

# **Wetland Mitigation Monitoring for the La Grange Mitigation Bank Site, Areas 4 and 7 - 2009**

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## **Introduction**

In 2004, the Illinois Department of Transportation (IDOT) established the La Grange Wetland Mitigation Bank in Brown Co., IL (legal location: T. 1 S., R. 1 W., Sect. 16, 17, 20, 21) (Watson et al. 2004). This site, at the confluence of the Illinois and La Moine Rivers, occupies 665 ha (1643 acres), primarily comprising low agricultural fields with some previously existing upland forest, forested wetland, marsh, wet meadow and backwater lakes. Topographically, the site consists of a lower floodplain area, which is inundated for a sufficient duration to support wetland hydrology in more than 7 out of 10 years, a less frequently inundated upper floodplain and a small area of river bluff. The slope break between the lower and upper floodplain occurs at about 132.3 m (434 ft) elevation. To facilitate agriculture, the hydrology of the site has been modified. Ditch and tile drainage systems are in place, a levee is present, and pumps were operational. Since establishment of the bank, the pumps have been removed and portions of the tile and ditch systems have been deactivated or plugged. In 2002, a flood event breached the levee in two places. For organizational and management purposes, the site has been arbitrarily divided into 16 Areas (Watson et al. 2004).

The general site plan calls for emergent wetland establishment through natural regeneration on the lower floodplain and forested wetland planting on the upper floodplain. Wetland enhancement of areas designated as farmed wetland (FW) is expected to result in 95.8 ha (237 acres) of emergent wetland. Restoration of areas designated as prior converted cropland (PC) is expected to generate 220.3 ha (544.2 acres) of emergent wetland and 117.4 ha (290.1 acres) of forested wetland (Watson et al. 2004). In the fall of 2006, Areas 4 and 7 on the upper floodplain were planted with trees (five foot container grown). Species planted were *Quercus palustris*, *Quercus bicolor*, *Carya illinoensis* and *Carya laciniosa/ovalis*. On 39 acres, 2932 trees were to be planted (actually about 3191 trees were planted on 41 acres), for a proposed stocking of 75/acre. The understory was to be seeded with a mix of *Agrostis alba*, *Phleum pratense*, *Lolium perenne*, *Cinna arundinacea*, *Elymus virginicus*, *Rudbeckia laciniata* and *Polygonum punctatum*. The INHS was tasked to monitor planted tree survival and conduct qualitative assessments of understory vegetation beginning in 2007. This area was in row crops until fall of 2006 (Busemeyer and Plocher 2004).

In 2009, field monitoring was conducted on 17 September. This report details results of the 2009 monitoring. Project goals, objectives and performance criteria are included, as are

monitoring methods, monitoring results, summary information and recommendations. A wetland banking prospectus (IDOT 2002)) and Wetland Banking Instrument (Watson et al. 2004) were prepared by the Illinois State Geological Survey and Illinois Natural History Survey.

### **Project Goals, Objectives and Performance Criteria**

Proposed goals and objectives are based on information contained in the original IDOT project request (Sunderland, 2006) and the Wetland Banking Instrument (Watson et al. 2004). Performance criteria are based on those specified in the U. S. C. O. E. Wetland Delineation Manual (Environmental Laboratory, 1987), and Guidelines for Developing Mitigation Proposals (USACOE, 1993). Each goal should be attained by the end of the monitoring period. Project goals, objectives and performance criteria are listed below.

**Project goal 1:** The created wetland site should be determined to be jurisdictional by current federal standards.

**Objective:** The goal is to enhance 237 acres of Farmed Wetland and restore 834 acres of Prior Converted cropland by establishing emergent, scrub shrub and forested wetland.

**Performance Criteria:** The entire created wetland should satisfy the three criteria of the federal wetland definition: hydrophytic vegetation, hydric soils and wetland hydrology.

- A. Predominance of hydrophytic vegetation - More than 50% of the dominant plant species must be hydrophytic.
- B. Presence of hydric soils - Hydric soil characteristics must be present, or conditions favorable to the formation of hydric soil must persist at the site.
- C. Presence of wetland hydrology - the created wetland must be inundated at an average depth of less than 2 m (6.6 ft) or have soils saturated to the surface for at least 12.5 % of the growing season.

**Project goal 2:** The created wetland should meet minimum standards as to floristic composition.

**Objective:** The created wetland should compensate in-kind for loss of forested, scrub shrub and emergent wetlands. The wetland compensation should be composed of vegetation characteristic of forested, scrub shrub, and emergent wetlands.

**Performance Criteria:** At least 80% of the planted trees and shrubs should be established and living. At least 90% of the plant species present should be non-weedy, native, annual and perennial species. At least 75% of plant cover should be native. None of the three most dominant species in any stratum should be nonnative, or weedy species.

### **Methods**

Monitoring will be performed on the wetland bank site. Illinois Natural History Survey personnel qualitatively monitored the lower floodplain in 2004 and 2005, began quantitative vegetation monitoring in 2006, and will continue until the Illinois Department of Transportation requests that monitoring cease. Monitoring of tree plantings on the upper floodplain began in 2007 and is expected to continue for five years. The Illinois State Geological Survey has been tasked to monitor hydrology. Monitoring reports on the status of the wetland creation site will be submitted annually. The likelihood of meeting the proposed goals and performance criteria will be addressed. If evidence is discovered indicating that the goals/performance criteria will not be met by the end of the monitoring period, written management recommendations will be submitted to IDOT in an effort to correct the problems.

### **Project Goal 1**

Wetland restoration and enhancement areas will be mapped in the field, and boundaries overlain on digital ortho photographs using Arcview 3.2.

A. Hydrophytic Vegetation - In the lower floodplain area, species composition (dominant species) will be determined annually through visual estimation. In previous years, species composition was determined by quantitative sampling. After two years, we have determined that species composition is simple enough to be easily and accurately determined by visual estimation. For Areas 4 and 7 on the upper floodplain, planted trees were tallied in 30.2 m planted row sections at 302 m intervals (10% sample). In 2008, after severe flooding, planted tree survival was about 42%. After additional severe flooding in 2009, planted tree survival is about 6% or 7%. Therefore it is no longer necessary to sample planted trees in order to determine that survival is far below the required 80%. Herbaceous species composition in the reforestation areas will be determined using visual estimation. Dominance is based on Importance Value, a numerical average of species' relative frequency, density and/or aerial coverage (Cox 1985). In each stratum dominant species include, starting with the most dominant, those species whose Importance Values, when summed in descending order, exceed 50%, as well as any additional species whose Importance Values are 20% or greater (Federal Interagency Committee for Wetland Delineation, 1989). Dominant species are assigned wetland indicator status ratings (Reed, 1988). Any plant rated facultative or wetter (FAC, FAC+, FACW-, FACW, FACW+ or OBL) is considered hydrophytic. Hydrophytic vegetation is determined to be present if greater than 50% of the dominant species are hydrophytic (Environmental Laboratory 1987).

B. Hydric Soils – In 2000, soil cores collected from the mitigation site were examined for the presence of redoximorphic features (Environmental Laboratory 1987). Being on the floodplain of the Illinois River, virtually the entire area is underlain by hydric soils (IDOT 2002).

C. Wetland Hydrology - The extent of wetland hydrology at this site was monitored by the Illinois State Geological Survey and is shown on the accompanying figure (Carr 2009). Wetland hydrology occurs when inundation or saturation to land surface is present for greater than 5% of the growing season (10 days at this site) where the soils and vegetation parameters in the Corps

of Engineers Wetland Delineation Manual also are met; if either is lacking, then inundation or saturation must be present for greater than 12.5% of the growing season (26 days at this site) to satisfy wetland hydrology criteria (Environmental Laboratory 1987 [<http://el.erdc.usace.army.mil/wetlands/pdfs/wlman87.pdf>]). Inundation and saturation at the site were monitored using a combination of 32 monitoring wells and 10 stage gauges. Water levels were measured at least biweekly during April and May, and monthly during the remainder of the year. Manual readings are generally supplemented by 4 dataloggers, which measure surface and groundwater levels at regular intervals to document all hydrologic events. In 2009, however, no dataloggers were deployed due to extensive on-site flooding, and hence, on-site water level readings were augmented by data from a nearby stream gauging station. Additional details regarding site conditions and monitoring results for wetland hydrology in 2009 are summarized in ISGS' Annual Report for Active IDOT Wetland Compensation and Hydrologic Monitoring Sites, September 1, 2008 to September 1, 2009 (Carr 2009).

Information provided by ISGS concerning hydrology of the site is incorporated into this report. In addition, visual inspection of the site for field indicators of wetland hydrology, such as landscape position, inundation or surface saturation or wetland drainage and debris patterns, will be used to determine the presence of wetland hydrology (Environmental Laboratory 1987).

## **Project Goal 2**

A. Tree Survival – Quantitative sampling of planted trees will no longer be conducted since the 6% or 7% estimated survival is far below the required 80%.

B. Vegetation - Dominant plant species in each stratum in each plant community in the lower floodplain area will be determined annually by visual estimation. In the upper floodplain area, dominant shrub/sapling layer and herbaceous species will be determined by visual estimation. Lists of dominant species will be examined in an attempt to ensure that, in the enhancement and restoration areas, none of the three most dominant species are weedy or non-native. A species list will be prepared annually for each community in order to determine whether at least 90% of the plant species are native and non-weedy. A Floristic Quality Index will be computed annually for each plant community (Taft et al 1997).

## **Results**

**Project Goal 1:** The created wetland site should be determined to be jurisdictional by current federal standards.

In Areas 4 and 7 of the upper floodplain, mowing was carried out until 2008 and planted trees are too sparse to constitute a dominant vegetation layer. The herbaceous layer is dominated by *Echinochloa muricata* (OBL), *Xanthium strumarium* (FAC) and *Cyperus ferruginescens* (OBL) and, therefore, the vegetation is hydrophytic. Areas 4 and 7 of the upper floodplain are underlain by hydric soils (figure 2, Appendix 1).

In 2009, precipitation was 150% of normal at the La Grange Bank Site. The only months with below normal precipitation were November 2008 and January 2009. The site was mostly inundated for the entire spring of 2009. In 2009, 1429 out of 1643 acres conclusively supported wetland hydrology (12.5% of growing season). All of Areas 4 and 7 conclusively support wetland hydrology (Carr 2009, figure 2).

# Former Wessel Property, La Grange Wetland Bank Site

## Estimated Areal Extent of 2009 Wetland Hydrology

September 1, 2008 through August 31, 2009

map based upon USGS digital orthophotograph, Cooperstown NE quarter quadrangle, produced from 4/14/98 aerial photography (ISGS 2002)

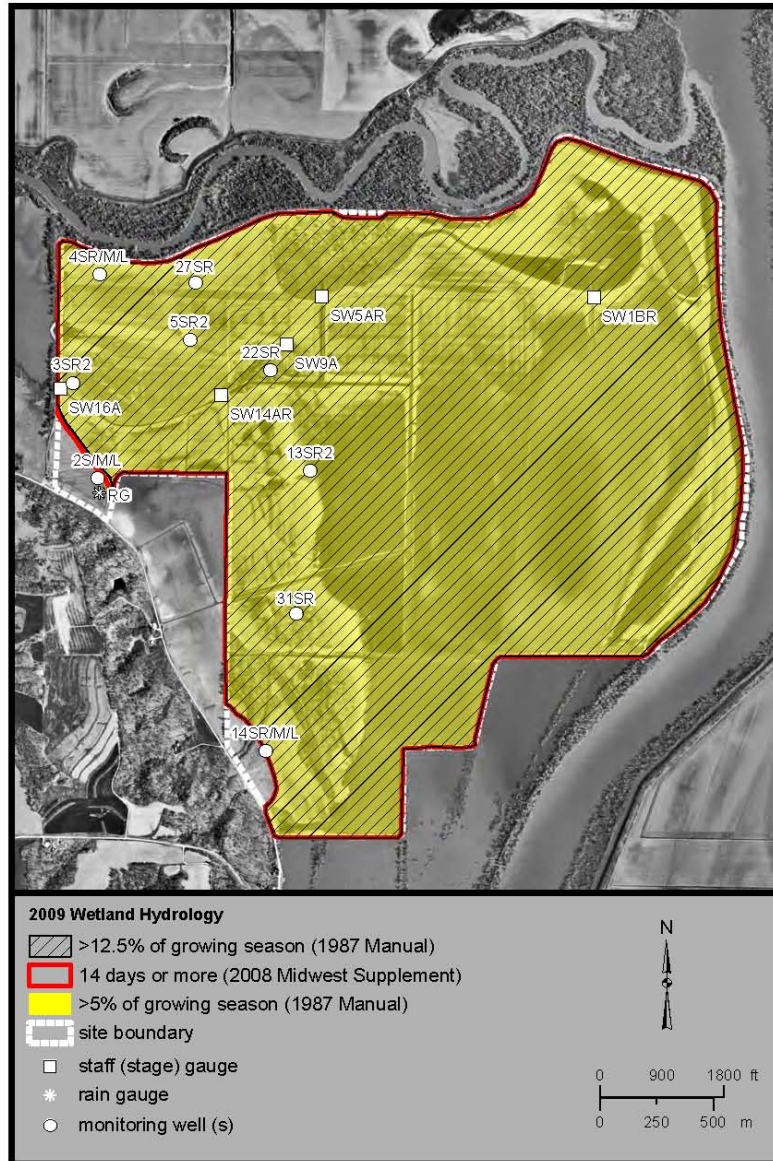


figure 1. Estimated extent of 2009 wetland hydrology

**Project goal 2:** The created wetland should meet minimum standards as to floristic composition.

### Tree Planting

In 2009, the tree planting was inundated for the entire spring. Planted tree survival is estimated at a maximum of 6% or 7%. Live individuals of *Quercus palustris*, *Q. bicolor* and *Carya illinoensis* were observed. Planted tree survival is now well below the required 80%.

### Vegetation

In 2009, mowing was not possible. FQI decreased slightly from 16.3 to 15.1. Percent native species was about the same as in 2008 (87.8%) and percent native and nonweedy species decreased slightly from 60.7% to 59.2%. Since all dominant species and all common species are native, native vegetative cover is greater than 75%. However, the three most dominant species, *Echinochloa*, *Xanthium* and *Cyperus ferruginescens* are all weedy natives, and less than 90% of the species present are nonweedy. Therefore the floristic goals for this site are not met. No seeded herbaceous species were observed in 2009 (Appendix 1).

## Summary and Recommendations

In 2009, this site was inundated for the entire spring. Consequentially the entire 41 acres area supported wetland hydrology. Vegetation quality is similar to 2008 (59.2% nonweedy natives, FQI 15.1). Severe flooding is maintaining an abundance of early successional species. The dominant species are all weedy natives and less than 90% of species present are native and non-weedy. Severe flooding has greatly reduced the survival of planted trees (approximately 6% - 7%).

## Literature Cited

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### **Appendix 1: Wetland Report**

A brief functional assessment of each wetland is provided in this report. However, this assessment is not an exhaustive description of the values of the site. The Floristic Quality Index (FQI), Developed by Taft, Ladd, Wilhelm and Masters (*Floristic Quality Assessment for Vegetation in Illinois*, 1997), was applied to the vegetation of each site. This index should not be used as a substitute for quantitative analysis, but it does provide a measure of floristic integrity. The FQI is calculated as follows:  $I=R/\sqrt{N}$ , where R represents the sum of the numerical ratings for all species recorded in the area, and N represents the number of recorded native species. The mean C is calculated as:  $\text{mean } C=R/N$ . FQI values of 10 or less indicate low natural quality, while sites with values of 20 or more (mean c generally greater than 3.0) have at least some evidence of native character and may be considered environmental assets.

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Site 1: This wet meadow is located in the tree planting of Areas 4 and 7. Hydrophytic vegetation, hydric soils and wetland hydrology are all present. Therefore this site is a wetland. The site occupies 16.6 ha (41 acres), all of which conclusively supported wetland hydrology in 2009. Hydrologic inputs are precipitation, sheetflow and overflow from the Illinois River. Water leaves the site by evapotranspiration and sheetflow. The site provides floodwater storage and wildlife habitat of fair quality. The NWI does not code the site as wetland. The FQI is 15.1, which is indicative of fair natural quality.

### **Watershed Data:**

This site is in the watershed for the Illinois River, which has a drainage area of 62,748 km<sup>2</sup> (24,227 mi<sup>2</sup>) at Beardstown, IL. The USGS hydrologic unit code is 07130011, Illinois River, Lower.

**ROUTINE ON-SITE WETLAND DETERMINATION**

Site 1 (page 1 of 4)

**Field Investigators:** Plocher, Keene, Larimore, Zercher **Date:** 17 September 2009

**Project Name:** LaGrange/Brown Co. Mitigation Bank

**State:** Illinois **County:** Brown **Applicant:** IDOT District 6

**Site Name:** Wet Meadow

**Legal Description:** T. 1 S., R. 1 W., E/2 Sect. 17

**Location:** Areas 4 and 7

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

**VEGETATION**

<b>Dominant Plant Species</b>	<b>Stratum</b>	<b>Indicator Status</b>
1. <i>Echinochloa muricata</i>	herb	OBL
2. <i>Xanthium strumarium</i>	herb	FAC
3. <i>Cyperus ferruginescens</i>	herb	OBL

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

**Hydrophytic vegetation:** Yes: X No:

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

**SOILS\***

\* field checked in 2000

Series and phase: Mapped as Beaucoup silty clay loam, Titus silty clay loam and Wagner silt loam by NRCS. Revised to Wagner silt loam

On 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: X No:

Matrix color: N 4/ and 5Y 5/1

Other indicators: level landscape position

**Hydric soils?** Yes: X No:

**Rationale:** This soil meets the requirements for NRCS hydric soil indicators F2 – loamy gleyed matrix, F3 – depleted matrix.

**ROUTINE ON-SITE WETLAND DETERMINATION**

Site 1 (page 2 of 4)

**Field Investigators:** Plocher, Keene, Larimore, Zercher **Date:** 17 September 2009

**Project Name:** LaGrange/Brown Co. Mitigation Bank

**State:** Illinois **County:** Brown **Applicant:** IDOT District 6

**Site Name:** Wet Meadow

**Legal Description:** T. 1 S., R. 1 W., E/2 Sect. 17

**Location:** Areas 4 and 7

**HYDROLOGY**

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

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

Overview of hydrological flow through the system: Primary hydrologic inputs to this site are precipitation, sheetflow and overflow from the Illinois River. Evapotranspiration and sheetflow are the major outputs.

Size of watershed: 62,748 km<sup>2</sup> (24,227 mi<sup>2</sup>) at Beardstown, IL

Other field evidence observed: level landscape position

**Wetland hydrology:** Yes: X No:

**Rationale:** Field evidence listed above indicates that this site is flooded or saturated for a sufficient period during the growing season to meet the criterion of wetland hydrology.

**WETLAND DETERMINATION AND RATIONALE:**

**Is the site a wetland?:** Yes: X No:

**Rationale:** Hydrophytic vegetation, hydric soils and wetland hydrology are all present. Therefore the site is a wetland. The site is not coded as wetland by the NWI.

Determined by: Allen Plocher (vegetation and hydrology)  
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**ROUTINE ON-SITE WETLAND DETERMINATION**

Site 1 (page 3 of 4)

**Field Investigators:** Plocher, Larimore, Keene, Zercher **Date:** 17 September 2009

**Project Name:** LaGrange/Brown Co. Mitigation Bank

**State:** Illinois **County:** Brown **Applicant:** IDOT District 6

**Site Name:** Wet Meadow

**Legal Description:** T. 1 S., R. 1 W., E/2 Sect. 17

**Location:** Areas 4 and 7

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 saccharinum</i>	silver maple	seedling	FACW	1
<i>Alisma plantago aquatica</i>	water plantain	herb	OBL	2
<i>Amaranthus tuberculatus</i>	water hemp	herb	OBL	1
<i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
<i>Ammannia coccinea</i>	ammannia	herb	OBL	5
<i>Apocynum cannabinum</i>	dogbane	herb	FAC	2
<i>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
<i>Aster simplex</i>	panicked aster	herb	FACW	3
<i>Bidens connata</i>	beggar's ticks	herb	OBL	2
<i>Bidens frondosa</i>	beggar's ticks	herb	FACW	1
<i>Boltonia asteroides</i>	false aster	herb	FACW	5
<i>Campsis radicans</i>	trumpet creeper	herb	FAC	2
<i>Carex lacustris</i>	lake sedge	herb	OBL	6
<i>Carya illinoensis</i>	pecan	shrub	(planted)	6
<i>Cassia fasciculata</i>	partridge pea	herb	FACU-	1
<i>Cephalanthus occidentalis</i>	buttonbush	shrub	OBL	4
<i>Chamaesyce humistrata</i>	milk spurge	herb	FACW	1
<i>Cyperus ferruginescens</i>	flatsedge	herb	OBL	1
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
<i>Eclipta prostrata</i>	yerba de tajo	herb	FACW	2
<i>Eleocharis erythropoda</i>	red rooted spikerush	herb	OBL	3
<i>Eleocharis obtusa</i>	spikerush	herb	OBL	2

= Coefficient of Conservatism, as developed by Taft, Ladd, Wilhelm and Masters (1997)

Continued on following page

**ROUTINE ON-SITE WETLAND DETERMINATION**

Site 1 (page 4 of 4)

**Field Investigators:** Plocher, Keene, Larimore, Zercher **Date:** 17 September 2009

**Project Name:** LaGrange/Brown Co. Mitigation Bank

**State:** Illinois **County:** Brown **Applicant:** IDOT District 6

**Site Name:** Wet Meadow

**Legal Description:** T. 1 S., R. 1 W., E/2 Sect. 17

**Location:** Areas 4 and 7

SPECIES LIST (Continued)

Scientific name	Common name	Stratum	Wetland indicator status	C=
<i>Eragrostis hypnoides</i>	creeping lovegrass	herb	OBL	5
<i>Eupatorium serotinum</i>	late flowering thoroughwort	herb	FAC+	1
<i>Fraxinus pennsylvanica</i>	green ash	seedling	FACW	2
<i>Ipomoea hederacea</i>	ivy leaf morning glory	herb	FAC	*
<i>Ipomoea lacunosa</i>	small white morning glory	herb	FACW	1
<i>Lindernia dubia</i>	false pimpernel	herb	OBL	5
<i>Lysimachia ciliata</i>	fringed loosestrife	herb	FACW	4
<i>Morus alba</i>	white mulberry	seedling	FAC	*
<i>Panicum dichotomiflorum</i>	fall panicum	herb	FACW-	0
<i>Panicum capillare</i>	witchgrass	herb	FAC	0
<i>Phyla lanceolata</i>	fog fruit	herb	OBL	1
<i>Polygonum amphibium</i>	water smartweed	herb	OBL	3
<i>Polygonum lapathifolium</i>	nodding smartweed	herb	FACW+	0
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Populus deltoides</i>	cottonwood	seedling	FAC+	2
<i>Quercus bicolor</i>	swamp white oak	shrub	(planted)	7
<i>Quercus palustris</i>	pin oak	shrub	(planted)	4
<i>Rorippa islandica</i>	marsh yellow cress	herb	OBL	4
<i>Sagittaria latifolia</i>	arrow head	herb	OBL	4
<i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
<i>Setaria glauca</i>	yellow foxtai	herb	FAC	*
<i>Sida spinosa</i>	prickly sida	herb	FACU	*
<i>Solanum carolinense</i>	horse nettle	herb	FACU-	0
<i>Toxicodendron radicans</i>	poison ivy	herb	FAC+	1
<i>Xanthium strumarium</i>	cocklebur	herb	FAC	0

= Coefficient of Conservatism (Taft et al. 1997)

\* Non-native species

Percent native: 43/49=87.8%

Percent weedy or non-native: 20/49 = 40.8%

Quality = fair

mCv with planted species=  $\sum C/N = 99/43 = 2.30$

FQI with planted species =  $\sum C/\sqrt{N} = 99/\sqrt{43}=15.1$

mCv without planted species=  $\sum C/N = 82/40 = 2.05$

FQI without planted species =  $\sum C/\sqrt{N} = 82/\sqrt{40}=13.0$

# LaGrange Mitigation Site, Areas 4 and 7 Brown County - 2009

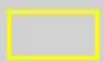


0 400 800 Feet



scale 1:4800  
1 inch=400 ft

0 100 200 Meters



Site boundary



11/09