WETLAND MITIGATION SITE MONITORING REPORT
FAP 313 (U.S 34) Henderson County

Summary

Based on observations made during the 1999 season, the following is a summary that relates the likelihood that the compensation site will meet each goal within the 5 year monitoring period. The goal, objective, and performance standards follow those outlined in the IDOT monitoring request (15 January, 1999).

Project goal : To create a 10.13 acre (4.1 ha) emergent wetland.

Hydrophytic vegetation, hydric soils, and wetland hydrology are currently present. This site does not comply with all of the performance standards. It currently meets the required floristic quality index (FQI) but not the mean coefficient of conservatism (mean C). The native mean wetness coefficient (native mean W) is less than zero and therefore surpasses the performance standard. The most dominant species, *Typha angustifolia,* is non-native. Water interspersion was moderate at the time of the survey. The site is dominated by tall graminoid plants and 90% is covered by hydrophytic vegetation.

Introduction

This report details monitoring of the site restored for wetland impact mitigation for FAP 313 (U.S. 34) in Henderson County. Site location is NE1/4 NE 1/4 SW 1/4 sec. 34 T.10N. - R.6W. (U.S. Geological Survey (USGS) topographic map, Burlington 7.5 minute quadrangle). It is found in the USGS Upper Mississippi Hydrologic Unit 07080104, Mississippi River tributaries from New Boston to Warsaw. This site was formerly wet prairie (Plocher *et al.*, 1995), was converted to farmland, and had been fallow for an estimated 5 years prior to excavation in September 1997 for wetland mitigation. Apparently, 8 obligate herbaceous wetland species were planted in the wetland portion of the site. Three species of tree seedlings were also planted along the edge (perimeter) of the site. Monitoring is required for five years. On-site monitoring in 1999 was conducted on 26 August.

This report discusses the goals, objectives, and performance standards for the mitigation project, the methods for monitoring the site, monitoring results, and a discussion and recommendations based on results. Methods and results are discussed by performance standards for each goal. The monitoring plan was not previously submitted.

Goals, Objectives, and Performance Standards

Proposed goals for the mitigation project are those indicated in the IDOT monitoring tasking order (15 January, 1999) and are listed on the following pages.

Project goal: The created wetland community should be a 10.13 acre (4.1 ha) emergent wetland.

Objective: A high quality marsh will develop through natural recolonization and planting of obligate wetland species.

Performance standards:

1. The entire created wetland (10.13 acres) should satisfy the three criteria of the federal wetland definition:

   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 be present at the site.

   c) Presence of wetland hydrology. The compensation area must be either permanently or periodically inundated at averaged depths less then 2 m (6.6 ft) or have soils that are saturated to the surface for at least 12.5% of the growing season.

2. By the end of the fifth year, a native mean coefficient of conservatism value (native mean C value) of greater than or equal to 3.5 must be achieved, measured over the entire mitigation area. The native mean C value must increase each successive year.

3. By the end of the fifth year, the native floristic quality index value (native FQI) must be greater than or equal to 20 as measured over the entire mitigation site. The native FQI must increase each successive year.

4. By the end of the fifth year, the native mean wetness coefficient (native mean W) must be less than or equal to 0 in the wetland community.

5. The relative importance value of total native plants (RIV_n) must increase each successive year.

6. By the end of the fifth year, none of the three most dominant plant species in any of the wetland community zones may be non-native or weedy species, including, but not limited to *Phragmites australis, Poa compressa, Poa pratensis, Lythrum salicaria, Salix interior, Echinochloa crusgalli* or *Phalaris arundinacea,* unless otherwise indicated on the approved mitigation plan.

7. At the end of the five year monitoring period, at least 25-80% of the created wetland should be covered by hydrophytic vegetation. The interspersion of water and vegetation should be moderate to high –an open body of water surrounded by a continuous band of fringe vegetation is considered to have a low

degree of interspersion, while a checkerboard of open water would have a high degree of interspersion.

8. The planned wetland community should be dominated by tall graminoid plants. Woody vegetation should account for less than 30% of the aerial cover.

Methods

Performance standard 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) and further explained in the *Federal Manual for Identifying and Delineating Jursidictional Wetlands* (Federal Interagency Committee for Wetland Delineation, 1989). It is based on areal coverage estimates for individual plant species. Each of the dominant plant species is 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) Occurrence of hydric soils

To monitor hydric soil development, the soil was sampled in 1999. Soil profile morphology, including horizon color, texture, and structure was described at representative points throughout the site. Additionally, the presence, type, size, and abundance of redoximorphic features were recorded. In the absence of hydric soils indicators, hydrologic data can be used to confirm that conditions favorable for hydric soil formation persist at the site.

c) Presence of wetland hydrology

The method for determining the presence of wetland hydrology at a site is described in the *Corps of Engineers Wetland Delineation Manual* (Environmental laboratory, 1987). Hydrologic indicators may include, but are not limited to, drainage patterns, drift lines, sediment deposits on leaves, watermarks on trees, visual observations of saturated soils, ad visual observation of inundation. Monitoring well data from the Illinois State Geological Survey (Fucciolo *et al.* 1999) was also used to determine the seasonal depth to the water table.

Performance standards 2, 3, 6 and 8

Plant community quality and composition

The Floristic Quality Assessment (Taft *et al.*, 1997) was utilized to determine the floristic quality and nativity of the plant communities at the site. This method aids in identifying natural areas, monitoring restored and created wetlands, and comparing the quality of vegetation at different sites. First, each plant species native to Illinois is assigned a conservatism coefficient (C) ranging from zero to 10. Individual conservatism coefficients reflect the probability that a particular taxon correlates with anthropogenic disturbances. Plant species assigned zero tend to have low affinities for natural areas and those assigned 10 have very high affinities. A higher

quality site will have more species with high conservatism coefficients. When a complete species list is compiled for a site, the mean coefficient value (mCv) and a site floristic quality index can be calculated as follows:

N= the number of native plant species

$MCv = \Sigma C/N$

$FQI = mCv\ \sqrt{N}$

Sites with FQI values less than 10 indicate low natural quality. Sites with FQI values of 20 or more possess some evidence of natural character and may be considered environmental assets.

Performance standards 4 and 7

Characterization and extent of hydrophytic vegetation

In addition to being assigned a Coefficient of Conservatism, each species is also assigned a mean wetness coefficient based on the National Wetland Category for Region 3 of the U.S. Fish and Wildlife Service (Reed 1998). Plants are designated as obligate wetland (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), or upland (UPL). Plus (+) and minus (-) signs are added when a plant falls between two of the above categories. For example, FACW+ indicates that a plant is likely to be found in wetter environments than a FACW plant. Likewise, a FACU- suggests that a plant is almost an upland (UPL) species (may be found in slightly higher (drier) areas than FACU). Each category is assigned a numerical value, ranging from -5 for OBL, 0 for FAC, to +5 for UPL. These values were used to determine the mean wetness coefficient (an average of all ordinate wetness values) and the percent of the wetland covered by hydrophytic vegetation.

Performance Standard 5

Relative importance value of native plants

A baseline was established along the long axis near U.S. 34, bearing 75° east of north. The first transect was set approximately 25 m (82 ft) east-northeast of a large silver maple in the southwestern corner of the site, bearing 25° west of north. Five transects were 50 m (164 ft) apart with the exception of the last two transects which were 25 m (82 ft) apart. Additional plots were randomly located in the inundated portion of the wetland to insure adequate representation of that area. Transect length and the number of 1.0 m^2 quadrats (four to seven) per transect was variable. Quadrats were centered on the transects and set 25 m (82 ft) apart along the transects. The approximate location of the baseline and permanent transects is indicated on the aerial photo and plan sheet. A total of 33 quadrats was sampled. The aerial cover (indicated by cover class) of each species in the quadrats was recorded using the categories listed in Table 1. Percent cover of plant species was analyzed using cover class mid-points (Table 1).

Plant species frequency values were determined by dividing the number of plot an individual species occurred in by the total number of plots sampled (33). Relative importance values for individual species and for combined native (RIVn) and combined non-native (RIVa) were calculated by dividing the sum of relative coverage and relative frequency by two and multiplying by 100.

$$[(RC + RF)/2 * 100] = RIV$$

Sampling and analysis methods are based on standard vegetation sampling procedures (Smith, 1980 and Cox, 1985).

Table 1. Cover classes to be used for quadrat sampling

Cover class	Range of Cover (%)	Midpoint of Range (%)
1	0-1	0.5
2	1-5	2.5
3	5-25	15.0
4	25-50	37.5
5	50-75	62.5
6	75-95	85.0
7	95-100	97.5

Photography Stations

We established seven permanent photo stations at regular intervals (representative locations) along the perimeter of the wetland mitigation site to document changes in plant community features. Photo station locations and photograph direction are indicated on the enclosed aerial photograph and plan sheet. Photographs are in Appendix E.

Results

Performance standard 1

a) Predominance of hydrophytic vegetation

Dominant plant species for the wetland are shown in Table 1. All of the dominant species are hydrophytic. Also refer to the wetland determination form in Appendix B.

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

Dominant Plant Species	Indicator Status	Stratum
1. *Typha angustifolia*	OBL	herb
2. *Eleocharis acicularis*	OBL	herb
3. *Eleocharis erythropoda*	OBL	herb
4. *Elodea canadensis*	OBL	herb

b) Occurrence of hydric soils

In the fall of 1994, the wetland portions of the site had saturated soils within 0.3 m (12 in) of the surface (Plocher *et al.*, 1995). In the 1999 monitoring season, all soils in the excavated area were determined to be hydric. Because the soils were excavated, assumptions were made about the characteristics of the former topsoil. Based on landscape position, morphological characteristics in the lower profile, the Soil Survey of Henderson County (USDA, 1956), and soils data from the Mitigation Site Assesment (Plocher *et al.*, 1995) the Sawmill series (Cumulic Endoaquoll) was present. The mollic epipedon appears to have been removed. An iron depleted

matrix (former lower profile) is at the surface and contains many redoximorphic concentrations (Table 2). Standing water and saturated soils in a significant portion of the site were also observed.

Table 2. Soil profile description: Sawmill silty clay loam.

0-10 in	Cg	2.5Y 5/1, silty clay with sandy layer, subangular blocky to massive, common to many 7.5YR 5/8 iron masses
10+	compact/impenetrable (not bedrock)	

c) Presence of wetland hydrology

This site is located in the greater Mississippi River floodplain. Although the site may only flood occasionally, the site is affected directly by the Mississippi through water table fluctuations. Field evidence of wetland hydrology included water scouring, depressional (excavated) landscape, and inundation (approximately a third of the site was inundated at the time of the survey). The total area of the created wetland that conclusively satisfies the wetland hydrology criteria is 2.8 ha (6.9 acres) out of a total excavated area of 3.9 ha (9.6 ac) (Fucciolo *et al.*, 1999), Appendix D. Although water levels in the monitoring wells did not satisfy the wetland hydrology criteria, surface water levels measured by the RDS datalogger indicated that inundation occurred for a significant duration to satisfy the wetland hydrology criteria.

Performance standards 2, 3, 6 and 8

Plant community quality and composition

The performance standard indicates that the goal for the coefficient of conservatism is 3.5 (after 5 years). This was not met in the first year. The mean C value, including planted species was 2.8. Species that are present in the woods surrounding the site may eventually spread to the site. If these species are included in the calculations, a mean C value of 2.9 is obtained. The FQI for the wetland portion of the site (including planted herbaceous species) is 19.2. The FQI for the entire site (including planted tree species along the edge) is 20.6. The most dominant species at the site is the non-native *Typha angustifolia,* a weedy, non-native species. The second and third most dominant species are *Eleocharis acicularis* and *Eleocharis erythropoda* . Some experts consider these to be graminoid. Ten percent of the species are woody including *Acer saccharinum, Populus deltoides,* and *Salix exigua* which are currently are present only in the herb layer. The combined relative cover of these species is 2.2%. Trees planted along the perimeter of the site appear to be healthy and are expected to have a good chance of surviving in the long term. Trees identified were *Carya illinoensis, Quercus bicolor, and Quercus palustris.* These species are outside of the wetland.

Performance standards 4 and 7

Characterization and extent of hydrophytic vegetation

The excavated area primarily includes two different cover types: marsh in the main central portion (dominated by cattail, spikerushes, Canada water weed, and barnyard grass), and non-native grassland around the margin (foxtail dominates). Marsh is indicated by (A) and non-native grassland is indicated by (B) on the aerial plan sheet. The native mean wetness coefficient (W) is significantly less than zero. Ninety-two percent of the created wetland site is covered by persistent hydrophytic vegetation. The interspersion of water and vegetation was moderate. The east-central portion of the site is predominantly inundated and a few small, isolated areas of standing water exist.

Performance Standard 5

Relative importance value of native plants

The relative importance value of native plants (RIVn) is 71.0 (Appendix A, Table 2). The species having the highest importance values are *Typha angustifolia*, *Eleocharis acicularis*, *Eleocharis erythropoda*, *Elodea canadensis*, and *Echinochloa crusgalli* (21.7, 15.9, 7.66, 7.59, and 7.31, respectively) (Appendix A, Table 1). Of these, *Typha angustifolia* and *Echinochloa crusgalli* are non-native. Within the wetland, only three out of fifty-one species are non-native. A total of ten non-native species would be characterized as weedy.

Summary and Recommendations

This site is developing fairly well for a one year old created wetland. Wetland hydrology is established and the topography and hydrology are heterogenous enough to create a complex mosaic of vegetation types and water levels. Interspersion of water and vegetation is moderate. Both the naturally occurring and the planted vegetation are doing well. Floristic quality is rather high for a one year old site (FQI = 19.2, mean C = 2.8). Hydrophytic vegetation dominates and only three of the fifty-one species present are non-native. The created wetland supports 91.6 % total vegetation cover (8.4 % bare ground). Perennial, hydrophytic vegetation accounts for 69.6% of that coverage. The site is probably too wet to develop a significant woody component. Although aerial coverage of woody vegetation will probably increase beyond it's current 2% level, it is very unlikely to ever reach 30%.

Despite the positive progress of this site, a number of performance standards may never be achieved. Currently, 3.9 ha (9.6 acres) of wetland exist. Without further excavation at the perimeter, an aerial coverage of 4.1 ha (performance standard 1) will probably not be achieved. One serious problem that needs to be addressed quickly is the dense stand of narrow-leaved cattail (*Typha angustifolia*) which occupies approximately 35% of the created wetland. This species is very aggressive and persistent, may eventually dominate the entire site, and is in conflict with five of the site's eight performance standards. *Typha angustifolia* is non-native and weedy, and tends to dominate the wetlands where is occurs (performance standard 6). This species tends to shade out and reduce the relative importance value of native wetland species and

reduces floristic quality and diversity (performance standards 2,3, and 5). Narrow-leaved cattail is not a graminoid species, and its continued dominance will hinder the establishment of species typical of tall graminoid marshes (*Spartina pectinata, Scirpus validus, Scirpus americanus, Scirpus cyperinus, Carex lacustris*) (performance standard 8). Although the second and third most dominant species (*Eleocharis acicularis* and *Eleocharis erythropoda*) are considered graminoid, they are not tall. The aforementioned tall graminoid species (*Spartina*, etc.) need to be planted or seeded and the *Typha* population needs to be diminished for a tall graminoid marsh to be established. Management activities that will reduce the *Typha* population, such as prescribed burning and additional excavation, should be carried out. Also, without significant species additions, a mean C value of 3.5 will not be achieved (performance standard 2). The current mean C of 2.9 is more than adequate for a recently created wetland. Naturally occurring wetlands with mean C values of 3.5 are very uncommon. Although in a properly functioning wetland the FQI should generally increase over the first twenty years or so, at this site, the FQI may very well not increase each successive year. Also, at some point, the FQI will level off. The importance value of native plants should generally increase over time at a new site. At this site, however, it may not increase each successive year because the accomplishment of this performance standard (5) is also hindered by the dominance of *Typha* and by the fact that only three of the 51 species present are non-native to begin with (in 1999). Without management, the non-native, weedy, *Typha angustifolia* will be among the three most dominant species indefinitely (performance standard 6).

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Appendix A. Vegetation sampling results

Table 1. Vegetative cover, frequency, and importance value

Species	Total Cover (%)	Avg. % Cover per plot	Relative Cover (%)	Frequency	Relative Frequency (%)	Relative Importance Value
Typha angustifolia	952.5	28.86	25.08	0.61	18.37	21.72
Eleocharis acicularis	757.5	22.95	19.94	0.39	11.94	15.94
Eleocharis erythropoda	337.5	10.23	8.89	0.21	6.43	7.66
Elodea canadensis	402.5	12.20	10.60	0.15	4.59	7.59
Echinochloa crusgalli	241.5	7.32	6.36	0.27	8.26	7.31
Nymphaea odorata	145.0	4.39	3.82	0.15	4.59	4.20
Ammania coccinea	73.0	2.21	1.92	0.18	5.51	3.72
Potamogeton nodosus	85.0	2.58	2.24	0.15	4.59	3.41
Scirpus validus	90.0	2.73	2.37	0.09	2.75	2.56
Lindernia dubia	78.0	2.36	2.05	0.09	2.75	2.40
Bidens aristosa	100.0	3.03	2.63	0.06	1.84	2.23
Ambrosia artemisiifolia	45.0	1.36	1.18	0.09	2.75	1.97
Polygonum puctatum	45.0	1.36	1.18	0.09	2.75	1.97
Polygonum pensylvanicum	32.5	0.98	0.86	0.09	2.75	1.81
Setaria glauca	52.5	1.59	1.38	0.06	1.84	1.61
Acer saccharinum	30.0	0.91	0.76	0.06	1.84	1.31
Pontedaria cordata	62.5	1.89	1.65	0.03	0.92	1.28
Sagittaria latifolia	62.5	1.89	1.65	0.03	.092	1.28
Eleocharis obtusa	17.5	0.53	0.46	0.06	1.84	1.15
Populus deltoides	17.5	0.53	0.46	0.06	1.84	1.15
Solidago canadensis	17.5	0.53	0.46	0.06	1.84	1.15
Amaranthus tuberculatus	3.0	0.09	0.08	0.06	1.84	0.96
Nuphar lutea	37.5	1.14	0.99	0.03	0.92	0.95
Salix exigua	37.5	1.14	0.99	0.03	0.92	0.95
Scirpus fluviatilis	37.5	1.14	0.99	0.03	0.92	0.95
Bidens cernua	15.0	0.45	0.39	0.03	0.92	0.66
Cassia fasciculata	15.0	0.45	0.39	0.03	0.92	0.66
Aster pilosus	2.5	0.08	0.07	0.03	0.92	0.49
Bidens comosa	2.5	0.08	0.07	0.03	0.92	0.49
Eupatorium serotinum	2.5	0.08	0.07	0.03	0.92	0.49

Table 2. Summary: Native and non-native species

Species	Frequency	% Relative Frequency	Avg. % Cover per plot	% Relative Cover	Relative Importance Value
Native	2.42	73.4	78.9	68.6	71.0
Non-native	0.88	26.6	36.2	31.4	29.0
All	3.3	100	115.1	100	100

Appendix B. Routine Wetland Determination form

Routine Onsite Wetland Determination
Site 1 (page 1 of 4)

Field Investigators: Cooprider, Plocher, Tessene **Date:** 26 August 1999
Contract Number: 88516 **Project Name:** FAP 313 (U.S. 34)
State: Illinois **County:** Henderson **Applicant:** IDOT District 4
Site Name: Marsh
Legal Description: NE1/4 NE 1/4 SW 1/4 sec. 34 T.10N. - R.6W.
Location: Begins approximately 23 m (75 ft) north of U.S 34, 91 m (300 ft) east of an excavated lake in Gulfport, and south of Crystal Lake.

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

VEGETATION

Dominant Plant Species	Indicator Status	Stratum
1. *Typha angustifolia*	OBL	herb
2. *Eleocharis acicularis*	OBL	herb
3. *Eleocharis erythropoda*	OBL	herb
4. *Elodea canadensis*	OBL	herb

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

SOILS

Series and phase: Sawmill silty clay (Cumulic Endoaquoll)
On Henderson County hydric soils list? Yes: X No:
Is the soil a histosol? Yes: No: X
Histic epipedon present? Yes: No: X
Redox concentrations: Yes: X No: Redox depletions: Yes: No: X
Matrix color: 2.5Y 5/1 Redox color: 7.5YR 5/8
Other indicators: surface saturation

Hydric soils? Yes: X No:
Rationale: This soil has an iron depleted profile with common, prominent iron masses throughout. It is poorly drained and exhibits characteristics of the Sawmill series with the mollic epipedon removed during excavation.

Routine Onsite Wetland Determination
Site 1 (page 2 of 4)

Field Investigators: Cooprider, Plocher, Tessene **Date:** 26 August 1999
Contract Number: 88516 **Project Name:** FAP 313 (U.S. 34)
State: Illinois **County:** Henderson **Applicant:** IDOT District 4
Site Name: Marsh
Legal Description: NE1/4 NE 1/4 SW 1/4 sec. 34 T.10N. - R.6W.
Location: Begins approximately 23 m (75 ft) north of U.S 34, 91 m (300 ft) east of an excavated lake in Gulfport, and south of Crystal Lake.

HYDROLOGY

Inundated? Yes: X (in places) No: Depth of standing water: up to 0.13 m (5 in)
Depth to saturated soil: 0-0.6 m (0-24 in)
Overview of hydrological flow through the system: This site is located in an excavated area that is affected by the Mississippi River via water table fluctuations and occasional to rare flooding. Normal hydrologic inputs include precipitation and sheet flow from higher ground. Evapotranspiration is a hydrologic output.
Size of watershed: approximately 259,000 km^2 (100,000 mi^2) (est. from 119,000 m^2 drainage area at Keokuk, IA)
Other field evidence observed: water scouring (areas bare of vegetation)

Wetland hydrology? Yes: X No:
Rationale: Observation of inundation, location in an excavated area, and field indicators of wetland hydrology suggest that this site is inundated for a significant duration during the growing season.

DETERMINATION AND RATIONALE

Is this site a wetland? Yes: X No:
Rationale for decision: This site has hydrophytic vegetation, hydric soils, and wetland hydrology. The NWI does not classify this site as a wetland.

Determined by: Mary Cooprider (soils and hydrology)
Allen Plocher and Paul Tessene (vegetation and hydrology)
Illinois Natural History Survey
Center for Wildlife Ecology
607 East Peabody Drive
Champaign, Illinois 61820
(217) 333-6560, 333-6292, 244-7984

Species list can be found in Appendix C.

Appendix C. Species list

Scientific name	Common name	Stratum	Wetland Indicator	C*
Acer saccharinum	silver maple	herb	FACW	1
Alisma plantago-aquatica	water plantain	herb	OBL	2
Amaranthus tuberculatus	water hemp	herb	OBL	1
Ambrosia artemisiifolia	common ragweed	herb	FACU	0
Ammania coccinea	scarlet loosestrife	herb	OBL	5
Asclepias incarnata	swamp milkweed	herb	OBL	4
Aster pilosus	field aster	herb	FACU+	0
Bidens aristosa	swamp marigold	herb	FACW	1
Bidens cernua	nodding bur-marigold	herb	OBL	2
Bidens comosa	swamp tickseed	herb	FACW	2
Carex cristatella	sedge	herb	FACW+	3
Carex vulpinoidea	fox sedge	herb	OBL	3
Cassia fasciculata	partridge pea	herb	FACU-	1
Cyperus aristatus	flatsedge	herb	OBL	2
Cyperus esculentus	yellow nutsedge	herb	FACW	0
Cyperus strigosus	straw nutsedge	herb	FACW	0
Echinochloa crusgalli	barnyard grass	herb	FACW	**
Echinochloa muricata	barnyard grass	herb	OBL	0
Eleocharis acicularis	spike rush	herb	OBL	3
Eleocharis erythropoda	spike rush	herb	OBL	3
Eleocharis obtusa	spike rush	herb	OBL	2
Elodea canadensis	Canada water-weed	herb	OBL	5
Erigeron annuus	daisy fleabane	herb	FAC-	1
Eupatorium serotinum	late boneset	herb	FAC+	1
Iris shrevei	blue flag iris	herb	OBL	5
Leersia oryzoides	rice cutgrass	herb	OBL	3
Lemna minor	duckweed	herb	OBL	3
Lindernia dubia	false pimpernel	herb	OBL	5
Ludwigia alternifolia	seedbox	herb	OBL	5
Lythrum alatum	winged loosestrife	herb	OBL	5
Mimulus ringens	monkey flower	herb	OBL	5
Nuphar luteum	yellow water lily	herb	OBL	6
Nymphaea odorata	fragrant water lily	herb	OBL	6
Panicum dichotomiflorum	fall panic grass	herb	FACW-	0
Penthorum sedoides	ditch stonecrop	herb	OBL	2
Polygonum amphibium	water smartweed	herb	OBL	3
Polygonum hydropiper	water pepper	herb	OBL	**
Polygonum lapathifolium	nodding smartweed	herb	FACW+	0
Polygonum pensylvanicum	smooth smartweed	herb	FACW+	1
Polygonum punctatum	dotted smartweed	herb	OBL	3
Pontedaria cordata	pickerel weed	herb	OBL	8
Populus deltoides	cottonwood	herb	FAC+	2
Potamogeton nodosus	pondweed	herb	OBL	7
Sagittaria latifolia	common arrowhead	herb	OBL	4
Salix amygdaloides	peachleaf willow	herb	FACW	4
Salix exigua	sandbar willow	herb	OBL	1
Salix nigra	black willow	herb	OBL	3
Scirpus fluviatilis	river bulrush	herb	OBL	3

species list continues on next page

Scientific name	Common name	Stratum	Wetland Indicator	C*
Scirpus validus	soft-stemmed bulrush	herb	OBL	4
Solidago canadensis	tall goldenrod	herb	FACU	1
Typha angustifolia	narrowleaf cattail	herb	OBL	**

* Coefficient of Conservatism
** Species not native to Illinois

Mean c value = $\Sigma C/N = 133/48 = 2.8$ FQI = $\overline{C}\sqrt{N} = (2.8)\sqrt{48} = 19.2$

Without Iris, Nuphar, Nymphaea, and Pontedaria, the obviously planted species:
Mean c value = $\Sigma C/N = 106/44 = 2.4$ FQI = $\overline{C}\sqrt{N} = (2.4)\sqrt{44} = 16.0$

Without those, and Elodea and Potamogeton, possibly planted species:
Mean c value = $\Sigma C/N = 94/42 = 2.2$ FQI = $\overline{C}\sqrt{N} = (2.2)\sqrt{42} = 14.5$

(Scirpus validus and Sagittaria were also planted, but naturally occurring individuals were also present.)

Adding the planted tree species, and the weeds that grow with them on the edge of the site:

Carya illinoensis	pecan	shrub	FACW	6
Cenchrus longispinus	sandbur	herb	UPL	0
Cirsium discolor	field thistle	herb	UPL	2
Oenothera biennis	evening primrose	herb	FACU	1
Quercus bicolor	swamp white oak	shrub	FACW+	7
Quercus palustris	pin oak	shrub	FACW	4
Setaria faberi	giant foxtail	herb	FACU+	**
Setaria glauca	yellow foxtail	herb	FAC	**
Tridens flavus	purpletop	herb	UPL	1
Verbena stricta	hoary vervain	herb	UPL	2

Mean c value = $\Sigma C/N = 154/56 = 2.75$ FQI = $\overline{C}\sqrt{N} = (2.75)\sqrt{56} = 20.6$

Other species that grow in the woods and surrounding area just outside the site and could possibly spread to the site:

Ambrosia trifida	giant ragweed	herb	FAC+	0
Boehmeria cylindrica	false nettle	herb	OBL	3
Carex frankii	sedge	herb	OBL	4
Carex lupulina	hop sedge	herb	OBL	5
Carex lurida	bottlebrush sedge	herb	OBL	7
Carex muskingumensis	sedge	herb	OBL	6
Cornus drummondii	rough-leaved dogwood	shrub	FAC	2
Desmodium glabellum	smooth tick trefoil	herb	FACU	3
Eupatorium rugosum	white snakeroot	herb	FACU	2
Fraxinus pennsylvanica	green ash	tree, sapling, shrub	FACW	2
Geum canadense	white avens	herb	FAC	2
Geum laciniatum	marsh avens	herb	FACW	2
Leersia virginica	white grass	herb	FACW	4
Lobelia cardinalis	cardinal flower	herb	OBL	6
Panicum virgatum	switch grass	herb	FAC+	4
Prunella vulgaris	self-heal	herb	FAC	1
Spartina pectinata	prairie cordgrass	herb	FACW+	4
Stachys tenuifolia	hedge nettle	herb	FACW+	5

Mean c value = $\Sigma C/N = 216/74 = 2.9$ FQI = $\overline{C}\sqrt{N} = (2.9)\sqrt{74} = 25.1$

Appendix D: Aerial Extent of Wetland Hydrology

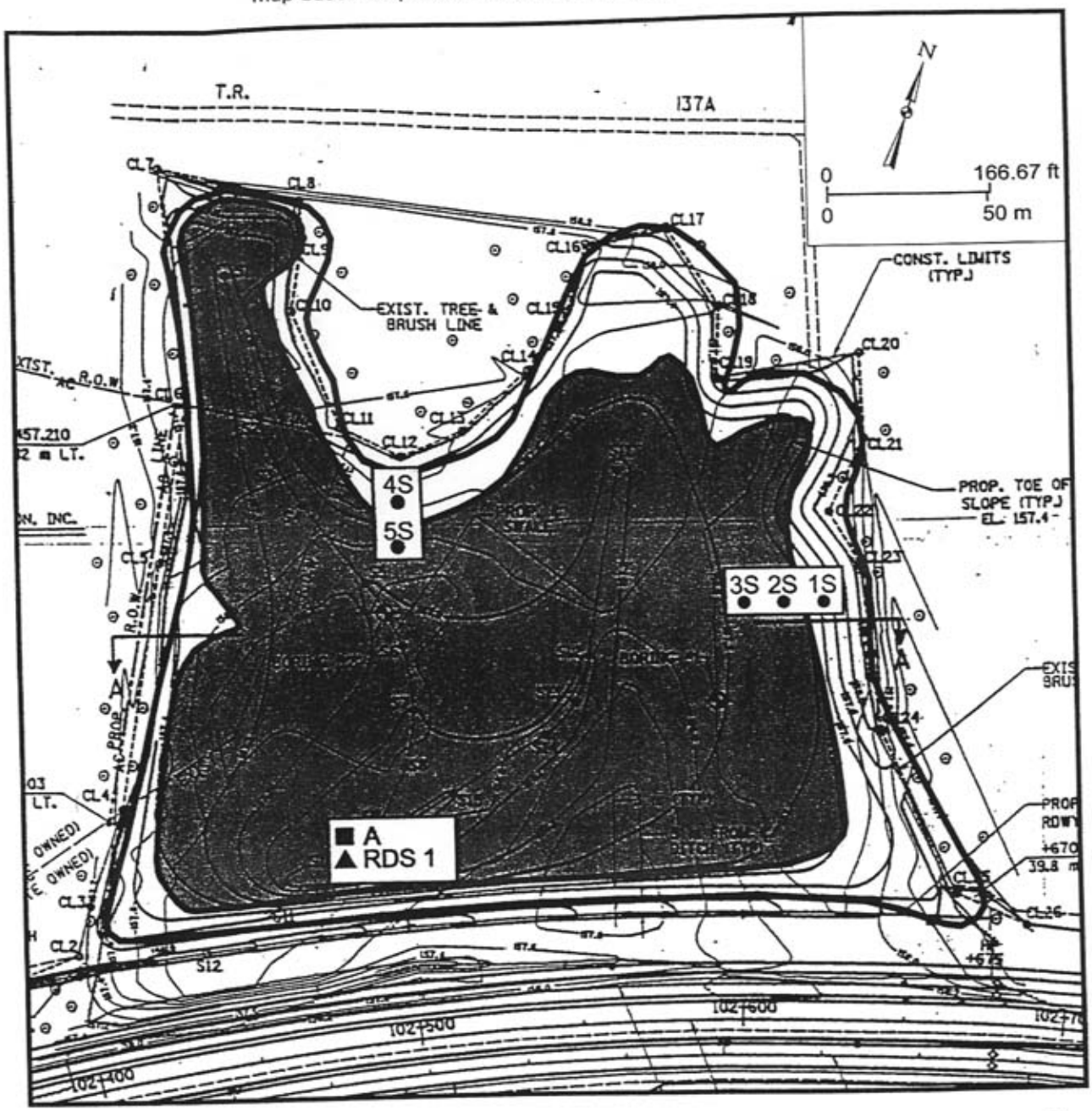
Gulfport Wetland Compensation Site

(FAP 313)

Estimated Areal Extent of 1999 Wetland Hydrology

based on data collected between September 1, 1998 and September 1, 1999

map based on plans received from IDOT (date unknown)



estimated areal extent of 1999 wetland hydrology

estimated areal extent of excavation

monitoring well

stage gauge

RDS data logger

Appendix E. Photographs from permanent photograph stations.

Figure 1. Photo station 1, north

Figure 2. Photo station 2, north-northeast

Figure 3. Photo station 3, north-northwest (behind "Restoration" sign)

Figure 4. Photo station 3, north-northwest

Figure 5. Pin oak seedling, eastern edge of site

Figure 6. Swamp white oak seedling, eastern edge of site

Figure 7. Photo station 4, west

Figure 8. Photo station 5, west

Figure 9. West of photo station 5.

Figure 10. Photo station 6, south

Figure 11. Photo station 6, north-northeast

Figure 12, Photo station 7, southwest


NAPP 98 60-539 1 4800 4-4-98
Gulfport
U.S. 34
PS1
PS2
PS3
PS4
PS5
PS6
T1
T2
T3
T4
T5
LEGEND (aerial photo 1 of 1)
FAP 313 (U.S. 34)
Contract No. 88516
Henderson County, Illinois
Wetland Monitoring Year 1
Wetland boundary (blue line)
Transect locations (T)
Photograph stations (PS)
N
Scale: 10 mm = 48 m (1 in = 400 ft)