# WETLAND BANKING INSTRUMENT
# LA GRANGE SITE

Illinois Department of Transportation
Bureau of Design and Environment
2300 S. Dirksen Parkway
Springfield, IL 62764-0002

March 2004

## Executive Summary

A 1,645-acre floodplain property, located at the confluence of the LaMoine and Illinois Rivers in Brown County, Illinois, was acquired by the Illinois Department of Transportation (IDOT) February 2001 for the purpose of developing a wetland bank. This instrument, prepared in accordance with the Federal Guidance for the Establishment, Use and Operation of Mitigation Banks (Federal Register 1995), describes in detail the physical and legal characteristics of the bank and how the bank will be established and operated. The site, formerly a backwater lake, marsh, wet shrubland, and floodplain forest environment, was drained via ditches, tiles and a levee for conversion to farmland prior to the 1940s. The goals of the bank are to remove land from agricultural use by restoring a more natural hydrologic regime, and to preserve or enhance additional wetland and non-wetland areas on the floodplain.

The proposed bank lands will be returned to floodplain forest, wet shrubland, emergent wetland (marsh), and open water. The site will provide floodwater and sediment storage for the Illinois and La Moine River watersheds, as well as provide habitat for aquatic and terrestrial wildlife and recreational opportunities for people. The IDOT anticipates that, upon completion of the restoration, the site habitat will consist of approximately 790 acres of marsh or wet shrubland, 606 acres of wetland floodplain forest, 56 acres of non-wetland floodplain forest, 10 acres of mesic upland forest, 31 acres of grassland, and 150 acres of non-vegetated open water. Marsh and wet shrubland will develop in areas with similar topography and hydrology and will be intermingled. Therefore, individual acreages for marsh and wet shrubland areas cannot be accurately predicted ahead of time. In addition, approximately 2 acres comprising site access roads will be maintained as such. Taking into account existing wetlands and compensation ratios, the IDOT plans to generate approximately 1024 acres of wetland credit at the bank site.

Due to the scale of the proposed undertaking, the IDOT has developed a phased approach to implementing the bank. The site was divided into 16 fields, and a strategy for reversing hydrologic alterations and re-establishing vegetation was developed for each. The time period for completion of all phases is estimated to be 15 years. Over this period, the IDOT proposes to deactivate roughly 9 miles of ditches and a minimum of 15 miles of agricultural drain tile. The overall hydrologic strategy also involves free exchange of river water with the site, unencumbered by levees, which are already naturally degrading. During and after the restoration of the hydrology of each field, the IDOT will implement a plan to re-vegetate the site with a predominance of native, non-weedy, hydrophytic species, via both natural re-generation and active planting.

Two primary performance standards will be used to judge success of the planned wetlands and determine credit availability at the bank site. The first states that each planned wetland should be a jurisdictional one, defined by the presence of a predominance of hydrophytic vegetation, the presence of hydric soils (or conditions favorable for their formation), and the presence of wetland hydrology. The second standard dictates that in each planned wetland, at least 80% of the planted trees should be established and living, 90% of the plant species present and 75% of the total vegetative cover should be non-weedy, native, perennial or annual species, and none of the dominant plant species may be non-native or weedy species.

The IDOT will transfer title to the bank site to a federal or state agency or, if an agreement cannot be reached, the IDOT will manage and maintain the site after all credits are certified.

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## I. Introduction

This instrument has been prepared in accordance with the Federal Guidance for the Establishment, Use and Operation of Mitigation Banks (Federal Register 1995). This instrument shall document agency concurrence on the objectives and administration of the Illinois Department of Transportation (IDOT) proposed bank in Brown County near La Grange, IL (Figure 1). This instrument describes in detail the physical and legal characteristics of the bank and how the bank will be established and operated. The site will subsequently be referred to as the La Grange bank site or mitigation bank.

The IDOT proposes that all activities regulated under Section 10/404 of the Clean Water Act will be eligible to use the La Grange mitigation bank as compensation for unavoidable impacts to wetlands and/or aquatic resources. Credits from the bank may also be used to compensate for environmental impacts authorized under the Interagency Wetland Policy Act of 1989. In no case will the same credits be used to compensate for more than one activity; however, the same credits may be used to compensate for an activity which requires authorization under more than one program.

Under the existing requirements of Section 10/404, all appropriate and practicable steps will be undertaken by the IDOT to first avoid and then minimize adverse impacts to aquatic resources, prior to authorization to use the La Grange mitigation bank.

### A. Bank goals and objectives

The goal of the bank is to remove land from agricultural use, and preserve or enhance additional wetland and non-wetland areas on the floodplain of the Illinois River in Brown County, Illinois. The proposed bank lands will be returned to a combination of floodplain forest, wet shrubland, emergent wetland (marsh), and open water environments. The result will be a contiguous tract of floodplain vegetation and habitat bounded by the La Moine River on the north; the Illinois River on the east; adjacent floodplain property, under separate ownership, to the south; and adjacent uplands, under separate ownership, to the west. The site will provide habitat for wildlife and recreational opportunities for people.

The objectives of the bank are to: 1) reforest agricultural land with native, non-weedy, hydrophytic vegetation, 2) allow natural re-vegetation of marsh and wet shrubland communities on agricultural land too wet for tree survival, 3) preserve existing wetlands on the site, 4) provide floodwater storage for the Illinois and La Moine river watersheds, and 5) provide net sediment storage for the Illinois and La Moine river watersheds. Site improvements for human use will be low-impact and may include items such as paths for walk-in fishing or birding, and may include interpretive signage.

### B. Ownership and legal description of bank lands

The IDOT has acquired the land and holds fee-simple interest to the land. The legal description of the bank site is given as…

> That part of the following described tracts situated in Brown County, Illinois; the Northeast Quarter of Section 16; the Northwest Quarter of Section 16 and the Northeast Quarter of Section 17; the Southeast Quarter of Section 16, the West Half of the Southwest Quarter of Section 16, the Southeast Quarter of

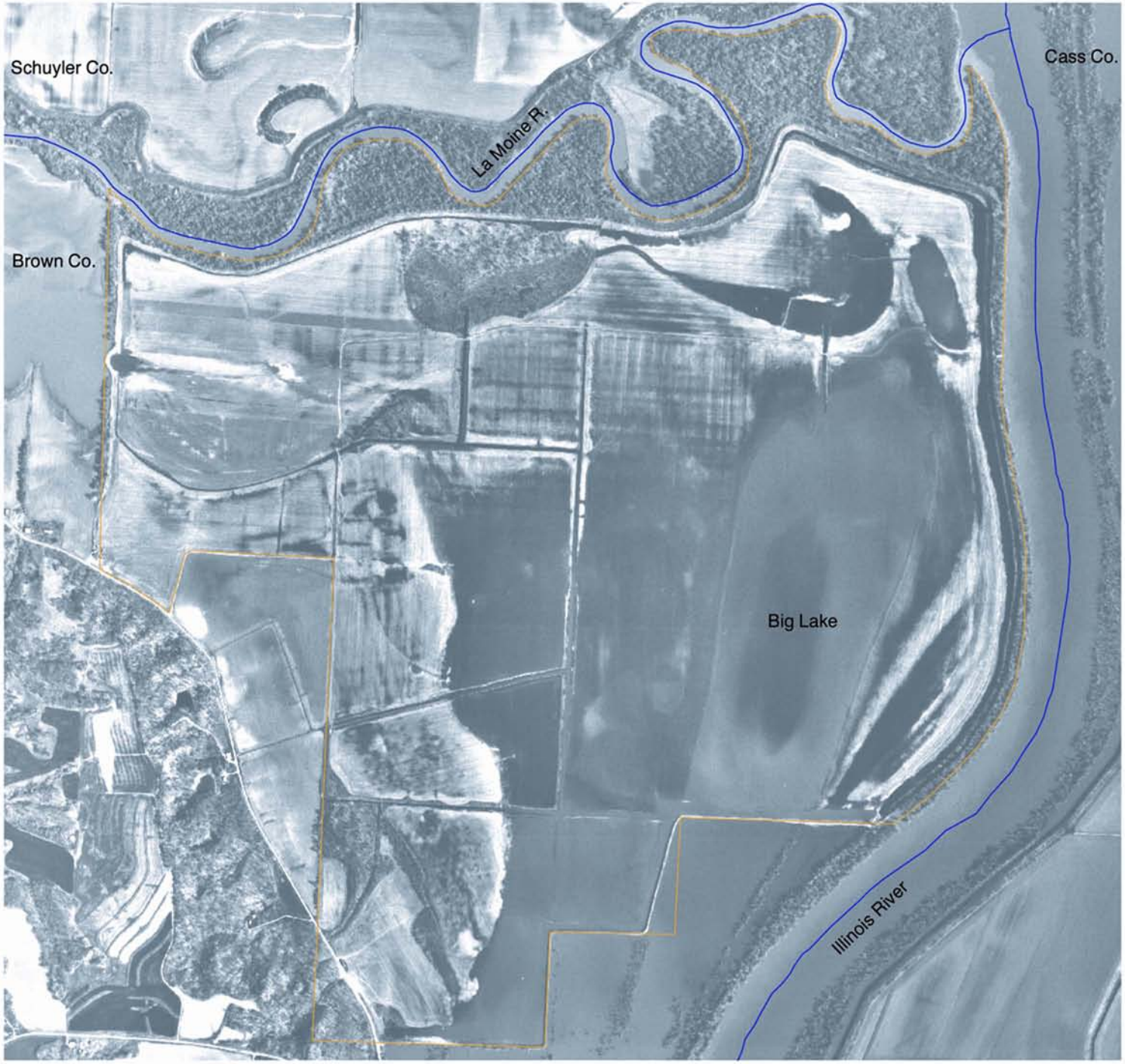
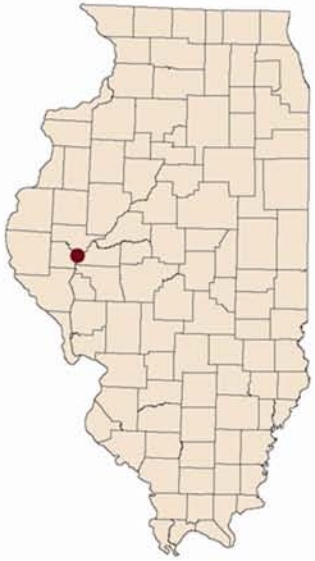



Figure 1. Map of the Proposed Wetland Bank Site and Vicinity
La Grange Wetland Bank
Brown County, Illinois

Property boundary
Counties

N

0 500 1000 1500 2000 Feet



10 February 2003

> Section 17, the Southeast Quarter of Section 20, the Northwest Quarter of Section 21, the Northeast Quarter of the Northeast Quarter of Section 21, and the Northwest Quarter of the Southwest Quarter of Section 21, the East One-Half of the Southwest Quarter of Section 16; the Northwest Quarter of the Northeast Quarter and the Fractional South Half of the Northeast Quarter of Section 21, the Northeast Quarter (NE1/4) of Section Twenty (20), the Southwest Quarter (SW1/4) of Section Seventeen (17); and all that part of the fractional Northwest Quarter (NW1/4) of Section Seventeen (17), which lies in Brown County, Illinois; that part of the North Half of Section Twenty (20) West of the Beardstown and Cooperstown Wagon Road, and North of La Grange and Rushville Wagon Road; and a tract of land containing one and a half acres, more or less, in the Northeast Corner of the Northeast Quarter (NE1/4) of Section Nineteen (19) described as: Beginning at the Northeast Corner of said Quarter Section and running from thence South thirteen (13) rods, thence West eighteen (18) rods, thence North thirteen (13) rods, thence East eighteen (18) rods, to the place of beginning, and all that part of Section 9 lying south of the La Moine River, all in Township One (1) South, Range One (1) West of the Fourth Principal Meridian, in Brown County, State of Illinois.

A description for the NW/4 and SW/4 of Section 17 is missing (Larson 2000).

The bank site has an easement covering 160 acres, more or less, in the southeast quarter of Section 20. The easement, made with the Adams Electrical Co-operative, gives permission to…

> cut and trim trees and shrubbery, or to control by chemical means, to the extent necessary to keep them clear of said electric lines or system and to cut down from time to time all dead, weak, leaning or dangerous trees that are tall enough to strike the wires in falling.

See Section V for a discussion of the transfer and long-term management and maintenance plans for the bank site.

C. Service area and impacts suitable for compensation via the bank

The service area the bank will cover is depicted on Figure 2. The service area falls within both the Rock Island and the St. Louis districts of the U.S. Department of the Army, Corps of Engineers. For activities regulated under Section 10/404 and the Illinois Interagency Wetland Policy Act of 1989, use of the La Grange bank to compensate for impacts beyond the designated area of service may be authorized, on a case-by-case basis, where it is determined to be practicable and environmentally desirable.

If wetland impacts occur outside the service area and they are to be compensated at the bank site, higher mitigation ratios will be required. The specific ratios used will be determined in accordance with 17 Illinois Administrative Code 1090.20 (Implementing Procedures for the Illinois Interagency Wetland Policy Act of 1989).

Designation of a more inclusive service area is proposed because the bank site will be used to compensate for highway projects that typically involve numerous small impacts in several

different watersheds. Because the La Grange bank site will contain emergent (marsh), wet shrubland, and forested wetlands, all of these classes will be eligible for compensation at the bank site.

## II. Description of baseline conditions at the bank site

In the year 2000, an on-site evaluation of vegetation, soils, topography, and hydrology was performed by the Illinois Natural History Survey (INHS). All potential wetlands were examined and determinations were performed. Soils were examined and the accuracy of the soil survey maps for this area was checked. Vegetative cover types, wetlands, and soil units were mapped as ARCView overlays on aerial photography (see Busemeyer et al., 2001). The area of each cover type and of each wetland and upland habitat was also calculated by ARCView from these overlays. For purposes of comparison, the Natural Resources Conservation Service (NRCS) wetland map is presented on Figure 3. Site hydrology was further investigated by the Illinois State Geological Survey (ISGS) and included documentation of precipitation, river hydrology, ground water, and on-site and off-site surface-water conditions (Fucciolo et al., 2000, 2001, and 2002).

### A. Endangered and threatened species and natural quality determination

A search was conducted for rare, endangered, and threatened flora and fauna, and high-quality plant communities, during the 2000 growing season. In the search, 20 communities were identified: (8) mesic-floodplain forest/wet-floodplain communities, (2) mesic/dry-mesic upland forest communities, (3) marsh communities, (4) mudflat/wet successional field communities, and (3) areas of cropland. On a scale of A (best) through E (worst), all communities were graded C or lower. Two of the natural communities, botanical site 1 (grade C, 106 acres), a mesic floodplain forest (near the La Moine River, outside the levee), and botanical site 19 (grade C, 7.5 acres), a mesic upland forest (on the bluff at the southwest corner of the site), were of particularly high floristic quality. Two individuals of the federally threatened decurrent false aster, *Boltonia decurrens*, were located within the bank site in botanical site 4 along the Illinois River (see Hill 2001). Bald eagles, a state and federally threatened species with known nesting areas at the downstream Meredosia National Wildlife Refuge, have been observed hunting over the site. Three additional state-listed birds, including the endangered Wilson's Phalarope, the threatened Least Bittern, and the state watch-listed Common Snipe, have also been observed at the La Grange site. None of the observations of these four bird species were of nesting activity, and none occurred at any time during their respective breeding seasons (Amundsen and Enstrom 2001). No other Illinois or federally listed endangered or threatened species were found at the bank site.

### B. Site soils and topography

A map of the soils of the bank site is included in this report (Figure 4). The USDA-NRCS soil survey for Brown County serves as a base map. INHS personnel field checked this map by conducting ground traverses over the entire bank site. Topography and soil properties, including organic content, parent material, drainage class, and soil texture, were used by the INHS to evaluate the NRCS soil boundaries. Based on the INHS inspection, some adjustments to the NRCS map were made (see INHS overlays of NRCS base map in Figure 4).

Figure 3 (NRCS wetland map) here.

Figure 4 (NRCS soils map) here.

Approximately 94% of the site soils were determined by INHS to be hydric. These soils include Beaucoup silty clay loam, Titus silty clay loam, Wagner silt loam, and Darwin silty clay. These hydric soils have a heavy clay texture present in the upper soil profile, making them ideal for saturation and ponding, and are rated as good for wetland plants by the NRCS. The hydric soils at the site do not need any alteration for wetland restoration if the hydrology of the area is similar to the hydrology at the time these soils were formed. Non-hydric soils, comprising the remaining 6% of the site, include Wakefield silt loam, Raddle silt loam, and Rozetta silt loam.

A generalized representation of the site topography is depicted on Figure 5. Most of the site is level and slopes are 0 to 2 percent. The banks of the La Moine River are very steep and high (up to 15 feet) and slopes are more than 30 percent. The Illinois River is less entrenched and bank slopes and heights are considerably less than those of the La Moine River.

C. Site hydrology

Throughout most of the modern period (ca. 1917-present), the site was protected from river flooding via an extensive levee system. However, on May 13, 2002, on the rising limb of a near-record flood event in the Illinois River basin, the perimeter levee was breached in two locations when the Illinois River was at a stage elevation of approximately 442 feet. During the subsequent flood crest (nearly 447 feet), the bank site's levee system was likely overtopped in several additional locations. As a result of the breaching, the current levee configuration is such that approximately 100 feet of levee near the east-west midpoint along the south property line has been reduced to a maximum height of approximately 432 feet. In addition, approximately 100 feet of levee along the western boundary, immediately south of the northwest site corner, was completely destroyed by the 2002 flood.

In the site's current configuration, hydrology is driven primarily by surface water from the La Moine and Illinois Rivers. To a lesser extent, site hydrology is also affected by some groundwater discharge and retention of local precipitation and bluff runoff. At the nearby New La Grange Lock and Dam gauging station, records from the past 60 years indicate that the site will flood to an average elevation of 430.0 feet for 23.6 consecutive days (approximately 12.5% of the growing season) in nearly every year, 435.0 feet for 21.8 consecutive days per year in 7 out of 10 years, and 440.0 feet for 15.3 consecutive days in approximately 1 out of 3 years. The near-record flood crest (approximately 447 feet) observed in May 2002 occurs, on average, 1 in 20 years.

Nested monitoring wells were emplaced by the ISGS in the fall of 2001 (Figure 6). Preliminary data from these wells indicate that the ground-water potentiometric surface in wells screened at approximately 10 feet depth is at an average depth of less than 1.6 feet below ground surface in the plain surrounding Big Lake. Wells screened at approximately 20 feet depth also indicate ground-water potential readings of 2.5 feet below ground surface. Despite this, significant deposits (6-10 feet thick) of fine-textured materials at ground surface likely limit upward movement of water from these confined units. The same fine-textured materials (silty clays), however, also limit downward percolation of surface waters, acting to maintain soil-zone saturation and inundation resulting from surface water inputs (*e.g.*, runoff, flooding, or precipitation sources). Further illustrating this, 14 of 23 soil-zone wells (representing nearly 75% of the site area) had conclusively met wetland hydrology criteria

Figure 5 (generalized site topography) here.

Figure 6 (ISGS monitoring instruments) here.

prior to the catastrophic flood of May-June 2002 (with no direct input from either the Illinois River or La Moine River).

Evidence, mostly from aerial photography, of extensive drain tile systems has been observed at the bank site. However, the full extent of this hydrologic modification is unknown at this time. An extensive network of drainage ditches is also present. These ditches link areas of former surface water bodies and major drainage tile outlets, discharging directly to the basin of Big Lake. A 36-inch diameter gravity drain is the ultimate outfall for water collected in the site's drainage systems. The gravity drain is at an outlet elevation of approximately 430 feet and is located at the southeast corner of the site; it discharges directly to the Illinois River through a gate valve. The channel of the La Moine River appears to be entrenched—this is probably due to upstream modification of the watershed.

D. Existing wetland and upland habitats

The INHS wetland and upland determinations made at the site in the year 2000 (Busemeyer et al., 2001) are presented in Table 1.

E. Nitrogen dynamics

Since Spring 2002, investigators from the Biology Department at the University of Illinois—Springfield have been studying the systematics of nitrogen cycling at the proposed bank site. Seven habitats were selected for this study, and they include: 1) Big Lake (3 habitats: deep, shallow, and intermittent marsh-lake margin), 2) undisturbed wet meadow, 3) disturbed meadow, 4) floodplain forest, and 5) Illinois River near-shore. Three replicate sites (30 feet diameter) exist in each habitat. Water (surface and bottom water if present), interstitial soil water, and surface sediment are collected every 45 days. Extra sampling events also occur during pre-, peak-, and post-flood periods.

Nitrogen measurements are made for nitrate/nitrite, ammonia/ammonium, total nitrogen, dissolved inorganic nitrogen, dissolved organic nitrogen, and particulate nitrogen. Identical parameter measurements are made for both soil and water, with the exception of total nitrogen from soil nitrogen measurements. Nitrogen transformation rates for oxidation of ammonia to nitrate (nitrification) and nitrate reduction to nitrogen gas (denitrification) are also measured. In addition, bacterial populations and reactive phosphorous measurements in the water column of Big Lake and the Illinois River are also monitored. General water quality monitoring of Big Lake includes temperature, dissolved oxygen, Secchi depth, pH, conductivity, and total suspended solids.

Information gathered through the ongoing study of nitrogen dynamics will assist the IDOT by providing a "remediation value" for the site with regard to the site's overall ability to convert soluble nitrogen to gaseous nitrogen (denitrification potential). This ongoing nitrogen monitoring will help to quantify the stated goal of net nitrogen removal from the Illinois River.

F. Cultural resources

A Phase I archaeological survey was conducted within the 1645-acre bank site. Spring and summer 2001, archaeologists undertook a systematic pedestrian surface survey of cultivated fields located within the bank site. Approximately 1108 acres of the site were examined in this fashion, providing a detailed record of near-surface prehistoric and historic activity within the project limits. The wooded bluffs were examined for evidence of mounds

Table 1. Year 2000 vegetative cover at the La Grange site (Busemeyer et al., 2001).

| Vegetative Cover Type | Acreage | Dominant Species | | NRCS Designation (11/30/2000) |
|---|---|---|---|---|
| A. Floodplain forest (wetland) | 103.9 | Overstory:<br>Sapling layer:<br>Shrub layer:<br>Herbaceous layer: | *Acer saccharinum*<br>*Acer negundo*<br>*Acer negundo*<br>*Ambrosia trifida, Aster simplex, Galium aparine, Phalaris arundinacea, Urtica dioica* | W (wetland) |
| B. Floodplain forest (non-wetland) | 60.8 | Overstory:<br>Shrub layer:<br>Sapling layer:<br>Herbaceous layer | *Acer saccharinum*<br>*Acer negundo*<br>*Acer negundo*<br>*Ambrosia trifida, Aster ontarionus, Aster simplex, Galium aparine, Phalaris arundinacea* | W (wetland) |
| C. Upland forest (non-wetland) | 10.5 | Overstory:<br>Shrub layer:<br>Herbaceous layer: | *Quercus rubra, Fraxinus americana, Quercus macrocarpa*<br>*Assimina triloba, Staphylea trifolia*<br>*Festuca obtusa, Geum canadense, Laportia canadensis, Sanicula gregaria* | U (unclassified) |
| D. Scrub-shrub (wetland) | 7.6 | Shrub layer:<br>Herbaceous layer: | *Populus deltoides, Salix nigra*<br>*Xanthium strumarium* | W (wetland) |
| E. Meadow (wetland) | 464.9 | Herbaceous layer: | *Amaranthus tuberculatus, Ambrosia trifida, Conyza canadensis, Polygonum amphibium, Polygonum pensylvanicum, Xanthium strumarium* | W (wetland), FW (farmed wetland), and PC (prior converted) |
| F. Meadow (non-wetland) | 7.0 | Herbaceous layer: | *Abutilon theophrasti, Ambrosia trifida, Conyza canadensis* | FW (farmed wetland) |
| G. Marsh (wetland)—Farmed when dry enough | 15.8 | Herbaceous layer: | *Cyperus strigosus, Leersia oryzoides, Rorippa islandica, Typha latifolia* | FW (farmed wetland) |
| H. Lake or flooded ditch | 170.1 | None | None | Wa (water) |
| I. Pond | 1.1 | None | None | FW (farmed wetland) |
| J. Cropland | 776.9 | Herbaceous layer: | *Zea mays* | PC (prior converted) |
| K. Berm | 24.8 | Herbaceous layer: | *Ambrosia trifida* | U (unclassified) |

Note: At the time of this survey, approximately 171.2 acres of the site consisted of open water (Big Lake and associated ditches, plus ponds). Annual variations in overall water budget and farming regime create variations in this value. These variations translate to differences in other acreage figures as well. As a result, acreage values presented in this table differ slightly from acreage values presented later in the text.

and none were found. Archaeologists relocated one previously recorded site, the Thompson site, and documented 22 heretofore unreported sites. In addition, 45 non-diagnostic find spots (i.e., localities with less than six artifacts) were also recorded.

## III. Initial site development plan

The IDOT proposes to develop the La Grange wetland bank according to the general plan outlined in the following sections. This section presents information related only to the initial bank development plans. Bank performance standards, reporting and monitoring protocols, and contingency or remedial action measures are discussed in Section IV (D).

### A. Bank size and classes of wetland and aquatic resources

The proposed bank site is approximately 1645 acres and includes the various wetland and non-wetland communities outlined in Table 2. As shown in Figure 7, the IDOT anticipates that, upon completion of the restoration, the site habitat will consist of approximately 790 acres of intermixed marsh or wet shrubland, 606 acres of wetland floodplain forest, 56 acres of non-wetland floodplain forest, 10 acres of mesic upland forest, 31 acres of grassland, 150 acres of non-vegetated open water, and 2 acres of access roads. Proposed credit values listed in Table 2 account for the conversion of existing habitats into the anticipated habitats, including considerations for NRCS wetland determinations. As such, although the total site area is approximately 1645 acres, there will be an estimated 1024 acres of credits generated and approximately 1396 physical acres of wetlands in existence upon completion of the restoration activities.

The boundaries separating the expected community types on the site are approximate. These were estimated based on five sources of information: 1) the topography of the site, 2) the soils at the site, 3) the historical and recently measured flooding regime of the site, 4) vegetation communities located on nearby, naturally vegetated floodplain sites, and 5) early (1800s) government land survey notes. Boundaries separating marsh and wet shrubland communities cannot be determined a priori since these communities occur in very similar topographic and hydrologic regimes both on-site and on neighboring floodplain properties.

*Wetland preservation*

Approximately 210 acres of existing wetlands will be preserved, but will generate no credits because the floristic quality of these areas is low (values from 3.0 to 17.9).

All areas designated solely for preservation are considered to be mostly self-maintaining and will receive little or no management except for control of invasive species, such as reed canary grass, *Phalaris arundinacea*.

*Wetland enhancement*

Approximately 340 non-flooded acres of the site are denoted by the NRCS as farmed wetland and have typically been farmed when dry enough. Of these, 44 acres are expected to naturally revert to floodplain forest wetland, while 296 acres (on lower ground) are expected to naturally revert to marsh or wet shrubland. Wetland functions of these areas will be restored and will generate a total of 85 credits. Enhancement areas include sites 12, 14, 16, and part of 15 (Busemeyer et al., 2001).

Table 2. Existing and proposed classes of wetlands and other aquatic resources.

| Class | Existing habitat | Proposed habitat[1] | Proposed hydrologic zone[2] | Credit Ratio | Area (acres)[1] | Credits (acres) |
|---|---|---|---|---|---|---|
| Wetland preservation | marsh or wet shrubland | marsh or wet shrubland | II | 0.0 : 1.0 | 94 | 0 |
| | floodplain forest, wetland | floodplain forest, wetland | IV | | 116 | |
| Wetland enhancement | farmed wetland | marsh or wet shrubland | II | 0.25 : 1.0 | 296 | 74 |
| | farmed wetland | floodplain forest, natural regeneration wetland | IV | 0.25 : 1.0 | 44 | 11 |
| Wetland restoration[3] | agricultural land | marsh or wet shrubland | II | 1.0 : 1.0 | 400 | 400 |
| | agricultural land | floodplain forest, natural regeneration wetland | IV | | 100 | 100 |
| | agricultural land | floodplain forest, planted wetland | IV | | 346 | 346 |
| Non-wetland preservation | floodplain forest, non-wetland | floodplain forest, non-wetland | VI | 10% of total credits generated via wetland preservation, enhancement, and restoration | 56 | 93 |
| | mesic upland forest | mesic upland forest | VI | | 10 | |
| | pond/deep water | open water | II | | 150 | |
| Non-wetland restoration | agricultural land | grassland, non-wetland | VI | | 31 | |
| Roads | | | | | 2 | 0 |
| | | | | Total | 1645 | 1024 |

[1] Due to variations in hydrology within the levee perimeter, these proposed habitats and acreage estimates, particularly those for open water, and marsh or wet shrubland and floodplain forest wetland restoration, may be subject to revision.
[2] Representative zone as listed in Table 5 of the 1987 Wetland Delineation Manual (Environmental Laboratory 1987).
[3] Represent areas designated as 'prior converted' by the NRCS.

Figure 7 (proposed bank habitat plan) here.

Although the existing floristic quality of these sites is low to moderate, ranging from 3.0 to 19.5, the herbaceous layer in these areas is currently vegetated by hydrophytic species and will not be planted. However, the IDOT will enhance these wetlands by clearing invasive vegetation such as reed canary grass (*Phalaris arundinacea*), sandbar willow (*Salix exigua*), and cattails (*Typha angustifolia* and *Typha latifolia*) and promoting revegetation of native hydrophytic plants. Over time, species composition should change and improve as propagules from existing on-site wetlands (see Tables 3 and 4) are carried in by wind or floodwater and colonize these areas.

Table 3. Common native herbaceous hydrophytes of the La Grange bank site.

| | |
|---|---|
| Giant ragweed | *Ambrosia trifida* |
| Long-leafed ammania | *Ammania coccinea* |
| Panicled aster | *Aster simplex* |
| Beggar's ticks | *Bidens frondosa* |
| Beggar's ticks | *Bidens vulgata* |
| False aster | *Boltonia asteroides* |
| Lake sedge | *Carex lacustris* |
| Nut sedge | *Cyperus esculentus* |
| Nut sedge | *Cyperus strigosus* |
| Barnyard grass | *Echinochloa muricata* |
| Virginia wild rye | *Elymus virginicus* |
| Late boneset | *Eupatorium serotinum* |
| Bed straw | *Galium aparine* |
| Rice cutgrass | *Leersia oryzoides* |
| Moonseed | *Menispermum canadense* |
| Witch grass | *Panicum capillare* |
| Fall panicum | *Panicum dichotomiflorum* |
| Water smartweed | *Polygonum amphibium* |
| Smartweed | *Polygonum lapathifolium* |
| Smartweed | *Polygonum pensylvanicum* |
| Marsh yellow cross | *Rorippa sessiliflora* |
| Arrowhead | *Sagittaria latifolia* |
| Bur reed | *Sparganium eurycarpum* |
| Stinging nettle | *Urtica dioica* |

Table 4. Common native, wetland shrubs and small trees of the La Grange bank site.

| | |
|---|---|
| Indigo bush | *Amorpha fruticosa* |
| Button bush | *Cephalanthus occidentalis* |
| Persimmon | *Diospyros virginiana* |
| Halbard-leaf mallow | *Hibiscus laevis* |

*Wetland restoration*

Approximately 846 acres of agricultural fields designated by the NRCS as prior-converted wetlands and located on poorly drained Darwin, Titus, Beaucoup, and Wagner soils will be restored to a combination of emergent wetlands (approximately 400 acres) and floodplain forest (446 acres). Floodplain forest wetland restoration will be accomplished through deactivation of hydrological modifications followed by plantings (346 acres) and natural regeneration (100 acres). The herbaceous layer in areas to be restored will quickly be re-vegetated by volunteer hydrophytic plants as in enhancement areas (see Table 3 above). A credit ratio of 1:1 will result in an equal number of wetland credits being generated for these areas.

*Non-wetland habitats*

Non-wetland areas often provide important habitat and hydrologic functions complementary to those provided by wetlands. Many biological processes require both wetland and non-wetland areas. For example, the life history of most amphibians includes both aquatic and terrestrial stages. Of the 41 amphibian species that occur in Illinois, 37 use non-wetlands at least part of the time (Illinois Department of Natural Resources, 1994). Recognizing the value of non-wetlands to the functioning of nearby wetlands, the bank sponsor will restore or preserve 247 acres of non-wetlands at the site. Approximately 93 acres of wetland banking credits will be generated by way of non-wetland restoration/preservation.

Non-wetlands include about 150 acres of open water habitats within Big Lake and associated drainage ditches, 56 acres of non-wetland floodplain forest, 10 acres of existing upland forest, and 31 acres of agricultural fields on non-hydric soils. Existing open water habitat, non-wetland floodplain forest, and upland forest will be preserved. In addition, approximately 3.9 miles of existing dirt-surface roads, covering approximately 2 acres, will be retained and will be maintained by the IDOT.

B. Field divisions

For bank implementation purposes, the site was divided into 16 fields (Table 5), on the basis of definable hydrologic alterations (see Figure 8). These field delimiters aid in developing a phased approach to the bank implementation.

C. Work phases

Currently, approximately 90% of the site's original hydrology has been modified. Hydrology is controlled by approximately 5 miles of levees, 9 miles of ditches, an estimated minimum of 15 miles of drain tile, a 36-inch gravity drain pipe with a screw gate, and periodic use of a 12,000 gallon-per-minute diesel-powered pump. The IDOT proposes to deactivate essentially all active hydrologic modifications. The periodic pumping will be discontinued immediately. The gravity drain would remain in place, although the gate would be removed or locked open. The levees have been naturally breeched and will not be repaired. As practicable and necessary, drain tile would be exhumed and ditches would be filled. The bank site will be open at all times to flooding from the Illinois and La Moine Rivers.

Table 5. Proposed field divisions of the La Grange bank site.

| Field # | Field location | Approximate field size (acres) | Known or suspected hydrologic alterations | Length of tile | Length of ditch | Length of berm |
|---|---|---|---|---|---|---|
| 1 | Big Lake and surrounding area | 535 | pump station, 36” gravity drain, tile, ditches | 26302 ft | 5522 ft | none |
| 2 | Horseshoe Lake and surrounding area | 140 | culvert and ditch at south end, berms, possible tile | 5164 ft | 6263 ft | 400 ft |
| 3 | Former Crane Lake and surrounding area | 82 | ditches, low berms, possible tile | unknown | 3113 ft | unknown length |
| 4 | West of Field #5 | 21 | ditch outlet of Field #5, possible tile | 1693 ft | 679 ft | none known |
| 5 | “Fire swamp” | 49 | culvert and ditch at south end, north margin ditch between parcel and levee | unknown | 3642 ft | none known |
| 6 | East of Field #5 | 22 | ditch outlet of Field #5, blockage of swale between Field 5 and Field 2, ditch along north margin, possible tile | 3245 ft | 564 ft | none known |
| 7 | Southwest of Field #5 | 35 | tile, ditches on east and south margins | 4278 ft | 1427 ft | none known |
| 8 | Southeast of Field #5 | 40 | tile, ditches on east and south margins | 7146 ft | 2881 ft | none known |
| 9 | Below the break in slope, near well 19S | 82 | tile, ditches on east and south margins | 9961 ft | 3819 ft | none known |
| 10 | Below the break in slope, near well 16S | 32 | ditches on east and south margins, possible tile | unknown | 2172 ft | none known |
| 11 | Former Amelia Barker Lake and surrounding area | 94 | tile, central ditch along axis of former lake, ditches on west and east margin | 10987 ft | 5295 ft | none known |
| 12 | Above the break in slope, near well 13S | 86 | tile, ditch on south margin | 9819 ft | 1335 ft | none known |
| 13 | Above the break in slope, near SW3 | 43 | ditch on south margin, possible tile | unknown | 3169 ft | none known |
| 14 | Northwest corner of site | 102 | disconnected stream to west, ditch along north margin, possible tile | 2717 ft | 3484 ft | none known |
| 15 | Southwest corner of site | 103 | channelized bluff stream, ditches, possible tile | unknown | 3150 ft | none known |
| 16 | Areas outside the levees | 179 | No alterations; hydrology controlled directly by Illinois River | unknown | none known | none known |

Figure 8 (Field breakdown and hydrologic alterations) here.

At this time, the IDOT anticipates that no structures (weirs, berms, etc.) will be needed for controlling flood waters or retaining surface water within the bank site. However, during the implementation of the bank, hydrology and vegetation will be monitored to determine the need for corrective or remedial actions to achieve proper hydrologic conditions. If monitoring indicates that modification of the plans are needed, the IDOT may implement some of the actions presented in Section IV (D). Using the available baseline information and the proposed field delineations outlined above, the IDOT has developed a phased approach to implementing the bank (Table 5; Figure 9).

D. Specifications

The IDOT will restore and enhance existing wetland vegetation through a combination of clearing invasive vegetation and replanting with native hydrophytic trees or, for planned emergent (marsh) and wet shrubland areas, by allowing natural regeneration of native hydrophytic plants from the existing seed bank and from inflow during flood events. The IDOT will also reverse or deactivate existing hydrologic alterations to improve the wetland hydrology of the bank site. The following sections outline work guidelines for accomplishing these various tasks at the La Grange bank site.

*Preparation of fields to be planted*

Site preparation for planting will depend on the established hydrologic regime and the existing vegetation cover of a given field. In general, any existing hydrologic alterations (*e.g.*, drain tiles or ditches) within a given field will be reversed, or made ineffective, prior to planting in that field. The effort expended in reversing or removing specific hydrologic alterations may vary, depending on the extent to which the specific hydrologic alteration might negatively affect future wetland hydrology of the field in question. For a large portion of the site (including fields 1-3, 5, 6, and 8-10), the IDOT expects the herbaceous and shrub layers will consist of native, non-weedy volunteer species and will require no planting or field preparation.

Any field which is: located above a ground-surface elevation of 433' (approximate), designated for restoration of floodplain forest wetland, and partially covered by an herbaceous layer or shrub cover of non-invasive species, will be mowed as needed prior to planting. Similar fields with only a patchwork of invasive species will be selectively mowed and treated with herbicides. Fields with a pure cover of invasive species will be plowed, treated with herbicides, and seeded with a nurse crop prior to tree planting (see *Perennial and cover crop grass planting* below). Some species of native plants may be added to the cover crop mix.

Table 6. Work phases of the La Grange bank site.

| Work Phase | Field # (~acreage) | Work items | Time frame |
|---|---|---|---|
| A | 1 (535)<br>16 (179) | A-1. remove pump station, cease pumping | completed |
| | | A-2. pre-construction hydrology monitoring | underway |
| | | A-3. permanently open 36" drain, thus connecting site to Illinois River | year 1 |
| | | A-4. pre-construction monitoring/control of invasive vegetative species, especially reed canary grass in areas outside or on the levee | year 1 |
| | | A-5. remove derelict cranes located near southeast corner | Fall/Winter year 1 |
| | | A-6. destroy/deactivate ~26300 ft of tile northwest of Big Lake | Fall/Winter year 1 |
| | | A-6. fill/deactivate ~5500 ft of ditch along east margin | Fall/Winter year 1 |
| | | A-7. post-construction hydrology monitoring | year 2 – year 6 |
| | | A-8. post-construction monitoring of vegetation for performance standards and continued control of invasive species | year 2 – year 6 |
| | | A-9. request certification of credits based on monitoring results | year 7 |
| B | 2 (140) | B-1. pre-construction hydrology monitoring, determine hydrologic relationship between Field #2 and Big Lake after Phase A work | through year 2 |
| | | B-2. pre-construction monitoring/control of invasive vegetative species | year 1 – year 2 |
| | | B-3. destroy/deactivate ~5160 ft of tile around Horseshoe Lake | Fall/Winter year 2 |
| | | B-3. remove ~400 ft of low berms dividing portions of Horseshoe Lake | Fall/Winter year 2 |
| | | B-3. fill/deactivate ~6260 ft of ditches within, or along east margin of, Field #2 and connecting Field #2 with Big Lake | Fall/Winter year 2 |
| | | B-4. post-construction hydrology monitoring | year 3 – year 7 |
| | | B-5. post-construction monitoring of vegetation for performance standards and continued control of invasive species | year 3 – year 7 |
| | | B-6. request certification of credits based on monitoring results | year 8 |
| C | 3 (82) | C-1. pre-construction hydrology monitoring, determine hydrologic relationship between Field #3 and Big Lake after Phase A work | through year 2 |
| | | C-2. pre-construction monitoring/control of invasive vegetative species | year 1 – year 2 |
| | | C-3. locate/destroy/deactivate any tile around Crane Lake | Fall/Winter year 2 |
| | | C-3. remove or degrade any berms dividing portions of Field #3 | Fall/Winter year 2 |
| | | C-3. fill/deactivate ~3100 ft of ditches along margins of Field #3 and connecting Field #3 with Big Lake | Fall/Winter year 2 |
| | | C-4. post-construction hydrology monitoring | year 3 – year 7 |
| | | C-5. post-construction monitoring of vegetation for performance standards and continued control of invasive species | year 3 – year 7 |
| | | C-6. request certification of credits based on monitoring results | year 8 |
| D | 4 (21)<br>5 (49)<br>6 (22)<br>7 (35)<br>8 (40)<br><br>Total (166) | D-1. continued row-crop agriculture as possible in Fields #4 and #7 | year 1 – year 3 |
| | | D-2. pre-construction hydrology monitoring (all five fields) | through year 3 |
| | | D-3. pre-construction monitoring/control invasive vegetation in Fields #5, #6, and #8. | year 1 – year 3 |
| | | D-4. re-connect drainage swale between Horseshoe Lake and Field #5 | Fall/Winter year 3 |
| | | D-4. destroy/deactivate ~16360 ft of tile in Fields #4, #6, #7, and #8 | Fall/Winter year 3 |
| | | D-4. fill/deactivate ~9190 ft of ditches south of Field #5, along margins of Fields #7 and #8, and along north margins of Fields #4, #5, and #6. | Fall/Winter year 3 |
| | | D-5. post-construction hydrology monitoring in Fields #5, #6, and #8 | year 4 – year 8 |
| | | D-6. post-construction monitoring of vegetation for performance standards and continued control of invasive species in Fields #5, #6, and #8 | year 4 – year 8 |
| | | D-7. prepare Fields #4 and #7 for planting of hydrophytic tree species | Spring/Summer year 4 |
| | | D-8. plant hydrophytic tree species in Fields #4 and #7 | Fall/Winter year 4 |
| | | D-9. post-construction hydrology monitoring in Fields #4 and #7 | year 5 – year 9 |
| | | D-10. post-construction monitoring of vegetation for performance standards, continued control of invasive species in Fields #4 & #7 | year 5 – year 9 |
| | | D-11. request certification of credits based on monitoring results for Fields #5, #6, and #8 | year 9 |
| | | D-12. request certification of credits based on monitoring results for Fields #4 and #7 | year 10 |

Table 6 (continued). Work phases of the La Grange bank site.

| Work Phase | Field # (~acreage) | Work items | Time frame |
|---|---|---|---|
| E | 9 (82)<br>10 (32)<br><br>Total (113) | E-1. pre-construction hydrology monitoring | through year 4 |
| | | E-2. pre-construction monitoring/control of invasive vegetative species | year 1 – year 4 |
| | | E-3. destroy/deactivate a minimum of ~9960 ft of tile | Fall/Winter year 4 |
| | | E-3. fill/deactivate ~5990 ft of ditches along east and south margins of Fields #9 and #10 | Fall/Winter year 4 |
| | | E-4. post-construction hydrology monitoring | year 5 – year 9 |
| | | E-5. post-construction monitoring of vegetation for performance standards and continued control of invasive species | year 5 – year 9 |
| | | E-6. request certification of credits based on monitoring results | year 10 |
| F | 11 (94) | F-1. continued row-crop agriculture as possible | through year 5 |
| | | F-2. pre-construction hydrology monitoring, determine changes in hydrologic characteristics of Field #11 after Phase D work | through year 5 |
| | | F-3. pre-construction monitoring/control of invasive vegetative species | year 5 – year 6 |
| | | F-4. remove machine sheds and miscellaneous equipment | Spring/Summer year 5 |
| | | F-5. destroy/deactivate ~10990 ft of tile | Fall/Winter year 5 |
| | | F-5. fill/deactivate ~5290 ft of ditches along centerline of former Amelia Barker Lake and in northwest and southeast corners of Field #11 | Fall/Winter year 5 |
| | | F-6. post-construction hydrology monitoring | year 6 – year 11 |
| | | F-7. plant perennial and cover crop grasses in upland areas | Spring/Summer year 6 |
| | | F-8. as based on hydrologic conditions, prepare suitable areas for planting of hydrophytic tree species | Spring/Summer year 6 |
| | | F-9. plant hydrophytic tree species in hydrologically suitable areas | Fall/Winter year 6 |
| | | F-10. post-construction monitoring of vegetation for performance standards and continued control of invasive species | year 7 – year 11 |
| | | F-11. request certification of credits based on monitoring results | year 12 |
| G | 12 (86)<br>13 (43)<br><br>Total (129) | G-1. continued row-crop agriculture as possible | year 1 – year 5 |
| | | G-2. pre-construction hydrology monitoring | through year 6 |
| | | G-3. pre-construction monitoring/control of invasive vegetative species | year 6 – year 7 |
| | | G-4. destroy/deactivate ~9820 ft of tile | Fall/Winter year 6 |
| | | G-4. fill/deactivate ~4500 ft of ditches, south margins of Fields 12 & 13 | Fall/Winter year 6 |
| | | G-5. post-construction hydrology monitoring | year 7 – year 12 |
| | | G-6. as based on hydrologic conditions, prepare suitable areas for planting of hydrophytic tree species | Spring/Summer year 7 |
| | | G-7. plant hydrophytic tree species in hydrologically suitable areas | Fall/Winter year 7 |
| | | G-8. post-construction monitoring of vegetation for performance standards and continued control of invasive species | year 8 – year 12 |
| | | G-9. request certification of credits based on monitoring results | year 13 |
| H | 14 (102) | H-1. continued row-crop agriculture as possible | year 1 – year 6 |
| | | H-2. pre-construction hydrology monitoring | through year 7 |
| | | H-3. pre-construction monitoring/control of invasive vegetative species | year 7 – year 8 |
| | | H-4. destroy/deactivate ~2720 ft of tile | Fall/Winter year 7 |
| | | H-4. fill/deactivate ~3480 ft of ditches on north and west field margins | Fall/Winter year 7 |
| | | H-4. if feasible, reconnect Field #14 to stream along west levee | Fall/Winter year 7 |
| | | H-5. post-construction hydrology monitoring | year 8 – year 13 |
| | | H-6. prepare suitable areas for planting of hydrophytic tree species | Spring/Summer year 8 |
| | | H-7. plant hydrophytic tree species in hydrologically suitable areas | Fall/Winter year 8 |
| | | H-8. post-construction monitoring of vegetation for performance standards and continued control of invasive species | year 9 – year 13 |
| | | H-9. request certification of credits based on monitoring results | year 14 |
| I | 15 (103) | I-1. continued row-crop agriculture as possible | year 1 – year 6 |
| | | I-2. pre-construction hydrology monitoring | through year 7 |
| | | I-3. remove grain bins and foundations | Spring/Summer year 6 |
| | | I-4. pre-construction monitoring/control of invasive vegetative species | year 7 – year 8 |
| | | I-5. locate/destroy/deactivate any tile | Fall/Winter year 7 |
| | | I-5. fill/deactivate ~3150 ft of ditches; restore bluff stream to fan | Fall/Winter year 7 |
| | | I-6. post-construction hydrology monitoring | year 8 – year 13 |
| | | I-7. prepare suitable areas for planting of hydrophytic tree species | Spring/Summer year 8 |
| | | I-8. plant hydrophytic tree species in hydrologically suitable areas | Fall/Winter year 8 |
| | | I-9. post-construction monitoring of vegetation for performance standards and continued control of invasive species | year 9 – year 13 |
| | | I-10. request certification of credits based on monitoring results | year 14 |

Figure 9 (Phased work diagram) here.

*Planting of hydrophytic tree species*

The IDOT will restore and enhance floodplain forest wetlands through a combination of clearing invasive vegetation and replanting with conservative, hydrophytic trees (Table 7).

Table 7. Hydrophytic tree species for wetland enhancement/restoration.

| | | |
|---|---|---|
| Bitternut hickory | *Carya cordiformis* | FAC |
| Pecan | *Carya illinoensis* | FACW |
| Swamp white oak | *Quercus bicolor* | FACW+ |
| Pin oak | *Quercus palustris* | FACW |

Three-gallon, containerized plants will be used in floodplain forest wetland restoration and enhancement areas. Containerized plants are preferred to bare root plants because they will be taller and better able to compete with other vegetation. The extra height of the containerized plants will also help to place the plant tips out of reach of deer and moderately high floodwaters, both of which are expected to be common on the bank site. Seventy trees per acre will be planted in rows on 25-foot centers. Row planting makes possible mowing or herbicide application between the trees to give them a competitive advantage.

*Perennial and cover crop grass planting*

Fields being prepared for tree plantings may require establishment of nurse crops for erosion control and to reduce overgrowth of weedy or undesirable species. Nurse crops for these areas will consist of a mixture of annual and native grasses (Table 8).

Table 8. Nurse crop for tree planting.

| | | |
|---|---|---|
| ANNUALS | | |
| Redtop | *Agrostis alba* | FACW (3 lbs/acre) |
| Timothy | *Phleum pratense* | FACU (3 lbs/acre) |
| Annual rye | *Secale cereale* | UPL (50 lbs/acre) |
| NATIVE PLANTS | | |
| Stout wood reed | *Cinna arundinacea* | FACW |
| Virginia wild rye | *Elymus virginicus* | FACW- |
| Smartweed | *Polygonum punctatum* | OBL |
| Goldenglow | *Rudbeckia laciniata* | FACW+ |

The 31.1 acres of non-hydric cropland will be restored to grassland with native upland grass species (Table 9).

Table 9. Grasses for planting in non-wetlands.

| | |
|---|---|
| GRASSES | |
| Big bluestem | *Andropogon gerardii* |
| Canada wild rye | *Elymus canadensis* |
| Fall panicum | *Panicum virgatum* |
| Indian grass | *Sorghastrum nutans* |

*Control of invasive species and ongoing vegetation management*

For both planted and non-planted fields, areas containing the invasive, non-native species, *Phalaris arundinacea* (reed canary grass), will be treated with a systemic herbicide either in the early fall or in both spring and early fall, as determined to be necessary by the INHS. For those fields where it is needed, herbicide may be applied over an entire field before planting, or in bands immediately after planting. Herbicide bands, if used, will be located between rows of planted trees. A pre-emergent herbicide, such as Oust or Simazine, will be used.

Tall or weedy growth between the rows of planted trees and shrubs will be mowed 15 July through 30 September. Two to three years beyond the period of establishment, plantings may require further maintenance. Annual monitoring reports will provide the recommendations for maintenance of plantings.

Areas with poor survival of planted trees and shrubs will be replanted or one of the stated contingency measures (see Section IV [D]) will be employed. Problems with some invasive species should diminish as young forests mature, tree canopies close, and herbaceous layers become shaded.

At some point, the developing floodplain forest wetlands may benefit from a timber stand improvement, such as a thinning or release cutting. As recommended by the INHS, lower quality trees such as silver maple, green ash, cottonwood, and black willow may be selectively cut or treated with herbicide to favor higher quality pecan, bitternut hickory, and pin and swamp white oaks which, due to slower growth rates, may otherwise be shaded out.

*Tile inspection and deactivation*

For a given field, the tile deactivation strategy employed depends on the general field parameters (*e.g.*, topography or soil properties), known or suspected extent of drainage tiles, and observed hydrologic conditions of the specific field. The IDOT proposes two separate tile deactivation strategies based on a division of the site into two generalized areas. These areas can be roughly identified by their location relative to a natural north-south oriented break in slope representing a former river terrace (*e.g.*, a dividing line between Fields 4 and 5, 7 and 8, 12 and 9, 13 and 10, and 15 and 3, see Figure 8). For a given field, tile deactivation will generally precede ditch deactivation.

Strategy A: Fields located to the east of and below the slope break typically have minimal topographic variation, are closer to the local hydrologic base level, and receive drainage from upper portions of the site. This area also has an interconnected system of drainage ditches supplemented by drainage tile of unconfirmed extent and functionality. Based on these factors, any functional drainage tile in these areas is believed to have low potential for impacting the restoration of wetland hydrology. As such, the tile inspection and deactivation strategy for fields east of the slope break will generally be as follows:

1) Because of the low overall relief, the removal of trunk tile lines will degrade the effectiveness of a tile network without requiring the removal of smaller lateral lines, thus reducing the extensive time and work associated with removal of the

full tile system in a field. Whether observed to be flowing or not, main trunk lines of known or suspected tile systems should be entirely removed. Where possible, tile outlets in ditch banks will be manually located. If no outlets are found, exploratory trenches will be excavated near probable trunk tile lines based on available photographical evidence and geographical records.

2) The next step is to expose the top of the trunk tile, and to excavate a trench away from the outlet to expose the top of the entire trunk tile. To prevent washouts while the ditches are still functional, any excavations should begin approximately 30 feet from the known or suspected tile outlets in the ditch banks.
3) When the entire length of a trunk line is exposed, tile will be removed from the trench and the trench backfilled with materials equivalent to those in unaltered areas surrounding the tile trench. Backfill materials will be compacted to reduce the likelihood of erosion or the establishment of new drainage channels in the former tile trenches.
4) If, during excavation, a lateral tile appears to be flowing or potentially functional, the lateral tile will be removed and backfilled for a minimum distance of 50 feet away from the main trunk line.
5) If post-construction hydrological monitoring data for a given field suggest that tile effectiveness has not been sufficiently reduced and the area of wetland hydrology might be expanded, the IDOT may recommend additional tile deactivation activities (*e.g.*, complete removal of lateral tile lines) as a contingency action.

Strategy B: Fields located west and above the slope break typically have more topographic variation, are generally higher relative to the local hydrologic base level, and shed drainage to lower portions of the site. In these fields, ditches are fewer in number, shallower, narrower, and steeper in gradient. Also, drainage tile lines appear to discharge directly to ditch systems, rather than to trunk tile lines. Based on these factors, the drainage tile in these areas is believed to have more potential to impact the restoration of wetland hydrology, as compared to the local effects of tile in areas to the east of and below the slope break. As such, the tile inspection and deactivation strategy for fields to the west of the slope break will generally be as follows:

1) Because of the apparent lack of main trunk lines, it will be necessary to remove all encountered tile lines to maximize the potential for wetland hydrology within a given field. Whether observed to be flowing or not, all tile lines encountered should be entirely removed. Where possible, tile outlets in ditch banks will be manually located. If no outlets are found, exploratory trenches will be conducted near probable tile lines based on available photographical and geographical records.
2) Once existence of a tile line is confirmed, removal will begin by exposing the top of the tile along its full length. To prevent washouts while the ditches are still functional, any excavations should begin approximately 30 feet from the known or suspected tile outlets in the ditch banks.
3) When the entire length of a tile line is exposed, tile will be removed from the trench and the backfilled with materials equivalent to those in unaltered areas surrounding the tile trench. Backfill materials should be compacted to reduce the likelihood of erosion or the establishment of new drainage channels in the former tile trenches.

4) If, during excavation, a lateral tile is encountered, it should be entirely removed and backfilled as above.
6) If, during excavation, a tile appears to be flowing from or potentially providing drainage of the in-holding property, the tile trench should be left open. A contingency plan will then be developed to direct this water onto/across the La Grange site.

*Ditch abandonment/destruction*

Drainage ditches at the site will be deactivated on a field-by-field basis as the bank implementation proceeds (Table 5). For a given field, ditch deactivation will occur following tile deactivation. Ditch deactivation will include the installation of ditch checks to be followed by backfilling of the entire ditch to surrounding grade. The general procedure is as follows:

1) For any field that contains, or is bounded by, drainage ditches, aggregate ditch checks (anti-seep collars) will be constructed at 500-foot intervals along all open ditches prior to backfilling of the ditch. Ditch check specifications will be included as part of the individual work plan preparations for project contracting activities.
2) After completion of ditch checks, all material comprising ditch banks/berms, representing excavation spoil removed at the time of ditch installation, will be placed back into the ditches and compacted.
3) In order to reduce the likelihood of drainage re-establishment, ditches will need to be filled without preserving or creating swale topography. To accomplish this, additional material may be needed to ensure that the ditch can be brought to grade with surrounding areas. If so, any additional fill material should be of equivalent grain size and composition as that of the material in the immediate vicinity of the ditch being filled.
4) In fields where a hierarchy of drainage ditches is present, ditch filling activities will typically proceed from upslope (minor) to downslope (major) ditches.
5) Ditch deactivation in Fields #12 and #13 has the potential to impact, as well as be impacted by, the hydrology of the in-holding property located immediately to the west. Once the ditch dividing Field #12 from Field #13 is abandoned, drainage ditches on the in-holding property will not function as intended. There is also the potential that water draining from the in-holding could reactivate this ditch. If the in-holding property remains separate from the bank site at the end of Year 5 (one year prior to the planned implementation of Fields #12 and #13), the IDOT will develop plans for a water control structure capable of permitting continued drainage of the in-holding, while also reducing the likelihood of ditch re-establishment between Fields #12 and #13.

*Berm removal*

If monitoring data indicate that soil berms detrimentally isolate portions of the site, or otherwise diminish desirable water movement, they will be reduced to the average surrounding grade. Berms with no hydrological role may be left in place to provide topographic variation.

*Stream relocation (Field #14)*

The IDOT believes re-connection of a bluff stream to its natural alluvial fan located at the west perimeter of Field #14 would be a desirable goal. However, this area has been identified as a potential archaeological site and the energy of the stream system is known to be high due to the steep gradient. As such, concerns associated with relocating this stream include both the potential for excessive erosion of the fan and the possible disruption of any archaeological remnants. Secondary concerns surround possible disruption of the archaeological site during excavation to relocate the stream channel. If the IDOT decides to pursue this goal, further study of both the archaeological significance of the site and the geotechnical feasibility of relocating the stream would be required. Since work for Field #14 is planned for Year 7, there will be sufficient time to study this issue.

*Road maintenance*

Existing access roads will be maintained in their current condition and configuration. In the past, maintenance of these roads has involved periodic grading of the dirt surface to establish a slight crown, allowing water to be drained to the road edges. All road maintenance will be performed at the direction of the IDOT. No additional access roads are anticipated to be needed, however, if the IDOT identifies a need to modify the existing road network, a request for such work will be made to the Mitigation Bank Review Team (MBRT) as part of standard bank contingency actions.

E. Cultural resource concerns

Since development of the bank site will be phased over several years and the extent of, or need for construction (*e.g.*, filling of ditches, excavation of drain tile), is unknown, the bank sponsor is not able to determine the need for coordination with regards to cultural resources. If there appear to be conflicts, then the sponsor will consider measures to avoid disturbing known sites (*e.g.*, modify the method of deactivation). If there appears to be unavoidable conflicts (*e.g.*, drain tile will have to be removed to restore wetland hydrology to an area) then a phase II archaeology survey will be conducted and coordination will occur prior to the initiation of any earth moving activity.

## IV. Accounting, performance, and monitoring methods

A. Accounting procedures

The IDOT will begin development of the wetland bank within three years of approval of this instrument and will complete the work in nine phases (see Table 5; Figure 9). Upon approval of the bank instrument, the bank will be credited with 100 (Approximately 10% of total credits initially) acres of uncertified wetland credit. No additional credits will be generated for use in the bank beyond the initial 100 acres until all of the original uncertified credits have been converted to certified credits.

The IDOT will not use a wetland functional assessment methodology to determine credits or debits, but will use acreage as a surrogate for measuring function. All planned wetlands (*i.e.*, restorations or enhancements) will qualify for certification only after attainment of the approved performance standards (see Section IV [B]). The MBRT Chair will be responsible for certifying wetland credits.

As the site development plan is implemented and areas within the bank achieve the approved performance standards, the IDOT will submit supporting information from the monitoring reports to the MBRT Chair and request certification of these areas (5 acre minimum size) for wetland credit. The IDOT will also submit a copy of the bank ledger showing the proposed credit. The MBRT Chair will respond by either accepting or denying the new balance. If denied, the MBRT Chair will provide an explanation of the basis for the denial. If applicable, the MBRT will provide guidelines for the IDOT to make revisions to a denied request which would result in acceptance of some or all of the originally requested credits. Wetland bank credits will be good for ten years from the date of certification. If certified credits are not used within ten years, then they must be re-certified before they can be used. In order to get re-certified, credit areas must meet or exceed performance standards as determined by recent monitoring. The MBRT will approve or deny requests re-certification.

Different compensation ratios are used for Federal and State purposes. In addition, the Federal and State policies on the use of uncertified credits are different (uncertified credits may be applied on a 1:1 basis for State purposes whereas Federal policies call for 1.5 acres of uncertified credit to provide one acre of compensation). Since the State ratios will generally require compensation amounts equal to or greater than the Federal ratios, the State ratios will be applied for purposes of determining the amount of credits needed to provide the required compensation on highway projects allowed to use the bank.

As needed, the IDOT will submit to the MBRT Chair a request to debit the bank via the Section 404/10 permit application or wetland impact evaluation process. The request or permit application will include a copy of the bank ledger and a line item indicating the proposed debit. The MBRT Chair will respond by approving or denying the request. If denied, the MBRT Chair will provide an explanation of the basis for the denial. If applicable, the MBRT will also provide guidelines for the IDOT to revise the denied request to include the necessary information for its approval.

The IDOT Bureau of Design and Environment will be the banker for the department. As banker, the bureau will coordinate certification of credits, maintain the bank ledger (see Table 9), and coordinate with the MBRT departmental and local agency requests for debiting.

Table 10. Format of the wetland bank ledger with sample entries.

| La Grange wetland bank | | | | | | |
|---|---|---|---|---|---|---|
| ACOE permit no. | Field # | Date | Transaction | Credit | Debit | Balance |
| | | | Instrument approved | 100.0 | | 100.0 |
| | | | FAP 3XX (IL Rt. 67) Contract No. 32XX | | 37.1 | 62.9 |
| | 1 | | Certification of 10.0 credits | 0 | | 62.9 |
| | 2 | | Certification of 30.0 credits | 0 | | 62.9 |

Table 10. (Continued) Format of the wetland bank ledger with sample entries.

| Credit certification | | | | | |
|---|---|---|---|---|---|
| Field # | Date | Transaction | Certified | Uncertified | Total credits |
| -- | -- | Instrument approved | 0.0 | 100.0 | 100.0 |
| 1 | -- | cert. of 10 acres | 10.0 | 90.0 | 100.0 |
| 2 | -- | cert. of 30 acres | 40.0 | 60.0 | 100.0 |
| 3 | -- | cert. of 20 acres | 60.0 | 40.0 | 100.0 |
| | | | | | |

B. Performance standards for credit availability and bank success

Two primary performance standards have been established to judge success of the planned wetlands and credit availability at the bank site:

1. Each planned wetland should be a jurisdictional one as defined by current Federal standards.
   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.
   c) Presence of wetland hydrology. The planned wetlands must be either permanently or periodically inundated at average depths less than 6.6 feet or have soils that are saturated to the surface for at least 12.5% of the growing season.

2. Each planned wetland should meet standards for planted species survival and floristic composition.
   a) Planted species survivorship. At least 80% of the planted trees should be established and living five years after planting. This standard will not apply to areas which were initially planned to be planted, but for which no planting occurred due to modification of the work plan.
   b) Native species composition. At least 90% of the plant species present should be non-weedy, native, perennial and annual species.
   c) Native species cover. At least 75% of the vegetative cover present should be native, perennial and annual species.
   d) Dominant plant species. None of the dominant plant species may be non-native or weedy species, such as cattails, sandbar willow, reed canary grass, giant ragweed, or giant reed.

C. Reporting protocols and monitoring plan

Annual monitoring and status reports will be submitted to the MBRT Chair by December 31st. The IDOT will monitor for attainment of each of the above stated performance standards. In cases of non-attainment, the reports will provide recommendations for maintenance or remediation. The MBRT Chair will review the annual monitoring and status report and provide comments regarding any recommended maintenance or remedial actions proposed by the IDOT. If no response is received within 90 days of submittal, approval to conduct proposed remedial or maintenance actions will be assumed.

If planted before June 1st, monitoring will begin that fall; if after, the following spring. The IDOT will generally follow the Level II procedures for monitoring as described in the Illinois Wetland Restoration and Creation Guide (Admiraal et al., 1997).

Hydrology and sedimentation will be monitored by the ISGS. A combination of soil-zone monitoring wells, surface-water staff gauges, and continuous-recording devices (data loggers) will be employed to monitor depth of surface water or depth to ground water (see Figure 6). Biweekly measurements in springtime and monthly measurements during the remainder of the year are normally adequate to determine if the wetland hydrology criterion has been satisfied. Staff gauges will also be deployed to monitor sediment storage at the site. Locations and quantities of monitoring equipment are believed to be sufficient for making determinations of the presence of wetland hydrology in all planned wetlands.

Vegetation will be monitored by the INHS. Species lists will be compiled for each of the 16 planned wetland "field" sites. A determination of dominant species ranked in order of importance value (I.V.) will also be made for each of the sites.

Planted tree survivorship will be quantitatively sampled in 33 foot x 33 foot quadrats placed at approximately 160 foot intervals along transects covering all parts of the site where trees have been planted. Transects will be spaced at approximately 160 foot intervals. Transects and quadrats will always be placed at least 33 feet inside the edge of the planned wetland.

Sampling transects and points will be laid out with the same spacing as above for the emergent wetland and wet shrubland areas. However, at each point two plots, 20 feet x 20 feet, will be established. In each plot the percentage cover of native and non-native species will be determined. The proposed layout for transects and sampling quadrats is depicted on Figure 10.

D. Contingency and remedial actions and responsibilities

Site development will be implemented in phases spanning 14 years. Over this time, the hydrology and vegetation of the entire bank site will be monitored continuously. This early monitoring will be used to fine tune or modify the plan as it is being implemented. If at any time during early monitoring it appears prudent to modify the plan, the bank sponsor will evaluate such an action in consultation with the Mitigation Bank Review Team. Early monitoring and modifications should reduce the need for late term remediation; nonetheless, there may be the need to take such actions after the plan is fully implemented.

There is the possibility that the target hydrology is not attained. If an area is wetter than planned and only un-vegetated open water is present, the bank sponsor would consider re-activating a portion of the breached levee system. A low levee might be placed in order to decrease the frequency of flooding from the Illinois and La Moine Rivers.

There is the possibility that some areas will flood longer than planned and planted trees will die. If numbers drop below the performance standards, then the IDOT may propose replanting or allowing for natural regeneration by flood tolerant species such as silver maple (*Acer saccharinum*). In some cases the planned wetland type may have to be changed in order to fit an area's hydrology. For example, an emergent marsh may be more appropriate where a floodplain forest was originally planned.

There is the possibility that some plantings will be overcome by natural growth and survivorship of planted trees will be low. If the floristic quality is moderate to high and the vegetation is dominated by hydrophytic plants, then the IDOT will request that the MBRT consider granting restoration of that area through natural regeneration. If floristic quality is

low, the IDOT will consider mowing or applying herbicides or even replanting. If floristic quality is moderate and tree stocking is very high, a third option may consist of thinning a timber stand to improve quality.

There is the possibility that reed canary grass (*Phalaris arundinacea*) may become a problem invasive over some areas of the site. The bank sponsor may propose to control this species through spraying with a systemic herbicide either in the early fall alone or in the spring and early fall. If control of invasive species is not cost effective, the sponsor may accept a lesser amount of credit or simply forgo the credits to be generated by an area.

The IDOT will be responsible for identifying and funding contingency and remedial action plans. Should the IDOT determine that any remedial actions are needed, a proposed work plan alteration and supporting documentation will be submitted in writing to the MBRT Chair for approval. The MBRT Chair will review the proposed alterations and approve or deny the request. If denied, the MBRT Chair will provide an explanation of the basis for the denial. If applicable, the MBRT will also provide guidelines for the IDOT to revise the denied request to include the necessary information for its approval. If no response is received within 90 days of submittal, approval to conduct proposed remedial or maintenance actions will be assumed.

Figure 10 (vegetation transect plan) here.

## V. Financial assurances and long-term bank management

The IDOT will program funds for remediation in the event there is failure at one or more of the planned wetlands. The IDOT will not post performance bonds, hold escrow accounts or dedicate legislatively enacted funds to cover contingency measures. The IDOT will cause to be monitored, the planned wetlands at the bank site.

The IDOT will manage the 1645-acre bank site up until the time it is transferred to an entity for long-term management. An agreement between the IDOT and the entity will transfer responsibility for the management of the bank site in accordance with the approved mitigation bank site instrument and wetlands site development plan. The agreement will also provide for the long-term protection of the wetland credit areas. No credits will be used until the IDOT has an agreement in place for the long-term management of the bank site.

As part of the wetland mitigation bank transfer process and before its completion, the IDOT would request the concurrence of the Illinois State Historic Preservation Officer (SHPO) in our determination, (1) that no sites subject to protection under Section 106 of the National Historic Preservation Act of 1966, as amended, which would be impacted by projects implemented by the transferee are present in the bank site area, or that (2) significant sites are present in the bank area and any future potential impacts by the transferee would have to be coordinated with the SHPO. If option (2) is the case, a report concerning the archaeological sites and a site location map would be sent to the transferee (with a copy to their staff archaeologist) prior to the completion of the transfer process.

## VI. Signatories

In accordance with the Federal Guidance for the Establishment, Use and Operation of Mitigation Banks, this document has been prepared to describe the provisions for establishment, use, and operation of the La Grange wetland bank site in Brown County, IL by the IDOT.

The undersigned agencies hereby agree that this banking instrument shall provide the basis for proceeding with establishment and operation of the La Grange site in accordance with its terms as approved or as subsequently amended with the concurrence of all signatory agencies.

Timothy W. Martin — Date
Secretary
Illinois Department of Transportation

Joel Brunsvold 6-17- — Date
Director
Illinois Department of Natural Resources

Richard C. Nelson 8/23/04 — Date
Field Supervisor
Rock Island Ecological Services Field Office
U.S. Fish and Wildlife Service

Joyce Collins 08/09/04 — Date
Assistant Field Supervisor
Marion Ecological Services Sub-Office
U.S. Fish and Wildlife Service

Duane P. Gapinski 10/7/04 — Date
Colonel, U.S. Army
District Engineer, Rock Island District

C. Kevin Williams 15SEP04 — Date
Colonel, U.S. Army
District Engineer, St. Louis District

for Kevin Pierard — Date
Chief, Watersheds and Wetlands Branch
U.S. Environmental Protection Agency

## VII. References


Admiraal, A.N., M.J. Morris, T.C. Brooks, J.W. Olson, and M.V. Miller. 1997. Illinois Wetland Restoration and Creation Guide. Illinois Natural History Survey Special Publication 19. viii + 188 pp.

Amundsen, S. and D.A. Enstrom. 2001. Memorandum: Year 2000 Bird Survey, Brown County Wetland Banking Site, Brown County, Illinois. Technical report submitted to the Illinois Department of Transportation, Bureau of Design and Environment.

Berning, G.V. 1980. Soil Survey of Brown County, Illinois. United States Department of Agriculture—Soil Conservation Service, in cooperation with the Illinois Agricultural Experiment Station, 163 pp. + 45 map sheets.

Busemeyer, D.T., D.J. Keene, L. Suloway, and A. Morgan. 2001. Mitigation Site Assessment for the Wessel Tract, Brown County, Illinois. Technical report submitted to the Illinois Department of Transportation, Bureau of Design and Environment.

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual: U.S. Army Corps of Engineers Technical Report Y-87-1. Washington, D.C. 100 p.

Federal Register. 1995. Federal guidance for the establishment, use and operation of mitigation banks. 60(228):58605-58614.

Fucciolo, C.S., J.J. Miner, S.E. Benton, K.W. Carr, D.B. Ketterling, B.A. Watson, G.E. Pociask, B.J. Robinson, K.D. Weaver, and M.V. Miller. 2001. Annual Report for Active Wetland Compensation and Hydrologic Monitoring Sites, September 1, 2000 to September 1, 2001: Illinois State Geological Survey Open File Series 2001-5, Champaign, IL, 297 p.

Fucciolo, C.S., J.J. Miner, S.E. Benton, K.W. Carr, D.B. Ketterling, B.A. Watson, G.E. Pociask, B.J. Robinson, K.D. Weaver, and M.V. Miller. 2000. Annual Report for Active Wetland Compensation and Hydrologic Monitoring Sites, September 1, 1999 to September 1, 2000: Illinois State Geological Survey Open File Series 2000-11, Champaign, IL, 225 p.

Fucciolo, C.S., S.E. Benton, K.W. Carr, D.B. Ketterling, M.A. Lake, M.V. Miller, J.J. Miner, G.E. Pociask, B.J. Robinson, P.J. Sabatini, B.A. Watson, K.D. Weaver, and K.J. Werner. 2002. Annual Report for Active Wetland Compensation and Hydrologic Monitoring Sites, September 1, 2001 to September 1, 2001: Illinois State Geological Survey Open File Series 2002–3, Champaign, IL, 341 p.

Hill, S.R. 2001. Botanical Survey of the Brown County Wetland Mitigation B (former Wessel Property), Brown County, Illinois with particular reference to *Boltonia decurrens*. Report submitted to the Illinois Department of Transportation, Bureau of Design and Environment.

Illinois Department of Natural Resources. 1994. The Changing Illinois Environment: Critical Trends. Volume 3 technical report. Illinois Department of Natural Resources, Springfield, Illinois.

Larson, G. 2002. Personal communication regarding legal property description.

Moffat, C., D. Nolan, R. Gifford, A. Graham, and J. Logan. 2001. Archaeological Survey Report: Wetland Mitigation Bank, Wessel Property, Brown County, IL. Project No. 01056, Illinois Transportation Archaeological Research Program, University of Illinois at Urbana-Champaign, 10 pages plus attachments.

Natural Resources Conservation Service. 2001. Documents pertaining to NRCS-certified wetland determinations.

U.S. Geological Survey. 1980. Cooperstown, Illinois, 7.5-Minute Series (Topographic): U.S. Department of the Interior, Geological Survey, Reston, Virginia, map scale 1:24,000, 1 sheet.