitigation site is comprised of two former crop fields, with existing wetland and buffer areas also present. Areas of existing wetland (floodplain forest and a wet meadow drainage-way) and areas where no efforts are being made to restore or create wetlands were excluded from monitoring. Therefore, only the two former crop fields where trees are planted were monitored again this year.

A separate plant species list was made for each of the wetland determination sites, representing the different vegetation cover types of the site. Dominant plant species for each wetland determination site were determined by visual assessment of each area. Planted tree species were added to the species lists for the two wetland determination sites. *Fraxinus pennsylvanica* is listed as planted but also occurs as volunteers on each site from nearby floodplain forest.

To calculate percent perennial, non-weedy native (PNWN) species, the total number of non-weedy (C value >1), native perennials was divided by the total number of species on the site. Trees were included as perennials, but biennials were excluded.

Included with the assessment of a site is the site's Floristic Quality Index, as described by Swink and Wilhelm (1994) and Taft *et al.* (1997). Although the Index is not a substitute for quantitative vegetation analysis in assessing plant communities, it provides a measure of the floristic integrity or level of disturbance of a site. Each plant species native to Illinois is assigned a rating between 0 and 10 (the Coefficient of Conservatism) that is a subjective indicator of how likely a plant may be found on an undisturbed site in a natural plant community. A plant species that has a low Coefficient of Conservatism (C) is likely to tolerate disturbed

conditions; a species with a high c is likely to require specific, undisturbed habitats. Species that are not native to Illinois are not rated.

The Florisitic Quality Index (FQI) is calculated as follows: FQI = R/√N, where R represents the sum of the numerical ratings (C) for all species recorded for a site, and N represents the number of native plant species on the site. The mean C value was also calculated for each site. This value is calculated as follows: mCv = R/N. The C value for each species is shown in the species list for the site. Species not native to Illinois (indicated by * in the species list for each site) are not included in calculations. An Index score below 10 suggests a site of low natural quality; below five, a highly disturbed site. FQI values of 20 or more (mCv > 3.0) suggest that a site has evidence of native character and may be considered an environmental asset. Sites with FQI values of 35 of more (mCv > 3.5) are considered to be of natural area quality.

Results and discussion

Project goal 1

a) Predominance of hydrophytic vegetation

Dominant plant species for each of the wetland determination sites are presented in Tables 1 and 2. Site 1 continues to lack dominant hydrophytic vegetation. A full list of plant species observed is presented in the wetland determination forms within Appendix 2.

Table 1 - Dominant plant species in the non-native grassland at wetland determination Site 1.

Dominant Plant Species	Indicator Status	Stratum
1. *Phalaris arundinacea*	FACW+	herb
2. *Poa pratensis*	FAC-	herb

Table 2 - Dominant plant species in the wet meadow at wetland determination Site 2.

Dominant Plant Species	Indicator Status	Stratum
1. *Elymus virginicus*	FACW-	herb
2. *Phalaris arundinacea*	FACW+	herb
3. *Poa pratensis*	FAC-	herb

b) Presence of hydric soils

The NRCS mapped the poorly drained Sawmill silty clay loam and a wetter version of that series over the vast majority of the site. The somewhat poorly drained Lawson silt loam was mapped in the very northeast portion of the project area (Ray et al. 1976).

Based on annual on-site soil sampling since 2007, a map showing the approximate extent of hydric soil on the mitigation site can be found on Figure 2 in Appendix 1. The line demarking hydric from non-hydric soil on Figure 2 is approximated from field observations and has not been mapped on-site for accuracy at this time. A more accurate delineation of the hydric/non-hydric soil line will be made in year 5, which is next year.

Dickinson sandy loam, a well drained soil, is found in the northeast corner of the compensation site (Site 1). This sloping area has a low likelihood of developing hydric soil. The soil sample taken within Site 1 this year was taken lower on the slope than years past and appears to be transitional between non-hydric and hydric soils. It is non-hydric and further described in Table 3. Batavia silt

loam (Table 4) is a well to moderately-well drained soil mapped on the western portion of the monitoring area. Batavia silt loam covers the largest extent of all the soil mapping units within the monitored areas. The likelihood of this soil becoming hydric is undetermined and will be largely dependant on site hydrology. Sawmill silty clay loam, a poorly drained soil, is mapped within and along the wet meadow drainage-way running through the northeast corner and along the eastern side of the monitoring area. Thorp silt loam, a poorly drained soil, is mapped between the Sawmill and Batavia soils. This soil makes up the majority of the hydric soils within the monitored areas. Soil sampling for 2010 concentrated on areas outside of those that appeared to likely posses hydric soils, thereby capturing transitional soils. These soils had hydric soil indicators. A description of a typical transitional soil found on this site can be found in Table 5.

Table 3 – Non-hydric soil sample from the northeast corner of the tree planting area (Site 1)

Depth [cm]	Matrix Color	Redox Concentrations	Redox Depletions	Texture	Structure
0-20	10YR 2/1	-	-	silty clay loam	subangular blocky
20-38	10YR 3/2.5	-	7.5YR 4/1 (20%)	silty clay loam	subangular blocky
38-51	10YR 3/2.5	7.5YR 2.5/1 (5%) & 2% concretions	-	silty clay loam	subangular blocky

Table 4 - Dominant non-hydric soil from both tree planting areas (Site 2) (Batavia silt loam)

Depth [cm]	Matrix Color	Redox Concentrations	Redox Depletions	Texture	Structure
0-20	10YR 2/1		-	silty clay loam	subangular blocky
20-61	10YR 4/3	-	-	clay loam	subangular blocky

Table 5 – A transitional hydric soil from both tree planting areas (Site 2)

Depth [cm]	Matrix Color	Redox Concentrations	Redox Depletions	Texture	Structure
0-18	10YR 2/1	10YR 3/6 (5%)	-	silt loam - silty clay loam	subangular blocky
18-46	10YR 3/3 (75 %) & 10YR 2/1 (15%)	-	10YR 4/1 (10%)	light silty clay loam	subangular blocky
46-61	10YR 3/3	-	10YR 4/2 (20%)	silt loam to light silty clay loam	subangular blocky

c) Presence of wetland hydrology

Field evidence of wetland hydrology included low landscape position over portions of the site (particularly adjacent to the preexisting wet meadow drainage-way), drift material, wetland drainage patterns, and areas of saturated soils, algal mats, sediment deposits on vegetation, and a few sparsely vegetated concave areas.

Well data from instruments placed by ISGS personnel estimated that 8.1 ha (20.1 ac) of the site met the wetland hydrology criterion for at least 12.5% of the 2010 growing season, while 9.4 ha (23.3 ac) met the criterion for 5% of the 2010 growing season. Using the 2010 Midwest Region supplement (United States Army Corps of Engineers 2010) to the 1987 Manual, it is estimated that 9.1 ha (22.4 ac) satisfied wetland hydrology criteria for 14 or more consecutive days during the growing season (Figure 3, Appendix 1). The site experienced above normal rainfall again this year and extended flooding on the Pecatonica River in July contributed to the wetland hydrology of this site (Miner et al. 2010).

Project Goal 2

a) Survival of planted trees

Table 6 presents data for planted tree survival, with numbers of observed live and apparent dead stems. Density of live stems per acre of each species is also listed. For the purposes of this calculation an estimated area of 6.9 ha (17.1 ac) was determined to be planted in trees.

Table 6 - Observed survival of planted trees in 2009

Species	Total stems Observed	(north field)	(south field)	Total density live/acre	(live/ha)
Carya illinoensis	242	213	29	14.1	(34.9)
Fraxinus pennsylvanica	279	259	20	16.3	(40.3)
Platanus occidentalis	207	191	16	12.1	(29.9)
Quercus bicolor	217	194	23	12.7	(31.3)
Quercus palustris	289	268	21	16.9	(41.7)
Total live stems	1234	1125	109	72.0	(178.1)
Dead	367	317	50		

In the fourth year of observation, many of the planted trees still seem to be doing well. Survival continues to exceed the project goal of 55 established planted trees/acre. Despite continuing to make the project goal there was a seemingly large decline in total live stems to 1234 after two years of relative stability with 1359 in 2009 and 1339 in 2008 (Kurylo et al. 2008 and 2009). While the exact cause has not been investigated, wire cages on some of the saplings, particularly along the northern portion of the drainage-way, continue to cause problems. Water rushes through the site along the drainage-way and causes the saplings to rub the top of the cages generating wounds that often appear to kill the saplings above that point. If the cages also become mangled this hampers growth and resprouting efforts by the saplings.

Seedlings and small shrub-sized individuals of native trees were also observed on the tree planting areas. These will continue to come in from surrounding woodlands and hasten the development of the planned wetland areas on the mitigation site as floodplain forest.

b) Native species composition and

c) Dominant plant species

Among the project goals for the mitigation site are that a majority of species on the site be native, non-weedy perennials, and that none of the dominant species be non-native or weedy species such as reed canary grass, cattail, or sandbar willow. Table 7 presents the total number of plant species,

number of native species, perennial non-weedy native species (PNWN) and percent of PNWN species for each of the wetland determination sites within the wetland mitigation site.

Table 7 - Percent perennial, non-weedy native species (PNWN)

Site #	Total species	Native	PNWN	% PNWN
1 non-native grassland	41	28	19	46.3
2 wet meadow	70	61	41	58.6

Again this year site 1 does not meet the goal of greater than 50% perennial, non-weedy native species. Site 2 now meets the percent PNWN goal. The number of perennial, non-weedy native species would normally be expected to increase over time. Despite the gains in percent PNWN for site 2 the total number of species decreased by 11 while the number of natives stayed the same. Concurrently, the number of PNWN increased over the last year by 8 (Kurylo et al. 2009). Site 1 had increases across each category: 13 more total species, of which 7 were perennial, non-weedy natives. The dominant species for both sites are primarily non-native, weedy species.

The existing wet meadow drainage-way continues to have *Phalaris arundinacea* (reed canary grass) as a dominant. This non-native, aggressive perennial grass can spread quickly by seed and rhizomes under suitable conditions, and is very likely to invade the restoration area. This species was common before the mitigation site was established (Plankell and Weaver-Miner 2007). The project goal that more than 50% native, non-weedy species dominate the site is threatened by this species, as well as the goal that *Phalaris* not be a dominant on the site. Control with herbicides and/or well-timed mowings or burnings should be considered, being careful to avoid other, more desirable, vegetation.

Summary and Recommendations

Precipitation was above average again this year, but only one major flood event occurred on the Pecatonica River. This year most of the site met the wetland hydrology criterion for both 5% and 12.5% of the growing season.

Planted tree species continue to do well, exceeding project goals. Natural colonization by woody species from the surrounding wetlands will also continue to augment tree density. Effort should be made to remove the wire cages from the trees along the wet meadow drainage-way in the northeastern portion of the site. Many of the trees have severe bark rubbing or the cage is disfigured enough to impede the growth/resporouting of the trees. Additionally, all the *Juglans cinerea* that were planted in the northwest portion of the site are long dead.

From Figure 2 (Appendix 1), the area meeting all three wetland criteria can be discerned by locating the area of hydric soil. This area is approximately 2.8 ha (6.9 ac). Next year is the fifth year of monitoring. At that time a more detailed in field accounting of the extent of hydric soils on the site will be made.

Phalaris arundinacea (reed canary grass) is a continued threat to the project's goal for native species dominance. It is common in areas surrounding the site and is the only dominant in the wet meadow drainageway running through the restoration site. *Phalaris* has been a dominant on site 1 and has now become a dominant on site 2. This is the fourth year of monitoring and *Phalaris* is now a dominant across the whole site. Without some concentrated control efforts the

5-year project objectives, particularly Project Goal 2, Performance Criteria c, will not be attainable. Given that the overall goal for this site is to create floodplain forest, the long term dominance of *Phalaris* may be diminished as the forest canopy closes and shades the site (Hovick and Reinartz 2007).

Phalaris arundinacea is rhizomatous and has non-dormant seeds creating a ready-to-germinate seed bank (Apfelbaum and Sams 1987). The literature suggests that a one-time application of herbicide, burning, or mowing will only reduce the species biomass temporarily (Lavergne and Molofsky 2006, Wilcox et al. 2007). A common practice of land managers for *Phalaris* abatement is a spring burn followed by spring herbicide treatment, but this often achieves only short term effectiveness. A spring burn followed by a late August or late September application of glyphosate was found to be more effective, although still a short term solution (Adams and Galatowitsch 2006). Rodeo®, a formulation of glyphosate recommended for wetlands, has been found to be effective in a handful of studies, but again, only in the short term (Lavergne and Molofsky 2006).

For long term control, efforts spread out over the year and over multiple years are found to be more effective. An Iowa study found reduced coverage of *Phalaris* in open areas of an oak savannah after 2-4 burns over 7 years (Dettman and Mabry 2008). An Illinois Nature Preserve was able to push back and keep *Phalaris* at its margins with burns every 2-3 years (Apfelbaum and Rouffa 1983). According to Lavergne and Molofsky (2006), the most effective methods combine both chemical and physical practices for the long term control of *Phalaris*. A suggestion for the areas of this site where *Phalaris* is a problem, namely the existing wet meadow drainageway and the northwest corner of the site, may include a spring application of Rodeo® followed by mowing in the early fall of the same year, hydrology permitting. In the second year conservative application of Rodeo® in the fall, followed in the third year with a spring burn is recommended. Burning would be of concern where the planted trees are densely surrounded by *Phalaris* as the trees may not be old enough, or their bark thick enough, to withstand a low intensity fire. By applying herbicide and mowing in the first few years before burning, the amount of fuel and area needing to be burned should hopefully be reduced.

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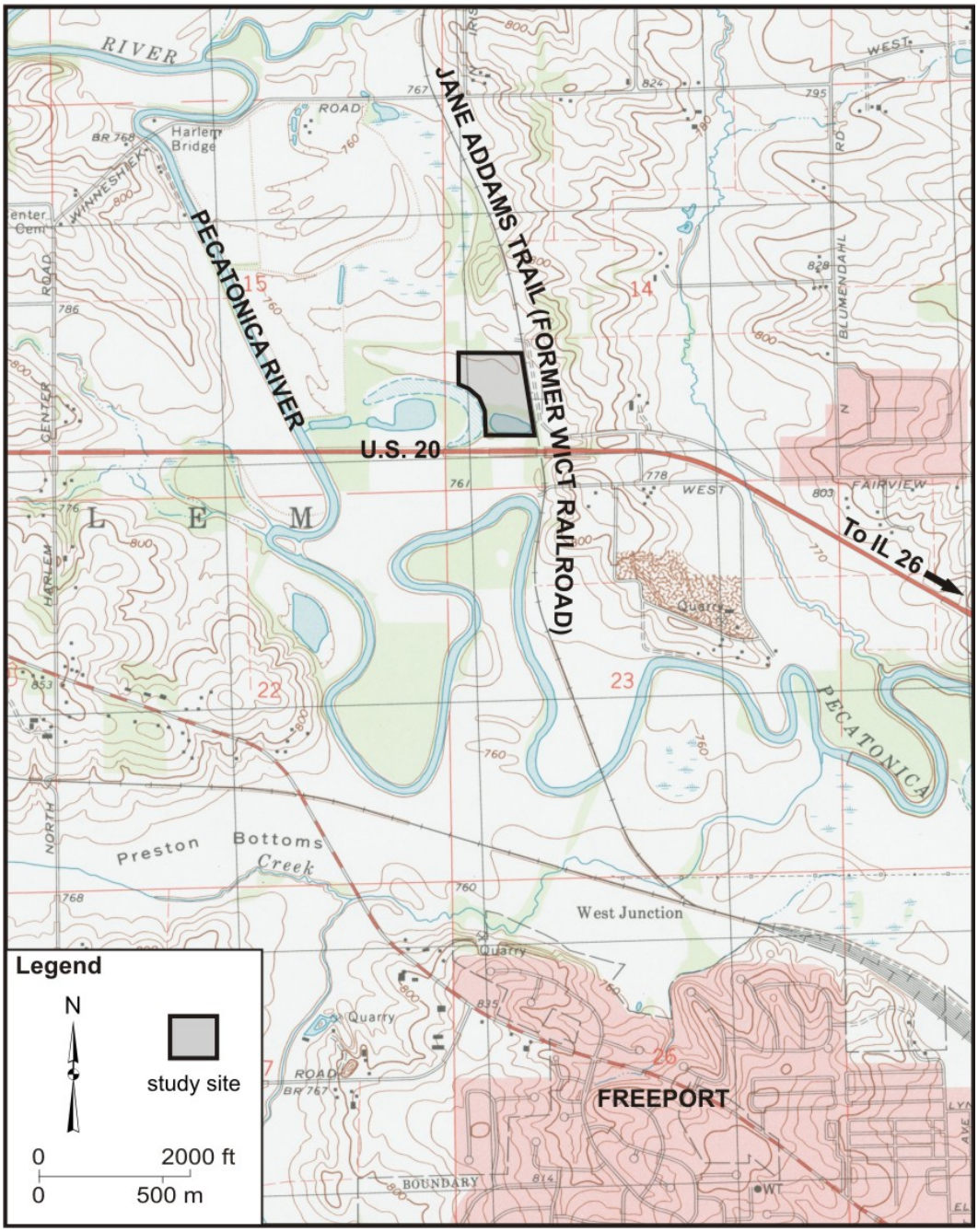
Appendix 1

Figures 1 – Mitigation Site Location Map
Figure 2 – Wetland Determination and Hydric Soil Map
Figure 3 – ISGS Mitigation Site Hydrology Map

Figure 1
Mitigation Site Location Map

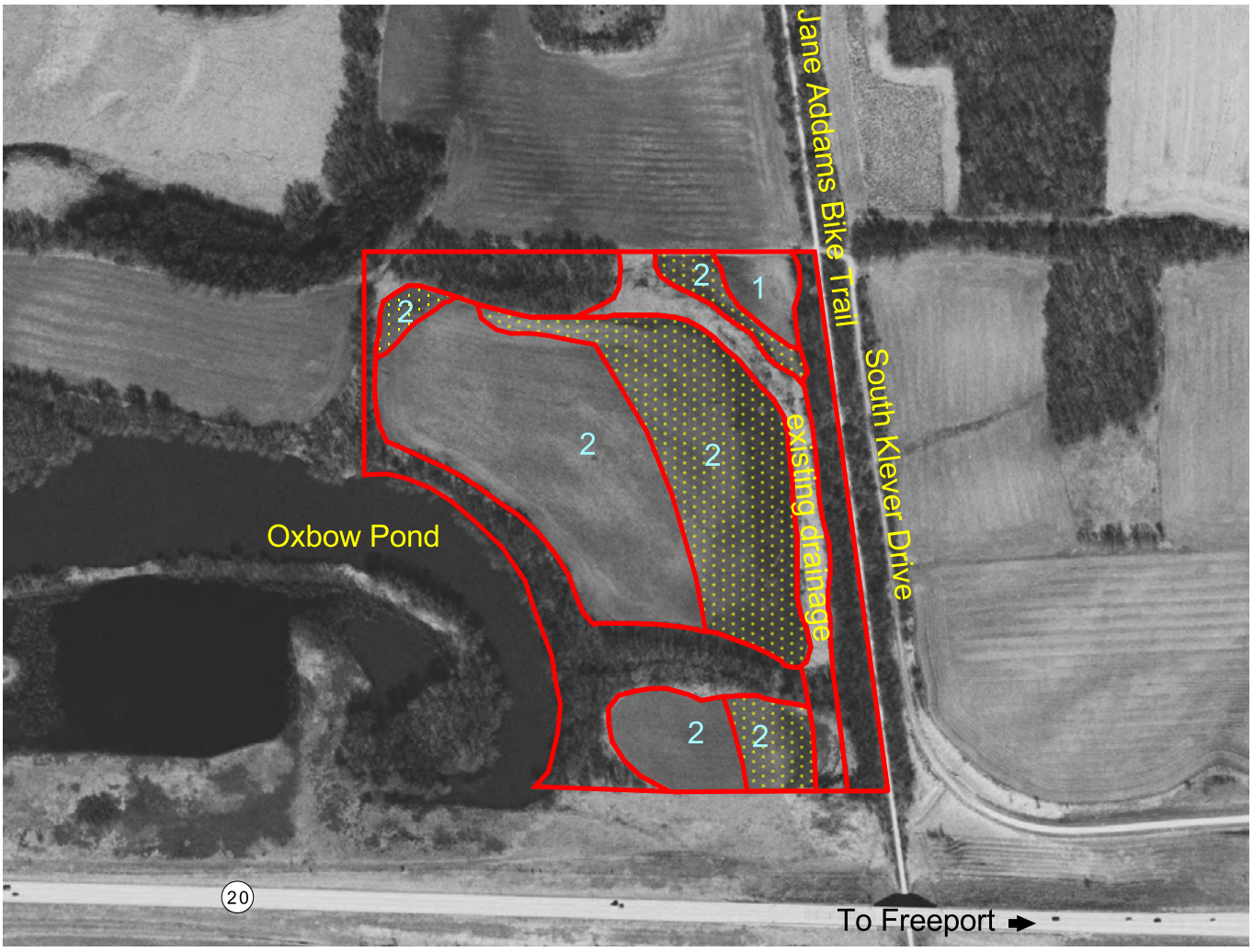
Freeport Bypass West
Wetland Mitigation Site 6W
(FAP 301 [US 20])
General Study Area and Vicinity
from the USGS Topographic Series, Freeport West, IL, 7.5-minute Quadrangle (USGS 1998)
contour interval is 10 feet



Miner et al. 2010

Figure 2
Wetland Determination and Hydric Soils Map

Jane Addams Bike Trail Wetland Mitigation Site
Stephenson County - 2010



0 400 800 Feet

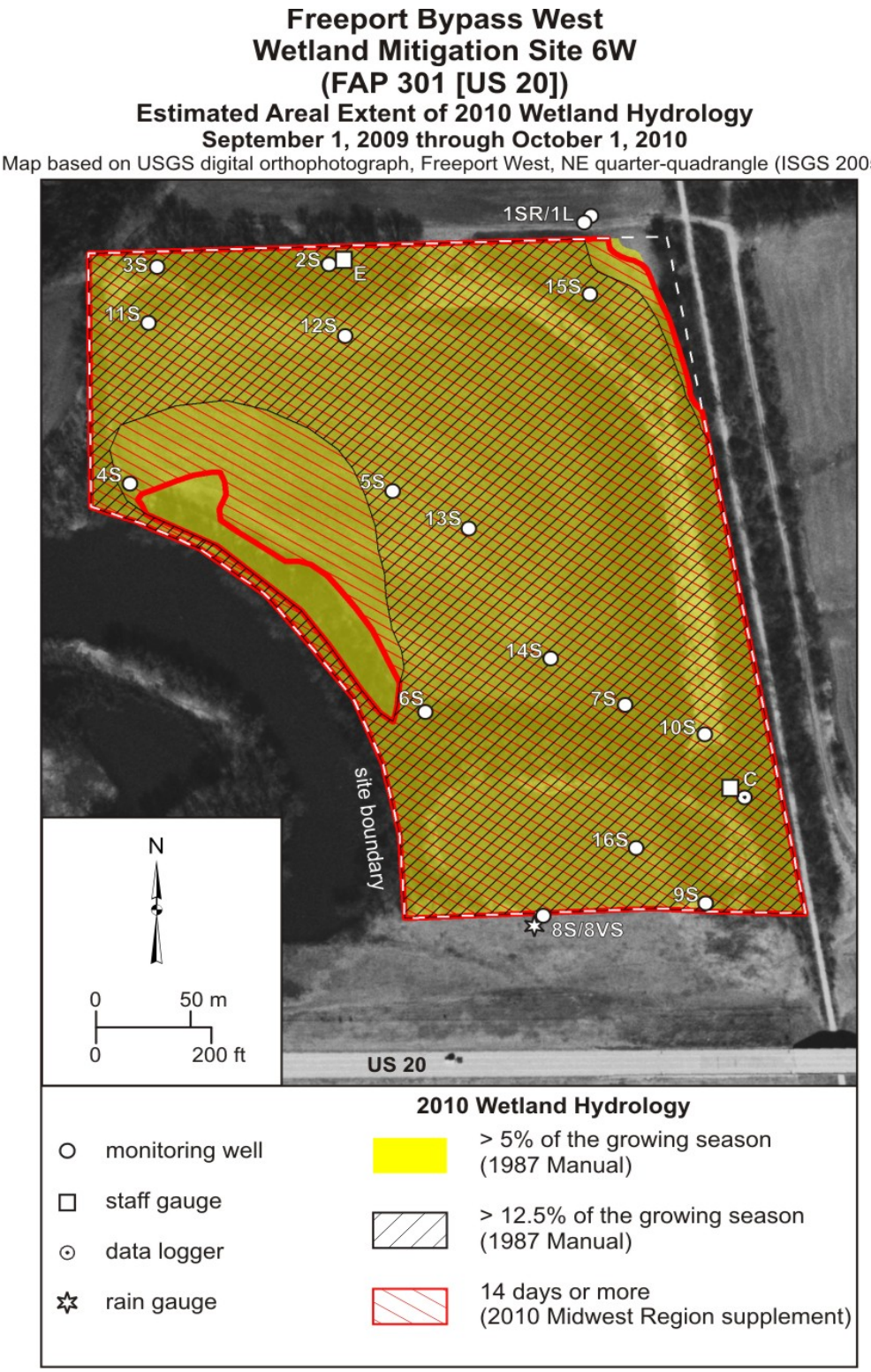
0 100 200 Meters

Approximate extent of hydric soil
Project boundary and wetland sites

N
W E
S

01/11

Figure 3
ISGS Mitigation Site Hydrology Map



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Appendix 2

Wetland Determination Forms

ROUTINE ONSITE WETLAND DETERMINATION

Field Investigators: Kurylo, Matthews, Zylka, and Wilm **Date:** 21 September 2010
Job No.: P92-029-02 **Project Name:** FAP 301 (US 20-Freeport bypass)
State: Illinois **County:** Stephenson **Applicant:** IDOT District 2
Site name: non-native grassland
Legal Description: SW/4, SW/4, SW/4, Sec. 14, T.27N., R.7E.
Location: Former crop field in the northeast corner of the mitigation site.

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. *Phalaris arundinacea*	FACW+	herb
2. *Poa pratensis*	FAC-	herb

Percentage of dominant species that are OBL, FACW, or FAC: 50%

Hydrophytic vegetation? Yes: No: X
Rationale: Not more than 50% of the dominants are OBL, FACW, or FAC.

SOILS

Series and phase: NRCS mapped as Lawson silt loam, revised to undetermined
On Stephenson County hydric soils list? Yes: No: X
Is the soil a histosol? Yes: No: X
Histic epipedon present? Yes: No: X
Redox concentrations? Yes: No: X Color: N/A
Redox depletions? Yes: X No: Color: 7.5YR 4/1
Matrix color: 10YR 2/1 over 10YR 3/2.5
Other indicators: Most of this site is situated on a slope above the rest of the project area.

Hydric soils: Yes: No: X
Rationale: This soil has a subsurface matrix color too bright to be considered hydric.

ROUTINE ONSITE WETLAND DETERMINATION
Site 1 (page 2 of 4)

Field Investigators: Kurylo, Matthews, Zylka, and Wilm **Date:** 21 September 2010
Job No.: P92-029-02 **Project Name:** FAP 301 (US 20-Freeport bypass)
State: Illinois **County:** Stephenson **Applicant:** IDOT District 2
Site name: non-native grassland
Legal Description: SW/4, SW/4, SW/4, Sec. 14, T.27N., R.7E.
Location: Former crop field in the northeast corner of the mitigation site.

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: None
Depth to saturated soil: More than 0.5 m (20 in)
Overview of hydrologic flow through system: Precipitation, sheet flow, and rare overflow from the Pecatonica River contribute water to this site. Water leaves the site by evapotranspiration, soil infiltration, and sheet flow to Site 2 and the drainage-way running through the restoration site.
Size of watershed: approximately 3359 km^2 (1297 mi^2) (Ishii et al. 2010)
Other field evidence observed: This site is located on a slope at the edge of a floodplain.

Wetland hydrology: Yes: No: X
Rationale: This site is on a slope and at an elevation that appears to rarely flood in normal years. The ISGS did not find most of this site to have wetland hydrology for even 5% of the 2010 growing season (Figure 2, Appendix 2) (Miner et al. 2010).

WETLAND DETERMINATION AND RATIONALE

Is the site a wetland? Yes: No: X
Rationale: The site does not posses any of the three criteria for a wetland.

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ROUTINE ONSITE WETLAND DETERMINATION
Site 1 (page 3 of 4)

Field Investigators: Kurylo, Matthews, Zylka, and Wilm **Date:** 21 September 2010
Job No.: P92-029-02 **Project Name:** FAP 301 (US 20-Freeport bypass)
State: Illinois **County:** Stephenson **Applicant:** IDOT District 2
Site name: non-native grassland
Legal Description: SW/4, SW/4, SW/4, Sec. 14, T.27N., R.7E.
Location: Former crop field in the northeast corner of the mitigation site.

SPECIES LIST

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
Acer negundo	box elder	herb	FACW-	1
Acer saccharinum	silver maple	herb	FACW	1
Ambrosia artemisiifolia	common ragweed	herb	FACU	0
Apocynum cannabinum	dogbane	herb	FAC	2
Asclepias incarnata	swamp milkweed	herb	OBL	4
Aster ontarionis	Ontario aster	herb	FAC	4
Aster pilosus	hairy aster	herb	FACU+	0
Bidens comosa	beggar's ticks	herb	OBL	2
Boehmeria cylindrica	false nettle	herb	OBL	3
Carex sp.	sedge	herb	-----	--
†*Carya illinoensis*	pecan	sapling	FACW	6
Cichorium intybus	chickory	herb	UPL	*
Cornus obliqua	pale dogwood	herb	FACW+	4
Daucus carota	Queen Anne's lace	herb	UPL	*
Elymus virginicus	Virginia wild rye	herb	FACW-	4
†*Fraxinus pennsylvanica*	green ash	sapling, herb	FACW	2
Gleditsia triacanthos	honey locust	herb	FAC	2
Lycopus americanus	common water horehound	herb	OBL	3
Lycopus virginicus	bugle weed	herb	OBL	5
Lysimachia nummularia	moneywort	herb	FACW+	*
Pastinaca sativa	parsnip	herb	UPL	*
Penthorum sedoides	ditch stonecrop	herb	OBL	2
Persicaria punctata	dotted smartweed	herb	OBL	3
Persicaria vulgaris	spotted lady's thumb	herb	FACW	*
Phalaris arundinacea	reed canary grass	herb	FACW+	*
Plantago rugelii	red-stalked plantain	herb	FAC	0
†*Platanus occidentalis*	sycamore	sapling	FACW	3
Poa pratensis	Kentucky bluegrass	herb	FAC-	*
Populus deltoides	eastern cottonwood	herb	FAC+	2
†*Quercus bicolor*	swamp white oak	sapling	FACW+	7
†*Quercus palustris*	pin oak	sapling	FACW	4
Rosa multiflora	multiflora rose	shrub	FACU	*
Rubus pensylvanicus	blackberry	shrub	FAC-	2

Species list continues on next page

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

Field Investigators: Kurylo, Matthews, Zylka, and Wilm **Date:** 21 September 2010
Job No.: P92-029-02 **Project Name:** FAP 301 (US 20-Freeport bypass)
State: Illinois **County:** Stephenson **Applicant:** IDOT District 2
Site name: non-native grassland
Legal Description: SW/4, SW/4, SW/4, Sec. 14, T.27N., R.7E.
Location: Former crop field in the northeast corner of the mitigation site.

SPECIES LIST, Continued

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
Rumex crispus	curly dock	herb	FAC+	*
Setaria glauca	pigeon grass	herb	FAC	*
Solanum carolinense	horse nettle	herb	FACU-	0
Solidago canadensis	Canada goldenrod	herb	FACU	1
Taraxacum officinale	common dandelion	herb	FACU	*
Toxicodendron radicans	poison ivy	herb	FAC+	1
Trifolium pratense	red clover	herb	FACU+	*
Vitis riparia	riverbank grape	herb	FACW-	2

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

With planted species:
mCv = ∑C/N = 70/28 = 2.5
FQI = ∑C/√N = 70/√28 = 13.2
Without planted species:
mCv = ∑C/N = 50/24 = 2.1
FQI = ∑C/√N = 50/√24 = 10.2

ROUTINE ONSITE WETLAND DETERMINATION

Field Investigators: Kurylo, Matthews, Zylka, and Wilm **Date:** 21 September 2010
Job No.: P92-029-02 **Project Name:** FAP 301 (US 20-Freeport bypass)
State: Illinois **County:** Stephenson **Applicant:** IDOT District 2
Site name: wet meadow
Legal Description: SW/4, SW/4, SW/4, Sec. 14, T.27N., R.7E.
Location: The majority of the former crop fields away from the drainage-way running along the east side of the mitigation site.

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. *Elymus virginicus*	FACW-	herb
2. *Phalaris arundinacea*	FACW+	herb
3. *Poa pratensis*	FAC-	herb

Percentage of dominant species that are OBL, FACW, or FAC: 66.7%

Hydrophytic vegetation? Yes: X No:
Rationale: Greater than 50% of the dominants are OBL, FACW, or FAC.

SOILS (see Figure 1 in Appendix 2 for approximate extents)
Series and phase: Thorp silt loam (eastern part of site), Batavia silt loam (western part of site), and a transitional soil was also found on the site
On Stephenson County hydric soils list? Yes: X (Thorp) No:
Is the soil a histosol? Yes: No: X
Histic epipedon present? Yes: No: X
Redox concentrations? Yes: X No: (Thorp and transitional soil)
Redox depletions? Yes: X No: (Thorp and transitional soil)
Matrix color: 10YR 2/1 over 10YR 4/2 (Thorp), 10YR 3/1 over 10YR 4/3 (Batavia), 10YR 2/1 over 10YR 3/3 (80%) with 10YR 2/1 (20%) (transitional)
Other indicators: Soft masses in the subsurface horizons were found in the Thorp soils and hard concretions were found in the transitional soils.
Hydric soils: Yes: X (in parts) No:
Rationale: The Natural Resources Conservation Service classifies Thorp as poorly drained and Batavia as well to moderately well drained soil. Approximately half the soil on this site is the non-hydric Batavia, the other half of the soil consists of the hydric Thorp and to a lesser extent hydric transitional soils. Thorp soils have a low chroma over depleted matrix with prominent redox concentrations. The transitional soils also have a low chroma matrix in the surface horizon with redox concentrations. These characteristics are evidence of a hydric soil and they meet the A11 hydric soil indicator from the NRCS.

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

Field Investigators: Kurylo, Matthews, Zylka, and Wilm **Date:** 21 September 2010
Job No.: P92-029-02 **Project Name:** FAP 301 (US 20-Freeport bypass)
State: Illinois **County:** Stephenson **Applicant:** IDOT District 2
Site name: wet meadow
Legal Description: SW/4, SW/4, SW/4, Sec. 14, T.27N., R.7E.
Location: The majority of the former crop fields away from the drainage-way running along the east side of the mitigation site.

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: None
Depth to saturated soil: 0.8 m (30 in) or greater
Overview of hydrologic flow through system: Precipitation, sheet flow, and overflow from the Pecatonica River and drainage-way running through the compensation site contribute water to this site. Water leaves the site by evapotranspiration, soil infiltration, and sheet flow to the drainage-way. This site slopes down from west along the oxbow pond to east where the wet meadow drainage-way lays.
Size of watershed: approximately 3359 km^2 (1297 mi^2) (Ishii et al. 2010)
Other field evidence observed: This site is within a floodplain. Saturated areas were present with the adjacent drainage-way. Drift, algal mats, and areas of sparsely vegetated concave surfaces were observed.

Wetland hydrology: Yes: X No:
Rationale: ISGS calculations suggest that most of the site met the wetland hydrology criterion for both 5% and 12.5% of the 2010 growing season (Figure 2, Appendix 2) (Miner et al. 2010).

WETLAND DETERMINATION AND RATIONALE

Is the site a wetland? Yes: No: Undetermined: X
Rationale: Despite dominant hydrophytic vegetation over the site as a whole and wetland hydrology over most of the site this year, hydric soils do not exist over the whole site.

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ROUTINE ONSITE WETLAND DETERMINATION
Site 2 (page 3 of 5)

Field Investigators: Kurylo, Matthews, Zylka, and Wilm **Date:** 21 September 2010
Job No.: P92-029-02 **Project Name:** FAP 301 (US 20-Freeport bypass)
State: Illinois **County:** Stephenson **Applicant:** IDOT District 2
Site name: wet meadow
Legal Description: SW/4, SW/4, SW/4, Sec. 14, T.27N., R.7E.
Location: The majority of the former crop fields away from the drainage-way running along the east side of the mitigation site.

SPECIES LIST

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
Abutilon theophrasti	velvet-leaf	herb	FACU-	*
Acalypha rhomboidea	three-seeded mercury	herb	FACU	0
Acer negundo	box elder	tree	FACW-	1
Acer saccharinum	silver maple	tree	FACW	1
Alisma plantago-aquatica	broad-leaf water-plantain	herb	OBL	2
Amaranthus tuberculatus	tall waterhemp	herb	OBL	1
Ambrosia artemisiifolia	common ragweed	herb	FACU	0
Ambrosia trifida	giant ragweed	herb	FAC+	0
Apocynum cannabinum	dogbane	herb	FAC	2
Asclepias incarnata	swamp milkweed	herb	OBL	4
Asclepias syriaca	common milkweed	herb	UPL	0
Aster ontarionis	Ontario aster	herb	FAC	4
Aster pilosus	hairy aster	herb	FACU+	0
Aster simplex	panicled aster	herb	FACW	3
Bidens frondosa	common beggar's ticks	herb	FACW	1
Boehmeria cylindrica	false nettle	herb	OBL	3
Bolboschoenus fluviatilis	river bulrush	herb	OBL	3
Boltonia asteroides	false aster	herb	FACW	5
Carex sp.	sedge	herb	-----	--
†*Carya illinoensis*	pecan	shrub	FACW	6
Cirsium arvense	Canada thistle	herb	FACU	*
Cyperus esculentus	yellow nut-sedge	herb	FACW	0
Dioscorea villosa	wild yam	herb	FAC-	4
Echinochloa muricata	barnyard grass	herb	OBL	0
Eleocharis acicularis	needle spike rush	herb	OBL	3
Eleocharis obtusa	blunt spike rush	herb	OBL	2
Elymus virginicus	Virginia wild rye	herb	FACW-	4
††*Fraxinus pennsylvanica*	green ash	shrub, herb	FACW	2
Geum canadense	white avens	herb	FAC	2
Gleditsia triacanthos	honey locust	herb	FAC	2
Laportea canadensis	wood nettle	herb	FACW	2
Leersia oryzoides	rice cutgrass	herb	OBL	3

Species list continues on next page

ROUTINE ONSITE WETLAND DETERMINATION
Site 2 (page 4 of 5)

Field Investigators: Kurylo, Matthews, Zylka, and Wilm **Date:** 21 September 2010
Job No.: P92-029-02 **Project Name:** FAP 301 (US 20-Freeport bypass)
State: Illinois **County:** Stephenson **Applicant:** IDOT District 2
Site name: wet meadow
Legal Description: SW/4, SW/4, SW/4, Sec. 14, T.27N., R.7E.
Location: The majority of the former crop fields away from the drainage-way running along the east side of the mitigation site.

SPECIES LIST, continued

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
† *Lemna minor*	common duckweed	herb	OBL	3
Lycopus virginicus	bugle weed	herb	OBL	5
Lysimachia lanceolata	lance-leaved loosestrife	herb	FAC	6
Lysimachia nummularia	moneywort	herb	FACW+	*
Morus alba	white mulberry	sapling, herb	FAC	*
Panicum dichotomiflorum	fall panicum	herb	FACW-	0
Parthenocissus quinquefolia	Virginia creeper	herb	FAC-	2
Penthorum sedoides	ditch stonecrop	herb	OBL	2
Persicaria amphibium	water smartweed	herb	OBL	3
Persicaria hydropiper	common smartweed	herb	OBL	*
Persicaria pensylvanica	giant smartweed	herb	FACW+	1
Persicaria punctata	dotted smartweed	herb	OBL	3
Phalaris arundinacea	reed canary grass	herb	FACW+	*
Physostegia virginiana	false dragonhead	herb	FACW	6
Pilea pumila	Canada clearweed	herb	FACW	3
†*Platanus occidentalis*	sycamore	shrub	FACW	3
Poa pratensis	Kentucky bluegrass	herb	FAC-	*
Populus deltoides	eastern cottonwood	herb	FAC+	2
Portulaca oleracea	purslane	herb	FAC-	*
†*Quercus bicolor*	swamp white oak	shrub	FACW+	7
†*Quercus palustris*	pin oak	shrub	FACW	4
Rorippa palustris	marsh yellow cress	herb	OBL	4
Rosa multiflora	multiflora rose	shrub	FACU	*
Rudbeckia laciniata	cutleaf coneflower	herb	FACW+	3
Rumex altissimus	pale dock	herb	FACW-	2
Rumex crispus	curly dock	herb	FAC+	*
Sagittaria latifolia	arrowhead	herb	OBL	4
Salix nigra	black willow	shrub, herb	OBL	3
Schoenoplectus tabernaemontani	great bulrush	herb	OBL	4
Scutellaria lateriflora	mad-dog skullcap	herb	OBL	4
Setaria faberi	giant foxtail	herb	FACU+	*
Setaria glauca	pigeon grass	herb	FAC	*

Species list continues on next page

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

Field Investigators: Kurylo, Matthews, Zylka, and Wilm **Date:** 21 September 2010
Job No.: P92-029-02 **Project Name:** FAP 301 (US 20-Freeport bypass)
State: Illinois **County:** Stephenson **Applicant:** IDOT District 2
Site name: wet meadow
Legal Description: SW/4, SW/4, SW/4, Sec. 14, T.27N., R.7E.
Location: The majority of the former crop fields away from the drainage-way running along the east side of the mitigation site.

SPECIES LIST, Continued

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
Sium suave	water parsnip	herb	OBL	5
Smilax hispida	bristly greenbrier	herb	FAC	3
Solanum carolinense	horse nettle	herb	FACU-	0
Sparganium eurycarpum	burreed	herb	OBL	5
Stachys tenuifolia	slenderleaf betony	herb	OBL	5
Taraxacum officinale	common dandelion	herb	FACU	*
Teucrium canadense	American germander	herb	FACW-	3
Toxicodendron radicans	poison ivy	herb	FAC+	1
Typha angustifolia	narrow-leaved cattail	herb	OBL	*
Typha latifolia	cattail	herb	OBL	1
Viola pratincola	common blue violet	herb	FAC	1
Vitis riparia	riverbank grape	herb	FACW-	2

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

With planted species:
mCv = ∑C/N = 160/61 = 2.6
FQI = ∑C/√N = 160/√61 = 20.5
Without planted species:
mCv = ∑C/N = 140/57 = 2.5
FQI = ∑C/√N = 140/√57 = 18.5

Appendix 3

Photos

Photo Station 1 – South field, northeast corner looking southwest.

Photo Station 2 – South field, southwest corner looking northeast.

Photo Station 3 – North field, southwest corner looking northeast.

Photo Station 4 – North field, northwest corner looking southeast.

Photo Station 5 – North field, northeast corner looking southwest.

Photo Station 6 – North field, southeast corner looking northwest.