Conservation Plan
for the Ornate Box Turtle

Ameren Oakley Substation
and
Pana-Midway Transmission Line Rebuild Projects

Prepared for:

Illinois Department of Natural Resources

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October 2020

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List of Abbreviations and Acronyms

AIC	Ameren Illinois Company
IDNR	Illinois Department of Natural Resources
ITA	Incidental Take Authorization
kV	kilovolt
mph	miles per hour
NRCS	Natural Resources Conservation Service
ROW	right-of-way
SWPPP	Storm Water Pollution Prevention Plan
U.S.	United States
USDA	United States Department of Agriculture

Illinois Department of Natural Resources

CONSERVATION PLAN

(*Application for an Incidental Take Authorization*)
Per 520 ILCS 10/5.5 and 17 Ill. Adm. Code 1080

PROJECT APPLICANT: Ameren Illinois Company

PROJECT NAME: Oakley Substation Project and Pana-Midway Transmission Line Rebuild Project within and/or Adjacent to the Coffeen Lake State Fish and Wildlife Area, Upland Site.

COUNTY: Montgomery County

AMOUNT OF IMPACT AREA: 17.55 acres (14.15 acres temporary impact, 3.39 acres permanent impact)

1. INTRODUCTION

This Conservation Plan has been prepared in accordance with the requirements outlined in Title 17, Chapter I(c), Section 1080 of the Illinois Administrative Code (Incidental Taking of Endangered or Threatened Species). Section 1080 allows the Illinois Department of Natural Resources (IDNR) to authorize the incidental take of species listed as Endangered or Threatened by the State of Illinois following the preparation of an approved Conservation Plan. This Conservation Plan is written in support of Ameren Illinois Company (AIC)'s application for incidental take authorization (ITA) from IDNR for the ornate box turtle (*Terrepene ornata*).

AIC is rebuilding the existing Pana-Midway 138-kilovolt (kV) Transmission Line and is constructing a new Oakley 138-kV breaker substation in the Pana-Midway line (proposed Project; Figure 1). Consultation with the IDNR (Appendix A), including Illinois EcoCAT reviews (2003313 and 1911835), indicated records for the state-listed ornate box turtle on the IDNR Coffeen Lake State Fish and Wildlife Area, Upland Site, in the vicinity of the Oakley Substation and Pana-Midway Transmission Line Rebuild Project areas.

Based on recommendations from IDNR during initial consultation in October 2019 (Appendix A), AIC implemented avoidance measures for the ornate box turtle at the Oakley Substation and Pana-Midway Transmission Line Rebuild Project areas on and adjacent to the State Fish and Wildlife Area during construction activities from May through August, 2020. Those measures included a silt exclusionary fence around the Project areas, monitoring the fence and work areas for the ornate box turtle, and informing crews onsite about the species. A flyer also was distributed to construction crews to aid with identification of the species (Appendix B).

Due to biological monitoring put in place by AIC, one ornate box turtle was found within the Oakley Substation work area on June 1, 2020, and one was found within the Pana-Midway Transmission Line work area on June 29, 2020. Both turtles were safely relocated to the IDNR Coffeen Lake State Fish and Wildlife Area boundary, and the encounters were reported to the IDNR.

After these ornate box turtle encounters, subsequent consultation with IDNR in June and July 2020 (Appendix A) revealed that recent occurrence data, including surveys conducted at the Upland Site by the IDNR's Division of Natural Heritage in the spring of 2020, indicate that the ornate box turtle population is likely larger and the risk of "take" is higher in this particular area than previously thought by IDNR. Therefore, the IDNR recommended on June 5, 2020 that Ameren apply for an ITA for both projects immediately. AIC also applied for and received an endangered and threatened species permit for the ornate box turtle for the Project areas (Appendix C).

2. LIKELY IMPACTS

A. Area to be Affected

Due to the age and condition of existing structures on the AIC Pana–Midway 138-kV Transmission Line in Montgomery and Christian Counties, Illinois, AIC is rebuilding 27.68 miles of the line from Pana to structure 237 (Schram City Tap) using T-2 conductor capable of carrying 2,000 amps under summer emergency conditions. To increase reliability and operating flexibility in the area, AIC also is constructing a new Oakley 138-kV breaker substation at the Schram City Tap on Highway 185 in the Pana-Midway line (Figure 1).

Through coordination with IDNR, it was determined that records of the state-threatened ornate box turtle exist within the Coffeen Lake State Fish and Wildlife Area, Upland Site, in Montgomery County. Therefore, the action area for this Conservation Plan is defined as the areas of disturbance associated with the Pana-Midway Transmission Line Rebuild Project and the Oakley Substation Project that are within and adjacent to the IDNR Coffeen Lake State Fish and Wildlife Area (17.55 acres). These areas include portions of the existing 50-foot right-of-way (ROW) of the Pana-Midway transmission line between the foundation structures 229 and 233, and between structures 235 and 237, as well as the temporary off-ROW access routes that feed these structures. The action area also includes the Oakley Substation construction limits and the ROW connecting the new substation to the existing Pana-Midway transmission line (Figure 1).

The action area is located approximately one mile northwest of the town of Coffeen, in Montgomery County, Township 8N, Range 3W, Sections 27 and 28. The proposed Oakley Substation is located on a parcel west of the IDNR Coffeen Lake State Fish and Wildlife Area, while

portions of the Pana-Midway transmission line are located on the IDNR property. Figure 1 depicts the action area in relation to the Coffeen Lake State Fish and Wildlife Area.

Appendix D includes a table summary indicating ownership or control of the affected properties in the Project areas. AIC has easement agreements for the transmission line ROW with each of the landowners. The terms of the individual easements vary. Maintenance and construction activities were completed under the existing easements.

B. Biological Data on Ornate Box Turtle

This Conservation Plan has been prepared in accordance with the Illinois Endangered Species Protection Act (520 ILCS 10/5.5 and 17 Ill. Adm. Code 1080) in support of an ITA application to the IDNR. The purpose of this Conservation Plan is to review the proposed Project in sufficient detail to determine to what extent the proposed action may result in "incidental take" of the ornate box turtle, which is a state-threatened species in Illinois.

A desktop and field habitat assessment were performed for the action area. Prior to the field investigation, several data sources were reviewed to identify areas of suitable habitat for the ornate box turtle. These data sources included:

- USGS 1:24,000 Scale Topographic Maps (Figure 1)
- National Land Cover Database (Homer et al. 2015) (Figure 2)
- Recent aerial photography (Figure 3)
- Natural Resources Conservation Service (NRCS) soils data for Montgomery County, Illinois (Appendix E)

As described in Section 1, due to biological monitoring for ornate box turtles recommended by IDNR during pre-construction consultation (Appendix A) and conducted by AIC during construction, one ornate box turtle was found within the Oakley Substation work area on June 1, 2020, and one was found within the Pana-Midway Transmission Line work area on June 29, 2020. Both turtles were safely relocated to the IDNR Coffeen Lake State Fish and Wildlife Area boundary, and the encounters were reported to the IDNR.

After these ornate box turtle encounters , subsequent consultation with IDNR in June and July 2020 (Appendix A) revealed that recent occurrence data, including surveys conducted at the IDNR Coffeen Lake State Fish and Wildlife Area Upland Site by the IDNR's Division of Natural Heritage in the spring of 2020, indicate that the ornate box turtle population is likely larger and the risk of "take" is higher in this particular area than previously thought by IDNR.

A site visit was made to the action area on July 7, 2020 to confirm the presence of suitable habitat for the ornate box turtle within the areas of proposed construction disturbance between structures 229 and 237, the temporary off-ROW access routes to these structures, and the Oakley Substation

construction disturbance limits and connecting ROW. Given the lack of occurrence records and predominance of agricultural fields north of structure 229, no additional habitat assessment site visits were made within the remaining portions of the Pana-Midway Transmission Line Rebuild Project.

Species Description

Ornate box turtles are small terrestrial turtles that average four to five inches in length and have a high-domed, round, or oval carapace (upper shell) with a dark brown color and yellow lines on each scale that radiate downward. The hinged plastron (lower shell) is similarly marked and allows the animal to completely enclose itself in the shell (IDNR 2017). Males may be distinguished from females by the presence of an enlarged and inwardly facing first toe on the hind feet, a concave plastron, and red eyes (USFS 2006).

Ornate box turtles spend a large amount of time underground in burrows, which are used for hibernation and resting. These turtles will emerge in the early morning, basking until a body temperature appropriate for foraging is reached, and then will forage as an opportunistic feeder until temperatures become too high (Ernst and Lovich 2009). The ornate box turtle eats insects, snails, earthworms, tadpoles, dead animals, bird eggs and berries and other plant materials (IDNR 2017). Once temperatures increase, the ornate box turtle will retreat to cooler, shadier areas until temperatures cool down enough for a second foraging period. The length of the turtle activities, which consist of basking, foraging, and resting, are affected by environmental temperatures (Ernst and Lovich 2009).

Female ornate box turtles lay one or more clutches of eggs in May through June and abandon their nests to let the eggs incubate for approximately 80-90 days. Hatchlings emerge in the fall or may overwinter depending on conditions. In mid- to late October, the ornate box turtle burrows two to three feet into the ground to overwinter. They remain in their overwintering burrow until they emerge in late April or early May. The range of an individual ornate box turtle was estimated to be approximately five acres (Legler 1960).

Species Status in the Action Area

IDNR records indicate that there are occurrence records for this species in Montgomery County (EcoCAT ID#2003313). This species is known to occur within the Coffeen Lake State Fish and Wildlife Area, Upland Site. Recent data, including surveys conducted at the Upland Site by the IDNR's Division of Natural Heritage in the spring of 2020, indicate that the ornate box turtle population is likely larger in this particular area than previously thought.

Habitat Requirements

Ornate box turtle habitat includes mesic and dry-mesic prairies, oak savannas, open to semi-open woodlands, and open fields in former prairie. Ornate box turtles are restricted to areas with soils

that allow for easy burrowing and thus prefer sandy soils and sand prairie habitats. However, they can also be found in southern till plain prairies and open fields that were former prairies. Overwintering sites include upland and sand prairies, sand dunes, and shrubland that are open and lack shade (IDNR EcoCAT ID#2003313, Appendix A).

Habitat Assessment

Based on a desktop analysis of NRCS soil survey data (Appendix E), the action area does not contain sandy soils but is characterized by southern till plain prairies. Soils within the action area consist predominantly of silt loams with landform settings consisting of till plains and ground moraines (NRCS USDA 2020). These soil types may be sufficient for ornate box turtle habitat because the unconsolidated material of a till plain would accommodate their burrows.

The extent of suitable ornate box turtle habitat within the action area was based on the following assumptions that ornate box turtles:

1. Use open canopy habitats and do not regularly utilize closed canopy forest or wetlands.
2. Prefer non-cropped grassland habitat over actively cropped areas, despite the fact that they may travel across actively cropped farmland at times throughout the year.

During a site visit on July 7, 2020, biologists identified habitat types associated with till plain prairie of various quality and old field conditions that are suitable to the ornate box turtle. Based on a desktop analysis of NRCS soil survey data, aerial photos, and land cover (Figure 2), as well as observations from the field site visit, it was estimated that the action area consists of approximately 17.6 acres of suitable habitat for the ornate box turtle (Figure 3). Actively cropped areas, such as the parcel encompassing structure 234 and its associated access road, are not considered suitable habitat and thus were not considered part of the action area for this Conservation Plan.

C. Description of Project Activities

i. Practices to be Used

Due to the age and condition of existing structures on the AIC Pana–Midway 138 kV Transmission Line in Montgomery County, Illinois, AIC is rebuilding 27.68 miles of the line from Pana to structure 237 (Schram Tap) using T-2 conductor capable of carrying 2,000 amps under summer emergency conditions. To increase reliability and operating flexibility in the area, AIC also is constructing a new Oakley 138 kV breaker substation that will connect to the Pana-Midway line on Highway 185 (Figure 1). The rebuilt line will improve grid reliability, meet local energy needs, and promote cleaner energy sources.

Transmission Line Rebuild

AIC is the sole owner and operator of the existing Pana-Midway 138-kv transmission line and will be responsible for the rebuild, operation, and maintenance activities for the Project. Within the action area, which includes an existing 50-foot ROW within and adjacent to the Coffeen Lake State Fish and Wildlife Area, Upland Site, AIC will be removing 8 wooden H-frame structures and replacing them with new H-frame structures (229-233, 235-236) that will need to be offset along the centerline by two to five feet. The offset is necessary since the new poles need to be set first before wires are transferred and the old structure can be removed. Structure 237 requires an upgrade to a steel monopole on 8-foot-diameter concrete piers and needs to be shifted approximately 20 feet from the existing structure due to a gas line that currently runs between the existing poles. There will also be one additional structure installed, 237A, that will replace the existing wooden monopole structure and connect structure 237 of the Pana-Midway line with the new Oakley Substation along Highway 185 (Figure 3).

Upon establishing safe and efficient access along the ROW, the existing conductors will be removed from the H-frame structures and recycled. Next, the existing wooden H-frame structures will be removed from the ground and their holes will be backfilled. Holes will be filled the day they are dug, or they will be covered until they are backfilled. The spoils from those holes will be graded into the substation site, and no spoils will be left onsite.

The new wooden H-frame structures will be placed in holes augured in the ground using truck- or track-mounted augers to a maximum estimated depth of 14 feet and backfilled with crushed rock; spoils/soil from the hole would be used for any additional backfill. The structure poles will each require a maximum 55-inch diameter augured hole. Transmission line structures are typically transported to the site in two or three pieces, assembled at the structure location, and then erected onto the foundation (steel structures) or into the new augured hole (wooden structures). Equipment utilized for this operation typically includes cranes and bucket trucks.

New conductors will replace the existing ones, and installation of conductors will occur from the ground with pull pads on the ROW. The height of the new structures will range from approximately 60 -92 feet above the ground. Once all structures within a wire pull segment are set, the wires are pulled and clipped into place. This procedure requires access to each structure with a bucket truck. Wire set-up areas containing reel trailers, wire pullers, and related equipment are located at each end of the wire pull. Structure spacing will vary between 600 and 700 feet. Estimated in-service date for the entire Pana-Midway transmission line rebuild is July 1, 2020, with work in the section located within the Coffeen Lake State Fish and Wildlife Area being fully completed by early December 2020.

Construction of Access Roads

In general, construction access will be along the ROW and directly from public roads. In some cases where constraints prevent direct access from public roads, access from outside the ROW was required on the Coffeen Lake State Fish and Wildlife Area. Because this is an existing transmission line and ROW, 20-foot-wide access roads already exist and most trees and shrubs have been previously cleared; however, some limited vegetation clearing will be necessary prior to installing temporary construction matting. The ROW will continue to be maintained free of tall growing vegetation throughout the operational life of the line. Temporary construction matting will be installed to provide access through wetlands or other unstable soil areas where needed prior to construction access. Construction matting may consist of timber, composite, or hybrid timber mats and will be installed with rubber-tired mat trucks, forwarders, forklifts, or skid loaders.

Substation Construction

The proposed Oakley Substation would be located on a 9.9-acre parcel and would be owned, constructed, and operated by AIC. During construction approximately 6.6 acres (areas of construction disturbance, laydown, and access) of this site would be disturbed. Once the equipment is installed, the area that would be permanently occupied by the substation would be approximately 3.3 acres of suitable ornate box turtle habitat. Access to the substation site would be from the south from Highway 185.

For the construction of the new Oakley Substation, AIC would clear vegetation, remove topsoil, and grade as detailed in the site-specific Storm Water Pollution Prevention Plan (SWPPP). Equipment used during clearing would include chain saws, skidders, bulldozers, tractors, and/or low ground-pressure feller-bunchers.

Silt fences and site drainage structures would be installed in each phase of construction and maintained throughout the Project. The substation yard would be covered with crushed stone and enclosed with chain link fencing. Primary access to the site, both during construction and operation, would be via a new graveled access road constructed from State Highway 185 to the substation, a distance of approximately 150 feet. Equipment installed at the substation would include 6 station service voltage transformers (SSVT's), 3 potential transformers, 3 SF-6 circuit breakers, connecting bus work, a supporting steel superstructure, communications tower, and control house.

Site restoration and revegetation will be based on the degree of disturbance caused by construction activities and the ecological setting of each site. Where soil disturbance occurs in environmentally sensitive areas, erosion control best management practices will be installed, maintained, and monitored until the area is revegetated. The estimated in-service date for the

Oakley Substation is December 1, 2020. Site restoration and revegetation of disturbed areas will be complete by June 2021.

ii. Timeline of Activities

Because the Project includes a rebuild of an existing line it needs to be carefully coordinated and scheduled around allowable electric outages. The Project is scheduled to begin in May 2020 and is expected to be complete by December 2020. Activities within the Coffeen Lake State Fish and Wildlife Area will be completed between May and July 2020. The following schedule is planned:

Pre-construction

Preconstruction activities include literature searches, site engineering surveys, environmental surveys and studies, including special status species surveys, landowner agreements, and engineering design. Preconstruction activities would apply to all components of the proposed Project.

- June 2019 – A comprehensive environmental review was conducted by IDNR for the Pana-Midway Transmission Line Rebuild Project (Appendix A).
- October 2019 – An EcoCAT review was performed for the Oakley Substation Project (Appendix A). IDNR recommended avoidance measures and biological monitoring for the ornate box turtle at the Oakley Substation and Pana-Midway Transmission Line Rebuild Project areas on and adjacent to the State Fish and Wildlife Area during construction activities.

Construction and Restoration

- May through July 2020 – Project construction begins.
- Spring 2020 – IDNR determines that ornate box turtle population is likely larger in this area due to results from ornate box turtle surveys at the Coffeen Lake State Fish and Wildlife Area, Upland Site.
- June 2020 – Due to biological monitoring put in place by AIC, one ornate box turtle was found within the Oakley Substation work area on June 1, 2020, and one was found within the Pana-Midway Transmission Line work area on June 29, 2020. Both turtles were safely relocated to the IDNR Coffeen Lake State Fish and Wildlife Area boundary, and the encounters were reported to the IDNR.
- June 2020 – IDNR requests that AIC submit a Conservation Plan for an ITA for the ornate box turtle at the Oakley Substation/Pana-Midway Projects adjacent to the Coffeen Lake State Fish and Wildlife Area, Upland Site.

- July 2020 – A habitat characterization of the action areas was performed in response to IDNR's request for an ornate box turtle ITA.
- August 2020 – A Conservation Plan was submitted for coverage of the ornate box turtle within and adjacent to the action areas.
- September 2020 – Oakley Substation has been physically constructed. Final site grading and grass seeding took place September 28th-October 2nd. Remaining activities include cable work within the substation fence and energization.
- September 2020 – All construction grading, and grass seeding restoration complete along the Pana-Midway Transmission Line.
- October 2020 – Anticipate obtaining the ITA.
- November 2020 – Anticipate cutting the transmission line from Pana-Midway into the new Oakley substation between November 21-29, 2020.
- November/December 2020 – Native pollinator seeding outside of substation pad in areas east, west, and north of the substation perimeter.
- March 2021 – Construction and site restoration will be complete for the Oakley Substation Project.
- Periodic monitoring report of construction activities and listed species observations will be submitted to IDNR for all work occurring within the Project areas. Relocation of any ornate box turtles from within the action area will be reported to IDNR immediately (within 24 hours) and will include photographs of the turtles as well as photographs and coordinates of the locations in which they are found and released. Similarly, any ornate box turtles accidentally killed (i.e., taken) during work will be recorded (approximate age, possible cause of death), photographed, and immediately reported to the IDNR.

Post-construction

- Post-construction monitoring of the ornate box turtle and habitat would occur 2 and 5 years post construction during the time of the year that coincides with peak activity (i.e., June).

iii. Permitting Reviews

AIC will comply with all federal, state, and local regulations. No other environmental permitting reviews are required for the Project (e.g., U.S. Fish and Wildlife Service biological opinion or U.S. Army Corps of Engineers Section 404 review) as no other sensitive resources are impacted by the project.

D. Adverse Effects on Listed Species

Direct Effects

Direct mortality to the ornate box turtle may occur from several Project construction activities including vehicle and equipment access within suitable habitat, and below-ground work within suitable habitat, such as foundation drilling, boring, and minor grading around foundation locations. Individual turtles or eggs could be accidentally crushed and killed if they are struck by a vehicle or dug up during ground disturbing activities.

A maximum of 14.15 acres of suitable ornate box turtle habitat will be temporarily impacted by the Project through construction disturbance, laydown areas, and the use of access roads (Table 1). All areas of temporary disturbance will be restored to pre-construction conditions once construction is complete. These areas are thus expected to return back to suitable ornate box turtle habitats.

A maximum of 3.39 acres of suitable ornate box turtle habitat will be permanently impacted by the Project through displacement by the Oakley Substation and 8 new H-frame structures for the Pana-Midway Transmission Line Rebuild (Table 1).

Indirect Effects

No indirect effects to the ornate box turtle are anticipated as a result of the Project. Construction matting, silt fencing, exclusion fencing, and any other temporary constraints for turtles will be removed prior to the next ornate box turtle active season, and all areas of temporary disturbance will be restored to pre-construction conditions once construction is complete.

Table 1. Summary of Impacts within Action Areas for AIC's Oakley Substation/Pana-Midway Transmission Line Rebuild Project in Montgomery County, IL

	Area		Total
	Oakley Substation	Pana-Midway Transmission Line	
Suitable Habitat within Action Area (acres)	9.90	7.65	17.55
Temporary Impact – Areas of Construction Disturbance, Laydown (acres)	6.62	2.83	9.45
Temporary Impact – Access Roads (acres)	---	4.70	4.70
Permanent Impact – Substation Footprint (acres)	3.31	---	3.31
Permanent Impact[1] – H-Frame Footprint (8 at 20 ft x 20 ft each) (acres)	---	0.08	0.08
Total[2] Temporary Impacts (acres)	**6.62**	**7.53**	**14.15**
Total[2] Permanent Impacts (acres)	**3.27**	**0.08**	**3.39**

[1] "Permanent impacts" occur where structures are placed and habitat is permanently removed. The new structures will be offset from the existing structures. The total permanent impact of the new structures (0.08 acre) includes the habitat restored by removal of existing structures (0.003 acre).
[2]Due to rounding, totals may be slightly different from the value of constituent parts.

3. MINIMIZATION MEASURES, MITIGATION, AND FUNDING

A. Number of Individuals Taken and Amount of Habitat Affected

Occurrence records within or near the proposed Project exist for the ornate box turtle. The amount of suitable habitat affected was minimized by avoiding portions of the action areas. Furthermore, take of individuals and suitable habitat will be minimized through a number of conservation measures as outlined below. Despite these best efforts, the number of individuals that could be impacted or taken as a result of Project activities is anticipated to range from one to five. Acreages of permanent and temporary suitable habitat impacted are summarized in Table 1.

Since the Project will utilize vehicles/construction equipment and ornate box turtles are relatively small, it is difficult to quantify how many individuals would be at risk for taking. However, ornate box turtles are typically solitary, which may limit the number of individuals, if any, that are taken. Given that the range of the ornate box turtle has been documented to be approximately five acres

and ranges may overlap, it is possible that one to five individuals could be present and affected during construction activities.

B. Plans for Management of the Area

Areas affected by Project activities will be restored to pre-construction conditions thereby re-establishing suitable habitat within the ROW for the ornate box turtle. Temporarily disturbed areas, including footprints of the removed wooden H-frame structures, will be planted with a cover crop and native seed mix that was developed by a team of biologists for the nearby Hillsboro Energy project. Please refer to the planting tables found in Appendix F of this conservation plan for more detail on cover crop (temporary) and reclamation (permanent) proposed seed species and seeding rates.

It is anticipated that IDNR and other individual landowners will manage the habitat within the ROW similarly to their adjacent lands. AIC will install permanent "Environmentally Sensitive Area" signs within the ROW to alert maintenance crews.

C. Measures to Avoid, Minimize, and Mitigate Effects

Conservation measures that will be implemented by AIC to avoid, minimize, and mitigate potential impacts to the ornate box turtle covered by this Conservation Plan, as well as to the Coffeen Lake State Fish and Wildlife Area, are summarized below.

i. Measures to Avoid Effects

- No physical impacts to the Coffeen Lake State Fish and Wildlife Area outside of the existing AIC ROW and access routes will occur as a result of the Project. No placement of temporary matting, construction of permanent structures, access, or on-the-ground activity will occur outside of ROW and access routes.
- Permanent "Environmentally Sensitive Area" signs will be installed within the ROW at the boundaries of the Coffeen Lake State Fish and Wildlife Area to alert construction and maintenance crews of the sensitive nature of the site and to keep out with equipment.

ii. Measures to Minimize Effects

- Construction activities will be initiated in May while the ornate box turtle is active, and prior to the turtle beginning its overwintering period. This will avoid potentially impacting any overwintering turtles that could be burrowed underground in the construction zones. Working during the active season will allow for the installation of reptile exclusion fence along the ROW, visual encounter searches within the exclusion areas, and removal of individuals to outside of the exclusion and construction work areas.

- An onsite Biological Monitor will be present during work conducted within the areas within and adjacent to the Coffeen Lake State Fish and Wildlife Area (Figure 3). The Biological Monitor will have field experience with the ornate box turtle and its habitat and possess a valid Endangered Species Permit or similar authorization for capturing, handling, and removing the ornate box turtle. While onsite, the Biological Monitor will monitor the installation of reptile exclusion fence, the placement of construction matting, ground disturbance activities, excavation of pole foundations, and passage of vehicles and equipment. The Biological Monitor will coordinate as necessary with the IDNR in the event of an observation or "incidental take" of an ornate box turtle.
- When construction activities coincide with the turtle active period (April 1 through October 14), reptile exclusion fence (i.e., silt fence) will be installed along the existing ROW within turtle exclusion zone areas shown in Figure 3 to exclude turtles and other animals from the construction area. These exclusion areas include portions of the Pana-Midway Project that encompass structures 229 through 233 and structures 235 through 237, as well as the Oakley Substation construction area. These areas are within or adjacent to the IDNR Coffeen Lake State Fish and Wildlife Area (Figure 3).
- The exclusion fence will completely enclose the construction work areas and have temporary gates (e.g., triangular silt dikes, movable hay bales, or silt fence) at the entry/exit points or be installed with turn-back wings at each end facing away from the construction area. The exclusion fence will be buried at least six inches in the ground, staked, and maintained in an upright position throughout the duration of the Project. The exclusion fencing will be opened and closed at the end of each workday as needed to allow passage of equipment and crews.
- Prior to installation of the reptile exclusion fence, the Biological Monitor will conduct a visual encounter search within the action area immediately ahead of the fence installation crew to locate turtles and relocate them outside of the construction work area.
- The Biological Monitor will conduct visual encounter searches for listed reptiles ahead of any construction mat installation and during the active period on days when construction activities are occurring. All reptiles discovered will be recorded, photographed, and relocated outside of the construction work area. Construction in areas designated as suitable habitat for the turtles will not take place until the Biological Monitor has cleared the area.
- All reptile exclusion fence and construction matting will be removed from the work areas upon completion of all construction and restoration activities, and prior to the beginning of the reptiles' next active period.

- Species fact sheets for the ornate box turtle have been drafted with information on their identification, habitat requirements, active and inactive periods, and general life histories (Appendix B). The fact sheets will be provided to construction personnel for reference and reviewed periodically at daily tailgate meetings to inform the crews of the possible presence of the listed species in the action area. Crews will be asked to watch out for and report any listed species observations to the Biological Monitor.
- During turtle active periods, speed limits of construction vehicles traveling on access roads will be limited to 12 mph or less to reduce the potential for accidental collision with the turtles. The speed limit will allow drivers to scan the access roads to avoid turtles.
- All existing wooden H-frame structures within the action areas will be removed. A total of 8 of these structures with two poles each will have their holes filled, returned to grade, and restored to match surrounding habitat conditions. Each wooden pole is assumed to be three feet in diameter and when removed will replace approximately 9 square feet of habitat. Removal of 16 wooden poles will replace approximately 144 square feet (0.003 acre) of habitat.
- Relocation of any ornate box turtles from within the action area will be reported to IDNR immediately (within 24 hours) and will include photographs of the turtles as well as photographs and coordinates of the locations in which they are found and released. Similarly, any ornate box turtles accidentally killed (i.e., taken) during work will be recorded (approximate age, possible cause of death), photographed, and immediately reported to the IDNR.
- Upon completion of the Project, all areas of temporary disturbance will be restored to preconstruction conditions. Surface soils will be tilled and/or raked to reduce soil compaction. Temporarily disturbed areas, including footprints of the removed wooden H-frame structures, will be planted with a cover crop and native seed mix that was developed by a team of biologists in cooperation with IDNR for the nearby Hillsboro Energy project (Appendix F).

iii. Mitigation

In addition to the avoidance and minimization measures to be implemented as summarized above and restoring temporary impact areas after construction, AIC will provide compensatory mitigation in the form of a monetary contribution to the Illinois Wildlife Preservation Fund (the "Fund"). The contribution will support conservation, research, and/or habitat improvements that will contribute to the ornate box turtle's continued survival and recovery in Illinois. AIC will voluntarily contribute $21,696 to the Fund to offset the Project's permanent impact to suitable habitat.

This value was calculated by multiplying the total acreage of permanent impact (3.39 acres) by the estimated value per acre of similar land in Montgomery County ($6,400) near the project sites. The value per acre is based on data available to Ameren's reality group for similar land sold within the vicinity of the project. This value was rounded up to the nearest $100 for simplicity.

D. Monitoring

In addition to the pre-construction habitat survey and the biological monitoring during construction discussed in Sections 2a and 3Cii, respectively, post-construction monitoring will also be implemented. Post-construction monitoring of the ornate box turtle and habitat would occur approximately 2 and 5 years post construction during the time of the year that coincides with peak activity (i.e., June). Therefore, based on current construction completion schedules, post construction monitoring events would occur in June 2022 and June 2025.

The post construction surveys will include general assessment of the habitats present within the restored temporary use areas of the Pana-Midway ROW and the undeveloped portions of the Oakley Substation property not needed for the permanent substation facility and ancillary structures. This will include documenting vegetation cover, plant species present, and other general habitat data. As part of the post-construction surveys, any turtles observed within the survey areas will be documented but would not be handled or otherwise moved. Photographs and GPS locations would be taken if any ornate box turtles were observed. A final survey report summarizing the survey results will be prepared and provided to IDNR following each survey event.

E. Adaptive Management Practices

Adaptive management is a process that will allow AIC to adjust its actions to reflect new information or changing conditions to reach a goal, in this case, minimization of take and conservation of the ornate box turtle. AIC will use adaptive management processes to minimize take related to the Pana-Midway Transmission Line Rebuild Project and the Oakley Substation Project.

Specific adaptive management measures include:

- An onsite Biological Monitor will be present during work conducted within the action areas (Figure 3). By conducting monitoring during construction, AIC will be able to quickly react to unforeseen circumstances that may occur.
- If changed or unforeseen circumstances arise that reduce the effectiveness of the minimization measures described in this Conservation Plan, AIC will coordinate with the IDNR to determine if additional measures are warranted.

- If turtles are injured as a result of Project activities, AIC will immediately stop work, contact the Biological Monitor, and coordinate directly with IDNR. Arrangements will be made to take the individual to a licensed wildlife rehabilitator.

F. Funding to Support Minimization and Mitigation

Ameren Corporation is the parent of AIC, which provides services to electric and gas customers across central and southern Illinois. As a large utility, Ameren has adequate financial backing to support and implement mitigation activities described in this Conservation Plan. The costs of mitigation activities will be incorporated into the overall Project budget. Therefore, no specific financial instruments such as bonds, certificates of insurance, or escrow accounts will be required to implement the Conservation Plan.

4. ALTERNATIVE ACTIONS

A. Preferred Alternative

The Preferred Alternative is summarized above within the Project Description listed under 1) Likely Impacts, C) Description of Project Activities, and i) Practices to be Used.

B. No Action Alternative

The purpose of the Project is to improve power transmission system reliability and operating flexibility in the area needed due to age and condition of the existing line and continued electricity demands on the grid. Under the No Action Alternative, Pana-Midway transmission line would not be rebuilt, Oakley Substation would not be constructed, and the demands for power transmission to the grid would not be met. Impacts associated with the Project would not occur. The No Action Alternative would not satisfy the Project purpose and need; therefore, AIC rejected this alternative and continued to develop action alternatives that would satisfy the purpose and need in a manner that would result in minimal environmental impacts.

C. Potential Route Alternatives

Avoiding negative natural resource and community impacts is a priority for AIC. Alternatives to reroute the existing Pana-Midway ROW such that it would have been removed from the Coffeen Lake State Fish and Wildlife Area and existing suitable habitat were considered. However, removing and rerouting the existing line would have resulted in environmental impacts similar to the proposed action because the existing line would still need to be removed from the area, which would have required construction equipment and ground disturbance activities of similar magnitude. In addition, new ROW easements would need to be have been identified, negotiated,

and acquired. Rerouting this portion of the line would have increased the overall length of the line, increased the overall cost, and resulted in new environmental and landowner impacts. As a result, these alternatives were not fully developed.

5. SURVIVAL OF SPECIES

Take of the ornate box turtle is estimated to range from one to five individuals, but is not anticipated to reduce the survival or recovery of the species, the biotic community of which it is a part, or the habitat essential to its existence for the following reasons:

- Up to 17.6 acres of suitable ornate box turtle habitat will be impacted by the Project, 7.3 acres of which is within the Coffeen Lake State Fish and Wildlife Area. Impacts include:
    - The construction of 8 new H-frame poles will permanently impact approximately 0.083 acres of suitable habitat for the ornate box turtle within the action area; however, 0.003 acres will be replaced by the removal of the existing wooden H-frame structures resulting in a net loss of approximately 0.08 acres of habitat.
    - The construction of the Oakley Substation will permanently impact approximately 3.31 acres of suitable habitat for the ornate box turtle within the action area.
    - Up to 14.15 acres of suitable ornate box turtle habitat will be temporarily impacted by the Project from construction disturbance, laydown, and use of temporary access roads. Areas of temporary disturbance will be restored to pre-construction conditions once construction is complete, and therefore will provide similar habitat for turtles that existed prior to the project being completed.
- A Biological Monitor will be onsite to implement and oversee conservation measures to avoid and/or minimize direct effects to the species within the action areas, most notably measures to exclude, locate, and remove turtles from the construction work area. Furthermore, some of the work will be conducted during the species' inactive period when they will be at less risk of direct impacts.
- Construction and maintenance personnel will be informed of the possible presence of turtles in the construction work area and will be asked to avoid and report all observed turtles to the Biological Monitor.
- Portions of the funds contributed to the Illinois Wildlife Preservation Fund as compensatory mitigation for the Project will support conservation, research, and/or habitat improvements for the ornate box turtle in Illinois.

6. IMPLEMENTING AGREEMENT

A. Signatories

The following individuals are responsible for the execution of this Conservation Plan.

K W Lynn

10-23-2020

Kenneth W. Lynn
Consulting Environmental Scientist
Ameren Services

Date

B. Responsibilities and Schedules

Kenneth W. Lynn, Consulting Environmental Scientist of Ameren Services, will be the contact for this conservation plan. The individual responsibilities include the following:

- responsible for training and education of construction crews
- responsible for providing biological monitor(s) and turtle exclusion services at AIC's expense
- adaptive management; responsible for coordinating changes in construction activities and consultation with IDNR in response to unforeseen circumstances that may occur
- IDNR liaison; responsible for the preparation and submission of semi-annual IDNR progress reports

A monitoring report of construction activities and listed species observations will be submitted to IDNR for all work occurring within the action areas. Upon completion of the Project, a summary report of relocated turtles will be provided to the IDNR. Similarly, any ornate box turtles accidentally killed (i.e., taken) during work or found on site throughout will be recorded (approximate age, possible cause of death), photographed, and reported to the IDNR at the conclusion of the Project.

C. Certification

I hereby certify that the participant listed in Section 6A have the legal authority to carry out their respective obligations and responsibilities under the Conservation Plan.

Caleb L. Boyer

10-23-2020

Caleb L. Boyer
Project Manager
Ameren Transmission Company

Date

D. Compliance with Federal, State, and Local Regulations

The Project will comply with all pertinent Federal, State, and local regulations. The list of agencies and associated regulations is presented in Table 2.

Table 2. Federal, State, and Local Regulations

Agency	Regulation
U.S. Army Corps of Engineers	Section 401 and Section 10 Permits
U.S. Fish and Wildlife Service	Section 7 Consultation
Federal Aviation Administration and Illinois Division of Aeronautics	Notice of Airway Obstruction and Determination
Illinois Environmental Protection Agency	401 Water Quality Certification
Illinois State Historic Preservation Office	Concurrence
Illinois Department of Natural Resources	Crossing Easement or Leases
Counties	Flood Control District Permit
Illinois Department of Transportation and County Highway Departments	Road Crossing and Encroachment Permits
Foreign Utilities	Crossing and Encroachment Permits

7. REFERENCES

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Homer, C.G., J.A. Dewitz, L. Yang, S. Jin, P. Danielson, G. Xian, J. Coulston, N.D. Herold, J.D. Wickham, and K. Megown. 2015. Completion of the 2011 National Land Cover Database for the conterminous United States-Representing a decade of land cover change information. Photogrammetric Engineering and Remote Sensing, v. 81, no. 5, p. 345-354.

Illinois Department of Natural Resources (IDNR). 2017. Ornate Box Turtle (*Terrapene ornata*). Biodiversity of Illinois. Retrieved from https://www2.illinois.gov/dnr/education/CDIndex/OrnateBoxTurtle.pdf (accessed: July 16, 2020.

Legler, J. M. 1960. Natural history of the ornate box turtle, *Terrapene ornata* Agassiz. Univ. Kansas Press Publ. Mus. Nat. Hist. 11(10):527-669.

Natural Resources Conservation Service (NRCS), United States Department of Agriculture (USDA). 2020. Custom Soil Resource Report for Montgomery County, Illinois – Oakley Substation and Pana-Midway Projects. Retrieved from https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx (accessed July 16, 2020).

U.S. Forest Service (USFS). 2006. Ornate Box Turtle (*Terrapene ornata ornata*): A Technical Conservation Assessment. May 16, 2006. Retrieved from https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5182076.pdf (accessed July 16, 2020.

Figures

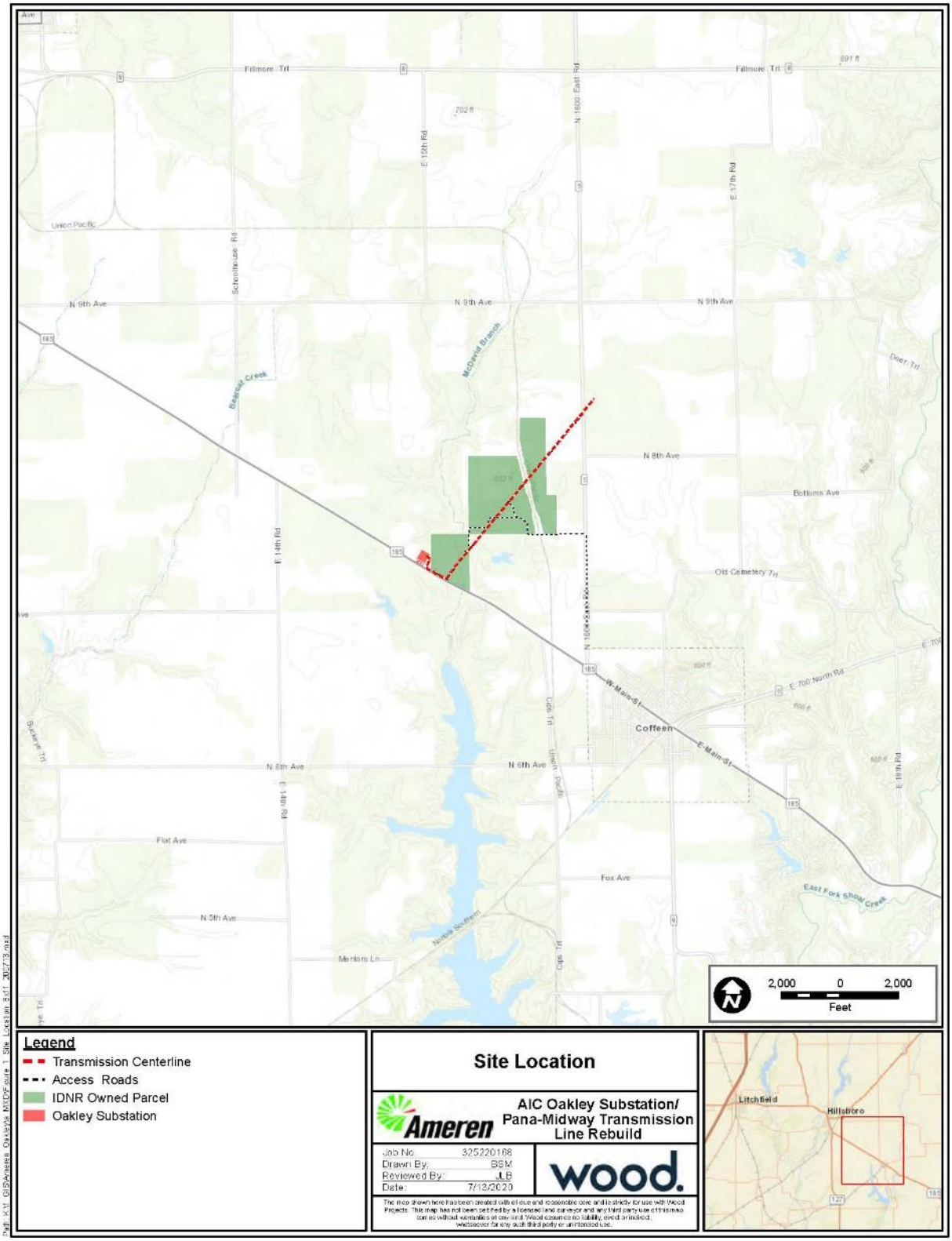


Figure 1. Ameren Oakley Substation/Pana-Midway Transmission Line Rebuild Site Location

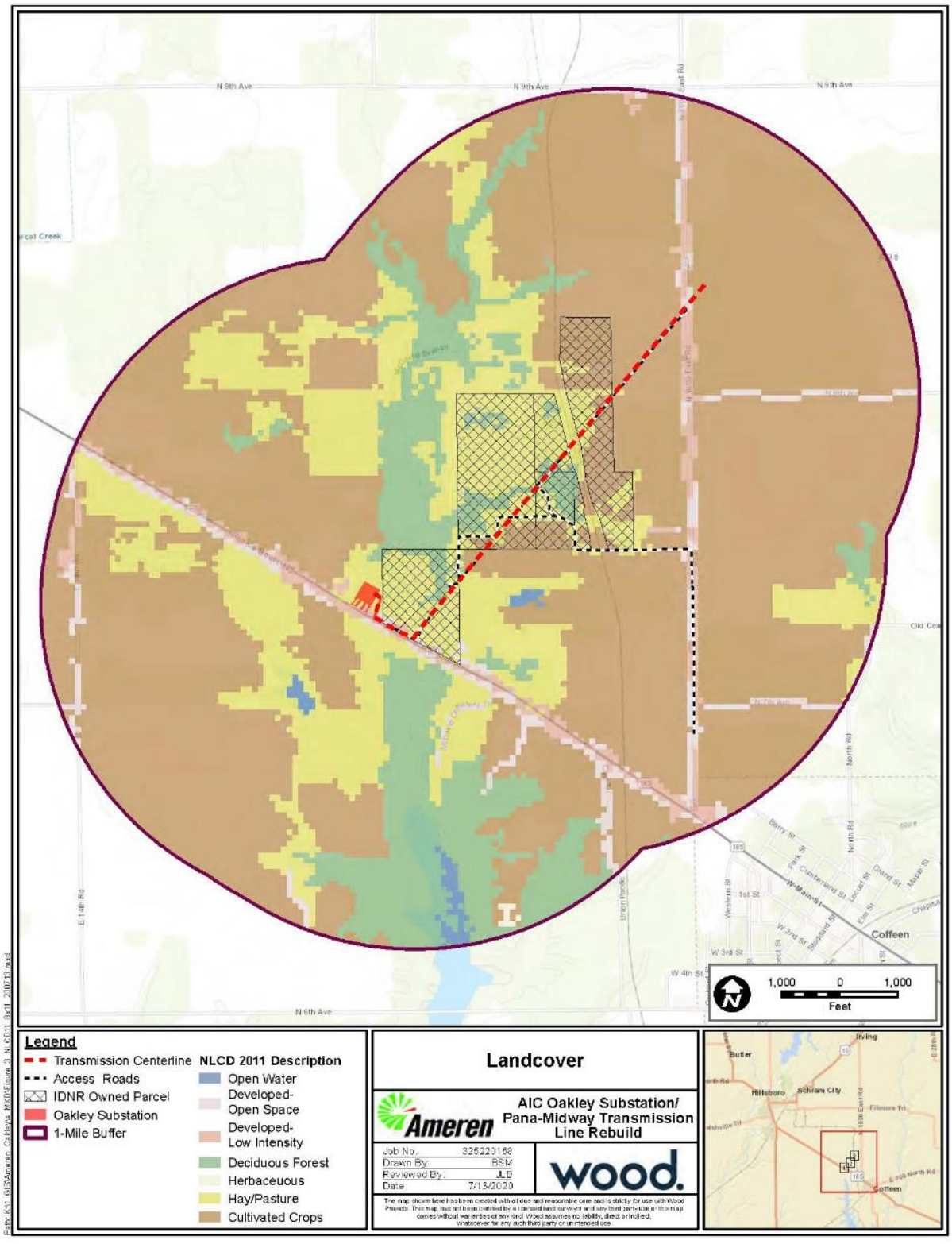


Figure 2. Land Use/Land Cover within the Oakley Substation/Pana-Midway Transmission Line Rebuild Project Areas and Vicinity

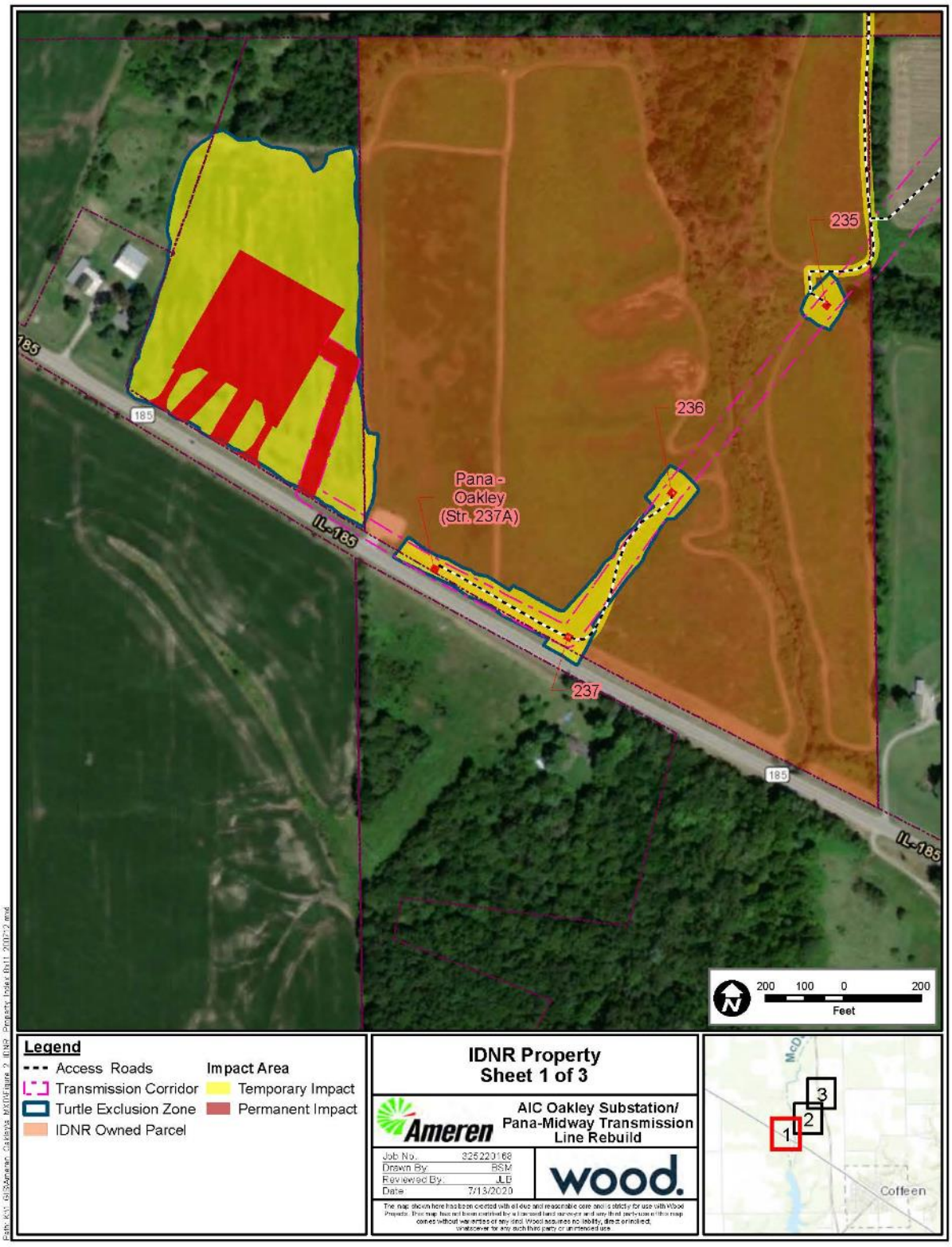


Figure 3. Action Area for Oakley Substation/Pana-Midway Transmission Line Rebuild Projects with IDNR Property Boundary (Sheet 1 of 3)

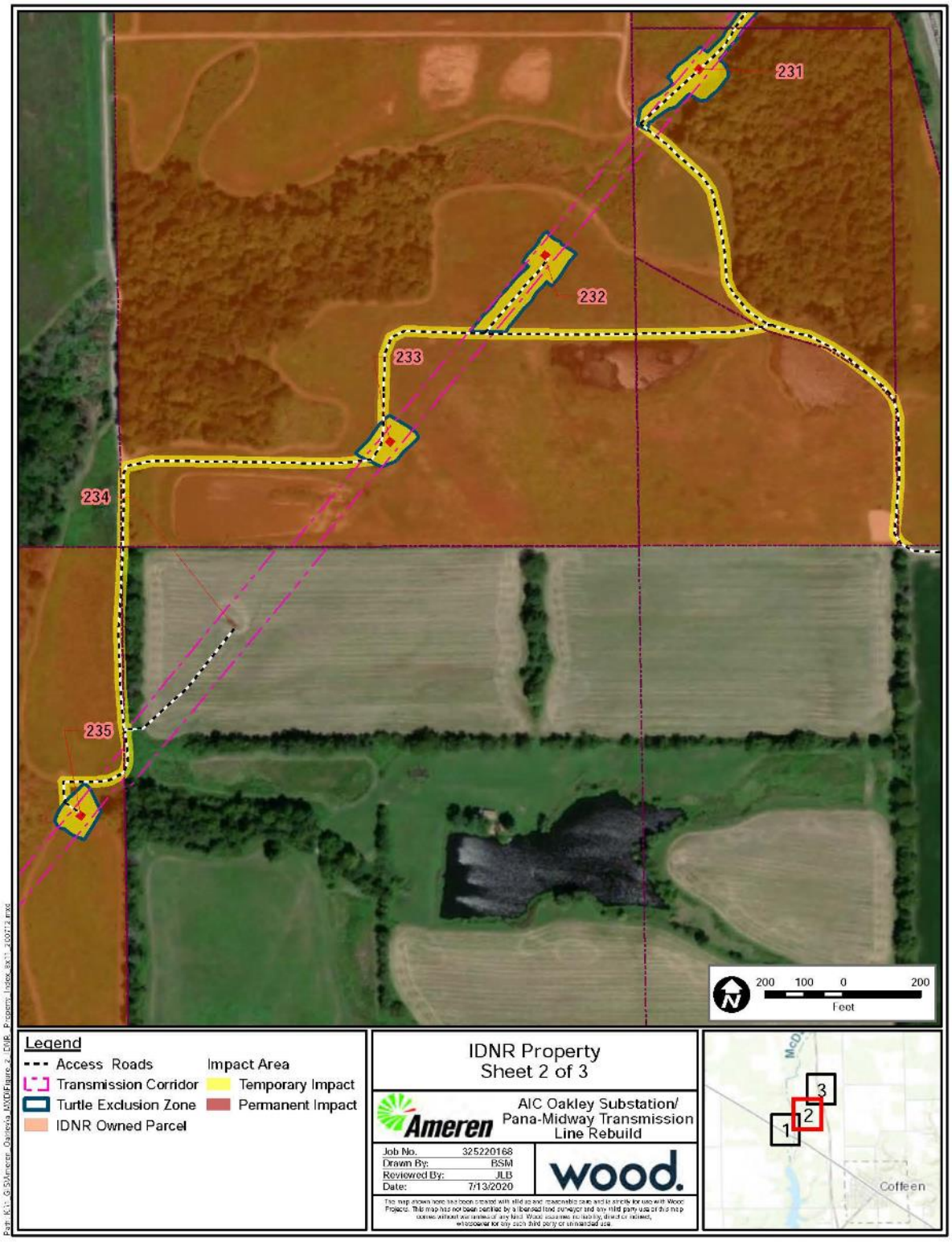


Figure 3. Action Area for Oakley Substation/Pana-Midway Transmission Line Rebuild Projects with IDNR Property Boundary (Sheet 2 of 3)

Figure 3. Action Area for Oakley Substation/Pana-Midway Transmission Line Rebuild Projects with IDNR Property Boundary (Sheet 3 of 3)

Appendix A

IDNR Correspondence

October 2020

Illinois Department of
Natural Resources
One Natural Resources Way Springfield, Illinois 62702-1271
www.dnr.illinois.gov

JB Pritzker, Governor
Colleen Callahan, Director

July 10, 2020

Bridgett Jacquot Ameren
1901 Chouteau Avenue, Mail Code 602
St. Louis, MO 63103

RE: Oakley Substation & Pana to Midway "H" Pole Project
Consultation Program
EcoCAT Review #2003313 & 1911835
Montgomery County

Dear Ms. Jacquot:

Due to an awareness of more recent records for state-listed species in the vicinity of the Oakley Substation Project, the Department is issuing this updated consultation. The previous consultation letter was issued on October 17, 2019. This review also includes comments regarding the Pana to Midway H Pole Replacement Project within the Coffeen Lake State Fish and Wildlife Area - Upland Site adjacent to the Substation Project that was reviewed by this office under our "Comprehensive Environmental Review Process" (CERP #1911835). These reviews are provided pursuant to the *Illinois Endangered Species Protection Act* [520 ILCS 10/11], the *Illinois Natural Areas Preservation Act* [525 ILCS 30/17], and Title 17 *Illinois Administrative Code* Part 1075.

The Department notes that measures to avoid impacts to the state-listed **Ornate Box Turtle** (*Terrepene ornata*) were implemented by Ameren on both projects as recommended by the Department in the previous letter. However, on June 1, 2020, an Ornate Box Turtle was found within the Oakley work zone and safely relocated to appropriate habitat on the adjacent IDNR property as indicated in an email dated June 2, 2020, by Joel Budnik with Wood Technical Consulting Services, an environmental consulting firm contracted by Ameren. On June 29, 2020, an Ornate Box Turtle was found within the Pana to Midway work zone within the IDNR site and safely relocated out of the work area.

Additionally, spring 2020 surveys by the Department's Division of Natural Heritage discovered additional Ornate Box Turtles in the IDNR's Upland Site. All of the recent information combined indicates the population is likely larger in this particular area than previously thought and the risk of "take" is higher than was anticipated.

Given the documented presence of the species in the project areas and all recent information combined, the Department requests Ameren immediately apply for an Incidental Take Authorization (ITA) for the Oakley Substation and Pana to Midway H Pole Projects pursuant to Part 1080 and Section 5.5 of the *Illinois Endangered Species Protection Act*. The Department

Oakley Substation, electrical utility facility, Consultation # 2003313

understands Ameren has already started a Conservation Plan as application for an ITA based on previous correspondence. All questions pertaining to ITA should be directed to the Department's ITA Coordinator at DNR.ITAcoordinator@illinois.gov. Please visit the link below for more information on the ITA process:

https://www.dnr.illinois.gov/conservation/NaturalHeritage/Pages/ApplyingforanIncidentalTakeAuthorization.aspx

The Department is updating our internal environmental review documents to reflect the presence of additional ornate box turtles in the vicinity as well.

Consultation on the part of the Department is closed unless Ameren desires additional information or advice related to these projects. Consultation for Part 1075 is valid for two years unless new information becomes available which was not previously considered; the proposed action is modified; or additional species, essential habitat, or Natural Areas are identified in the vicinity.

This natural resource review reflects the information existing in the Illinois Natural Heritage Database, and other available information, at the time of the project submittal and should not be regarded as a final statement on the project being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are unexpectedly encountered during the project's implementation, the applicant must comply with the applicable statutes and regulations.

Please contact Mr. Brian Willard of this office at 217-557-0480 or brian.c.willard@illinois.gov for additional information on this review, or if providing a response to this correspondence. Please reference EcoCAT 2003313 in any communication.

Thank you,

Nathan Grider
Manager, Impact Assessment Section
Office of Realty & Capital Planning
Illinois Dept. of Natural Resources
One Natural Resources Way
Springfield, IL 62702-1271
Email: nathan.grider@illinois.gov
Phone: 217-557-0483

cc: Kenny Lynn, Ameren
Joel Budnik, Wood Technical Consulting
IDNR, ORC
IDNR, Lands

Illinois Department of
Natural Resources
One Natural Resources Way Springfield, Illinois 62702-1271
www.dnr.illinois.gov
JB Pritzker, Governor
Colleen Callahan, Director

October 17, 2019

Bridgett Jacquot
Environmental Scientist
Ameren Illinois
1901 Chouteau Avenue, Mail Code 602
St. Louis, MO 63103

RE: Oakley Substation, Descriptive Phrase
Consultation Program
EcoCAT Review #2003313
Montgomery County

Dear Ms. Jacquot:

The Department has received your submission of this project for the purposes of consultation pursuant to the *Illinois Endangered Species Protection Act* [520 ILCS 10/11], the *Illinois Natural Areas Preservation Act* [525 ILCS 30/17], and Title 17 *Illinois Administrative Code* Part 1075. Additionally, the Department may offer advice and recommendations for species covered under the *Fish & Aquatic Life Code* [515 ILCS 5, *et seq.*]; the *Illinois Wildlife Code* [520 ILCS 5, *et seq.*]; and the *Herptiles-Herps Act* [510 ILCS 69].

The letter supersedes the previous letter sent October 9, 2019. Further information became available that required additional review.

The proposed action consists of the construction of an electrical substation facility in rural Montgomery County, Illinois. The project is located adjacent to the IDNR's **Coffeen Lake State Fish and Wildlife Area, Upland Site** along State Rt. 185.

EcoCAT has indicated records in the vicinity of the project for the state-listed **Ornate Box Turtle (*Terrepene ornata*).** Ornate box turtle habitat includes mesic and dry-mesic prairies, oak savannas, open to semi-open woodlands, and open fields in former prairie. Sandy soils facilitate burrowing and provide microhabitat for nesting and overwintering. Overwintering sites include upland and sand prairies, sand dunes, and shrubland that are open and lack shade. These habitat and soil preferences are consistent with the habitats and soil type found within the project area.

To avoid impacts to the Ornate Box Turtle and potential violations of the *Illinois Endangered Species Act*, the Department makes the following recommendations:

Oakley Substation, electrical utility facility, Consultation # 2003313

- If possible, work on the project should occur during the turtle's inactive season from approximately November 1st to March 1st. This species is less likely to occur in the row crop field during this time.
- Exclusionary silt fencing should be installed around the work area perimeter, securely trenched into the ground, and strictly maintained. The fencing and work area should be inspected daily for the ornate box turtle during the active season.
- Before installing silt fence or operating any equipment, the project area should be searched for Ornate Box Turtle.
- All on-site personnel should be educated about this species and should be instructed to contact the Department immediately if they are encountered in the project area. Fliers, with photos of adult and juvenile ornate box turtles and their life-history information, should be distributed to personnel. This flier should also contain contact information for the Department (217-785-5500). Please note: State-listed species may not be handled without the appropriate permits pursuant to the Illinois Endangered Species Protection Act.
- Excavations should be inspected daily for trapped wildlife and safely covered overnight.
- Soil or other potential turtle nesting medium stockpiles should also have exclusionary fencing installed around the perimeter to discourage turtle nesting and potential harm.

Coffeen Lake State Fish and Wildlife Area, Upland Site

The Department's Office of Land Management requests no equipment or vehicles belonging to crews be parked in the IDNR's parking lot adjacent to the project area to avoid conflict with our site users. The IDNR property is managed for hunting programs, more specifically upland bird hunting.

The Department recommends Ameren consider voluntary conservation measures of planting native grassland vegetation to benefit wildlife where feasible, such as the project perimeter. Mowing such areas should be avoided from May 1st through August 1st to prevent impacts to ground nesting birds, such a Bobwhite Quail.

Given the above recommendations regarding the Ornate Box Turtle are adopted, the Department has determined that adverse impacts are unlikely.

In accordance with 17 Ill. Adm. Code 1075.40(h), please notify the Department of your decision regarding these recommendations.

Consultation on the part of the Department is closed unless Ameren desires additional information or advice related to this proposal. Consultation for Part 1075 is valid for two years unless new information becomes available which was not previously considered; the proposed action is modified; or additional species, essential habitat, or Natural Areas are identified in the vicinity. If the action has **not been implemented within two years** of the date of this letter, or any of the above listed conditions develop, a **new consultation is necessary**.

Oakley Substation, electrical utility facility. Consultation # 2003313

This natural resource review reflects the information existing in the Illinois Natural Heritage Database at the time of the project submittal and should not be regarded as a final statement on the project being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are unexpectedly encountered during the project's implementation, the applicant must comply with the applicable statutes and regulations.

Please contact Mr. Brian Willard of this office at 217-557-0480 or brian.c.willard@illinois.gov for additional information on this review, or if providing a response to this correspondence. Please reference EcoCAT 2003313 in any communication.

Thank you,

Nathan Grider
Manager, Consultation Services
Office of Realty & Capital Planning
Illinois Dept. of Natural Resources
One Natural Resources Way
Springfield, IL 62702-1271
nathan.grider@illinois.gov
Phone: (217) 557-0483
Cell: (217) 836-7545

cc: IDNR, Lands
IDNR, Wildlife
IDNR, Heritage

CERP code: 1911835 (Provided by CERP staff.)

Illinois Department of Natural Resources

COMPREHENSIVE ENVIRONMENTAL REVIEW PROCESS

Regional CERP code:
Project title: Ameren Pana-Midway Transmission Line
Site name: Coffeen Lake SFWA
Proposed start date:
Contact person: Michael Rhodes, Tim Pryor
Phone: 217-782-2605, 618-423-2215
County: Montgomery
Township: 8 N
Range: 3 W
Section: 27

Project Description:
This project proposes to install eight (8) new electric service H-frame towers.

replacing the existing H-frames (229-233, 235-236) with new ones that will necessarily need to be offset along the centerline by 2-5 feet. The offset is necessary since the new poles need to be set first before wires are transferred and old structure can be removed.
Structure 237 needs to be upgraded to a steel H-frame on 7' diameter concrete piers and shifted 20 feet away from the existing due to a gas line that currently runs between the poles (see attached).

The project scope of work to include but not limited to the following: demolition of existing H-frames, earth excavation for footings, 7' dia concrete pier at Structure 237

Note: No trees to be impacted by this project.

Effected area; 8 towers 20'l X 20'w = 3200 sf say 0.07 acres +/-

*
1. Dingell-Johnson
3. Historic Preservation
10. OLRF – State Pheasant Fund, Il Habitat Fund, State Furbearer Fund, Migratory Waterfowl
12. State Wildlife Grant Program

Is work area in a Federal Aid Project boundary? Yes or No **Y** Federal Aid type: **1,3,10,12***
Funding source: IDNR Capital— Heavy Equipment— Force Account—
Other State, Local, or Private agency—
Federal Agency— Federal Program— **See * above**

Approval by Site Superintendent (for all NON-CAPITAL projects, e.g., heavy equipment, force account, leases, r-o-w, etc.)

Signature, Site Superintendent: *Tim Pryor* Date: June 12, 2019

CERP Staff Only
REVIEWS PERFORMED

	Approved	Approved w/ Restrictions	Comments
Threatened & Endangered Species		✓	see attachment RE: Ornate Box Turtle
Natural Areas/Nature Preserves			
Wetlands	✓		
Cultural Resources	✓		
Other	N/A		

Justin Dillard, CERP Program Manager
217–557-6723

6/18/2019
Date

File: Document2

Comprehensive Environmental Review Process

Attachment

Coffeen Lake SFWA

Ameren Pana-Midway Transmission Line – 1911835

The transmission line and tower replacement work shall meet one of the following conditions:

1. All work conducted between October 15 and March 31.

   OR

2. An individual shall walk immediately ahead of all heavy equipment and vehicles in search of all turtles. If an Ornate Box Turtle is encountered, work shall cease immediately and the Department shall be contacted for further guidance. Additionally, all areas where earthmoving is to occur shall be enclosed by silt fencing in order to exclude turtles from the work area. All silt fence exclusions and open cuts shall be inspected daily for turtles. Workers should be informed of the presence and identification of the Ornate Box Turtle, and reminded that they are protected by law.

The Department acknowledges that this project will occur in multiple phases. It is not necessary that all work meet the same above condition, but all work must meet one condition.

Appendix B

Ornate Box Turtle Construction Flyer

October 2020

CAUTION – ORNATE BOX TURTLE

MAY BE ENCOUNTERED IN THIS CONSTRUCTION AREA

STATUS: State Threatened, it is a CRIMINAL ACT to handle a protected species. State-listed species may not be handled without the appropriate permits pursuant to the Illinois Endangered Species Protection Act.

IDENTIFYING CHARACTERISTICS: Shell is dark brown with yellow midback stripe and yellow lines radiating from center of each scute (plates that make up the shell). Yellow markings on juveniles are more like spots than lines. Head and body are sometimes spotted. Moderately high carapace (shell) that is flattened along the midline.

Weight: Up to 1 ½ lbs; Length: Up to 6 inches

HABITAT: Mesic (moist) to dry-mesic (semi-moist) prairies, oak savannas, open to semi-open woodlands, and open fields in former prairie. Sandy soils facilitate burrowing and provide microhabitat for nesting and overwintering.

NESTING PERIOD: Between April and October

WHAT TO DO IF A TURTLE IS ENCOUNTERED

If any turtle is found on this construction site, the following procedures need to be followed:

Immediately stop construction in the surrounding area. **Do not touch the turtle**. If determined to potentially be an ornate box turtle, a worker should watch the turtle at a respectable distance. If possible, monitor the turtle's location until Wood or IDNR staff arrive. If the turtle moves or becomes hidden from view, personnel should mark the spot they first saw the turtle and the last spot it was seen.

Immediately contact Wood personnel who will then contact the Illinois Department of Natural Resources (IDNR) to report the presence of the turtle.

WOOD CONTACT INFORMATION:

Primary Contact: Joel Budnik, Project Manager

636-628-6452

Secondary Contact: Fred Jones, Field Lead

314-540-9827

If Wood personnel are unavailable, contact **IDNR** directly at **217-785-5500** to report the presence of the turtle, and then follow their instructions.

Appendix C

Project IDNR Endangered and Threatened Species Permit

October 2020

Illinois Department of Natural Resources

Endangered and Threatened Species Permit

Permit Number: 7313

Issued Date: 7/10/2020 **Expiration Date: 12/31/2020**

This permit is valid for the following Counties in Illinois:

Montgomery

Pursuant to 520 ILCS 10/5 and 17 Ill. Adm. Code 1070.10-1070.80, this permit is issued to:

Fred Jones
15933 Clayton Road
Ballwin, MO 63011

and covers the following additional personnel:

Kirby Branch
Rebecca Roth
Rebecca Arns

from:

Wood E & IS

for the purpose of SCIENTIFIC RESEARCH involving the following specimens and/or products:

Species	*Item*	*# Specimens/ Products*	*Collection Method*	*Action*	*Disposition*
Reptiles and Amphibians - Ornate Box Turtle - Terrapene ornata	Live Individual	< 50	Hand Capture	Photograph	Catch and Release Live Specimen

If the research project covered by this permit will involve propagation, the permit holder and additional personnel listed above are required to possess an IDNR endangered and threatened species permit Propagation Addendum.

Possession of federally listed species is covered by:

USDA Exhibitor Permit #
U.S. Fish and Wildlife Service Permit #

The research project covered by this permit will address:

- ☐ *Distribution or status of the listed species*
- ☐ *Life histroy of the listed species*
- ☐ *Ecological needs of the natural populations of the species*
- ☐ *Supplementing existing populations*
- ☐ *Captive rearing*
- ☐ *Effects of management actions on animals or plants*
- ☐ *Movement or habitat use*
- ☐ *Threats to the listed plants and animals and/or their habitats*
- ☐ *Effects of exotic species on native populatins*
- ☐ *Genetic diversity within population*
- ☐ *Wildlife disease vectors and transmission*
- ☐ *Translocation to unoccupied locations within species' historic range*
- ☐ *Impact of wind turbines on listed species*
- ☐ *Propagation for release into the wild*
- ☑ *Other:* **Observation of animals possibly present at site.**

Questions about this permit should be directed to DNR.ETPermit@Illinois.gov

The specific locations where this research will be conducted are:

Research Location	*Nearest City*
Oakley substation and IDNR (Coffeen uplands preserve) pana-midway line	**Coffeen IL**

ITEMS LISTED ON THIS PERMIT MAY BE SOLD, GIVEN AWAY, OR OTHERWISE DISPOSED OF ONLY WITH PERMISSION OF THE ILLINOIS DEPARTMENT OF NATURAL RESOURCES.

Signed:

Christopher Young
Office Director
IDNR Office of Resource Conservation
As designee of IDNR Director, Colleen Callahan

Special Conditions (IF APPLICABLE):

This permit covers ornate box turtles at Ameren's Oakley Substation and Pana to Midway H pole projects. Any movement/translocation of any and all listed species within the State of Illinois is prohibited unless such activities are specifically covered under an executed IDNR Incidental Take Authorization (ITA). Without an ITA, all animals shall be returned unharmed immediately at their original capture/discovery location after data has been humanely collected.

Please note that before any research is conducted within an Illinois DNR site, permission from the Site Superintendent must be granted. Research within a Nature Preserve or Land and Water Reserve cannot occur unless written authorization/special use permit is received from the Illinois Nature Preserves Commission.

Conditions:

- A copy of this permit must be in the possession of the permit holder when engaged in activities involving endangered or threatened species.
- There shall be no propagation of or attempt to propagate any endangered or threatened species covered by this permit unless a signed IDNR addendum approving propagation is attached. In addition, the Propagation Addendum must be in the possession of the permit holder when engaged in all activities involving propagation of an Illinois listed species.
- Permit holder cannot move/transport/translocate any endangered or threatened species outside of a designated project area/zone of impact without expressed written consent of the Director of the Illinois Department of Natural Resources.
- Permit holder shall notify IDNR of any changes to personal information within 10 days of making such changes.
- Permit holder shall notify IDNR of any changes to inventory of specimens through escape, theft, death or other unanticipated events within five working days of the discovery of loss.
- Permit holder must provide the Department with an electric copy or two hard copies of any reports, technical papers, or technical notes that result from studies conducted under the auspices of this permit.
- An annual report must be submitted to IDNR by January 31st of each year.

The holder of this permit may:

- Dispose of specimens or products covered by this permit through transfer or scrapping only afer a permit/written permission has been applied for and received from the Department.
- Allow temporary possession of the items covered by this permit by a licensed taxidermist for the purpose of providing taxidermic services.

Questions about this permit should be directed to DNR.ETPermit@Illinois.gov

Appendix D

Land Ownership or Control

October 2020

Appendix D. Summary of Land Ownership or Control within the Project Areas for the Ameren Oakley Substation and Pana-Midway Transmission Line Rebuild Project in Montgomery County, IL.

Location Along Project	Parcel ID	Owner Name	Street Address	City, State, Zip Code
Between Structures 228 and 229	17-27-200-011	People of the State of Illinois, Illinois Department of Natural Resources	One Natural Resources Way	Springfield, IL 62702
Between Structures 229 and 230	17-27-200-01	New River Royalty, LLC	PO Box 609	Benton, IL 62812
Between Structures 230 and 231	17-27-200-008	People of the State of Illinois, Illinois Department of Natural Resources	One Natural Resources Way	Springfield, IL 62702
Between Structures 231 and 232	17-27-200-007	People of the State of Illinois, Illinois Department of Natural Resources	One Natural Resources Way	Springfield, IL 62702
Between Structures 232 and 233	17-27-100-502	People of the State of Illinois, Illinois Department of Natural Resources	One Natural Resources Way	Springfield, IL 62702
Between Structures 233 and 235	17-27-300-014	Kenneth E. Blankenship	15039 Illinois Route 185	Hillsboro, IL 62049
Between Structures 235-236	17-27-300-001	People of the State of Illinois, Illinois Department of Natural Resources	One Natural Resources Way	Springfield, IL 62702
Between Structure 235 and Oakley Substation Property	17-27-300-501	People of the State of Illinois, Illinois Department of Natural Resources	One Natural Resources Way	Springfield, IL 62702
Oakley Substation Property	17-28-300-005	Ameren Illinois	300 Liberty	Peoria, IL 61602

Appendix E

Soil Report

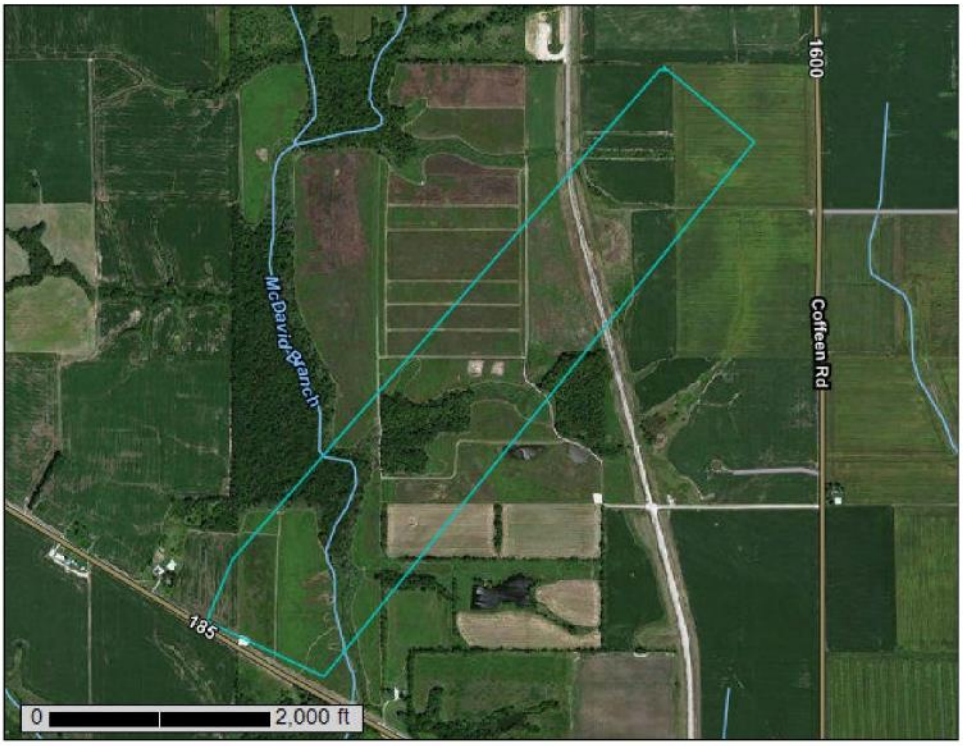
October 2020

United States Department of Agriculture
NRCS
Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Montgomery County, Illinois

Oakley Substation and Pana-Midway Projects



July 17, 2020

October 2020

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

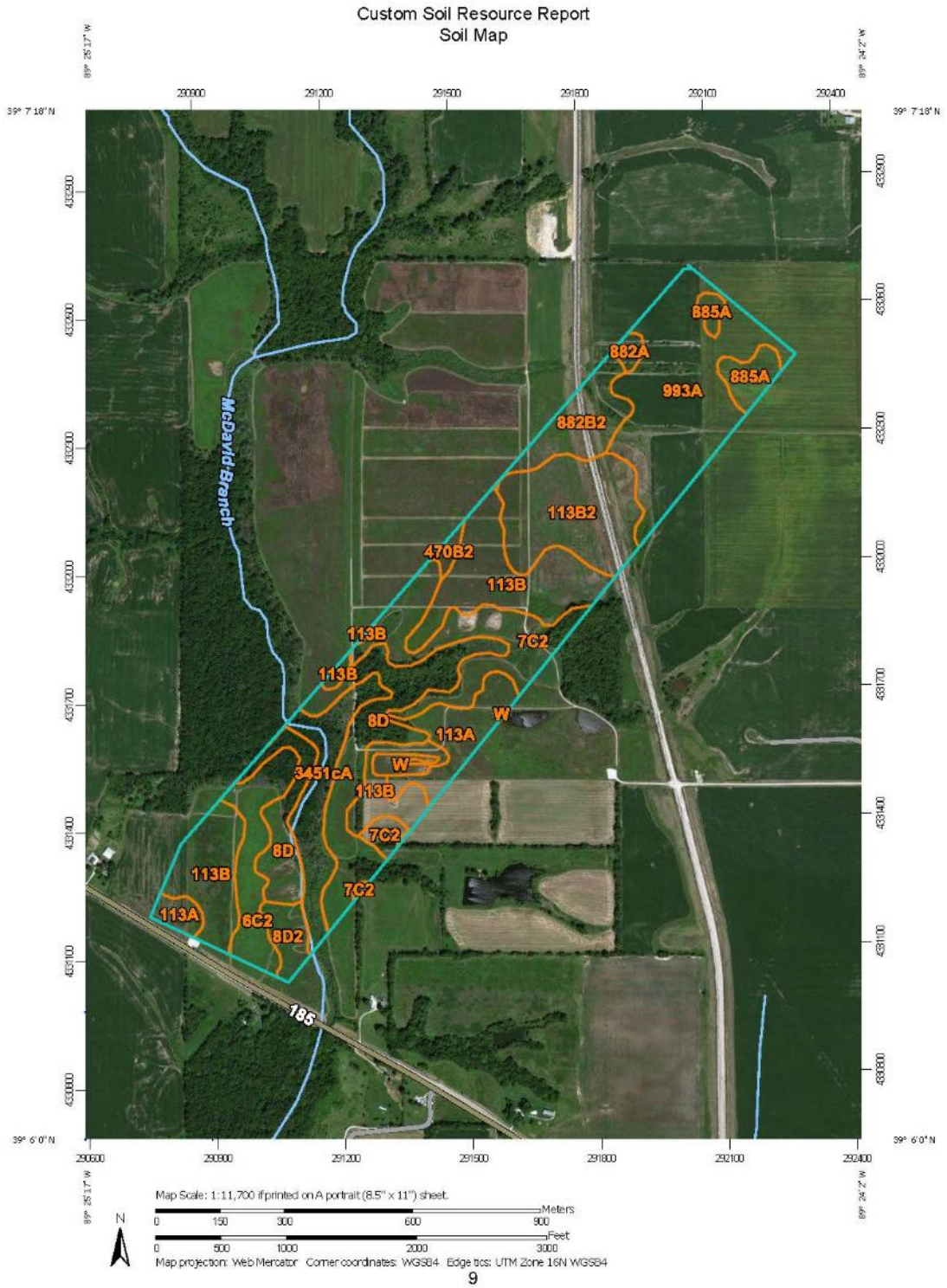
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

Custom Soil Resource Report

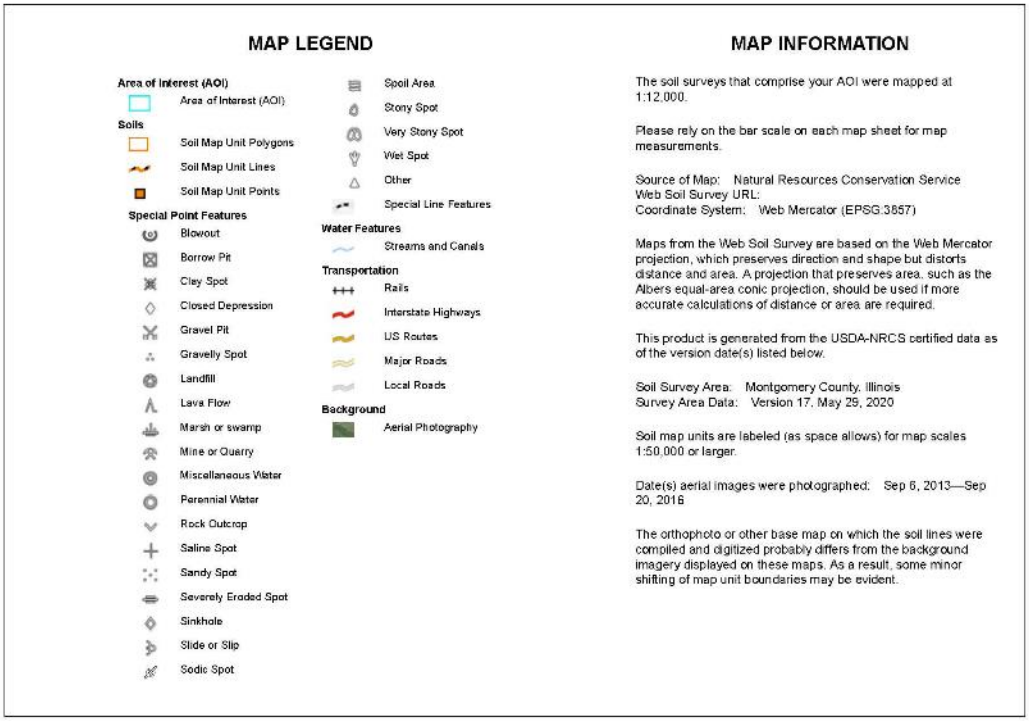
identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.


Custom Soil Resource Report
Soil Map
McDavid Branch
885A
882A
885A
993A
882B2
113B2
470B2
113B
113B
7C2
113B
8D
W
113A
W
3451cA
113B
7C2
8D
113B
7C2
113A
6C2
8D2
185
Map Scale: 1:11,700 if printed on A portrait (8.5" x 11") sheet.
Meters
Feet
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

Custom Soil Resource Report



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Montgomery County, Illinois
Survey Area Data: Version 17, May 29, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 6, 2013—Sep 20, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Custom Soil Resource Report

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6C2	Fishhook silt loam, 5 to 10 percent slopes, eroded	9.8	5.6%
7C2	Atlas silt loam, 5 to 10 percent slopes, eroded	18.2	10.4%
8D	Hickory silt loam, 10 to 18 percent slopes	25.9	14.8%
8D2	Hickory silt loam, 10 to 18 percent slopes, eroded	3.4	2.0%
113A	Oconee silt loam, 0 to 2 percent slopes	10.3	5.9%
113B	Oconee silt loam, 2 to 5 percent slopes	31.9	18.2%
113B2	Oconee silt loam, 2 to 5 percent slopes, eroded	18.5	10.6%
470B2	Keller silt loam, 2 to 5 percent slopes, eroded	1.0	0.6%
882A	Oconee-Darmstadt-Coulterville silt loams, 0 to 2 percent slopes	1.1	0.6%
882B2	Oconee-Darmstadt-Coulterville silt loams, 2 to 5 percent slopes, eroded	8.2	4.7%
885A	Virden-Fosterburg silt loams, 0 to 2 percent slopes	4.3	2.5%
993A	Cowden-Piasa silt loams, 0 to 2 percent slopes	29.5	16.9%
3451cA	Lawson silt loam, cool mesic, 0 to 2 percent slopes, frequently flooded	11.1	6.3%
W	Water	1.6	0.9%
Totals for Area of Interest		**174.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some

observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The

pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

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Montgomery County, Illinois

6C2—Fishhook silt loam, 5 to 10 percent slopes, eroded

Map Unit Setting

National map unit symbol: y5bd
Elevation: 350 to 1,020 feet
Mean annual precipitation: 37 to 45 inches
Mean annual air temperature: 48 to 57 degrees F
Frost-free period: 180 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Fishhook and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fishhook

Setting

Landform: Hillslopes on ground moraines
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Head slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess over paleosol formed in till

Typical profile

H1 - 0 to 6 inches: silt loam
H2 - 6 to 32 inches: silty clay loam
H3 - 32 to 51 inches: clay loam
H4 - 51 to 80 inches: clay loam

Properties and qualities

Slope: 5 to 10 percent
Depth to restrictive feature: 20 to 39 inches to densic material
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C/D
Ecological site: Loess Upland Forest (F115CY005IL)
Hydric soil rating: No

7C2—Atlas silt loam, 5 to 10 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2tp1z
Elevation: 330 to 840 feet
Mean annual precipitation: 38 to 46 inches
Mean annual air temperature: 54 to 58 degrees F
Frost-free period: 180 to 195 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Atlas, eroded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Atlas, Eroded

Setting

Landform: Till plains
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Head slope, side slope
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loess over paleosol formed in till

Typical profile

Ap - 0 to 7 inches: silt loam
2Btg1 - 7 to 29 inches: silty clay loam
2Btg2 - 29 to 79 inches: silty clay loam

Properties and qualities

Slope: 5 to 10 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.01 to 0.06 in/hr)
Depth to water table: About 6 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Ava, eroded

Percent of map unit: 10 percent
Landform: Hillslopes, ridges
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Side slope, interfluve
Down-slope shape: Convex
Across-slope shape: Linear, convex
Hydric soil rating: No

8D—Hickory silt loam, 10 to 18 percent slopes

Map Unit Setting

National map unit symbol: 2ybgg
Elevation: 420 to 850 feet
Mean annual precipitation: 39 to 46 inches
Mean annual air temperature: 54 to 57 degrees F
Frost-free period: 185 to 195 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Hickory and similar soils: 93 percent
Minor components: 7 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hickory

Setting

Landform: Ground moraines
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy till

Typical profile

A - 0 to 4 inches: silt loam
E - 4 to 12 inches: loam
Bt1 - 12 to 26 inches: clay loam
Bt2 - 26 to 46 inches: clay loam
Bt3 - 46 to 60 inches: clay loam

Properties and qualities

Slope: 10 to 18 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Atlas

Percent of map unit: 3 percent
Landform: Ground moraines
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Wakeland

Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Fayette

Percent of map unit: 2 percent
Landform: Ground moraines
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Crest, head slope, side slope
Down-slope shape: Convex
Across-slope shape: Linear
Hydric soil rating: No

8D2—Hickory silt loam, 10 to 18 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2w1yt
Elevation: 380 to 820 feet
Mean annual precipitation: 39 to 46 inches
Mean annual air temperature: 54 to 57 degrees F
Frost-free period: 185 to 195 days
Farmland classification: Farmland of statewide importance

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Map Unit Composition

Hickory and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hickory

Setting

Landform: Ground moraines
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Illinois till

Typical profile

Ap - 0 to 3 inches: silt loam
Bt1 - 3 to 26 inches: clay loam
Bt2 - 26 to 45 inches: clay loam
BC - 45 to 53 inches: clay loam
C - 53 to 60 inches: loam

Properties and qualities

Slope: 10 to 18 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 15 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Atlas

Percent of map unit: 3 percent
Landform: Ground moraines
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Wakeland

Percent of map unit: 1 percent
Landform: Flood plains

Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Ava

Percent of map unit: 1 percent
Landform: Ridges
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

113A—Oconee silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2tp7w
Elevation: 360 to 840 feet
Mean annual precipitation: 37 to 46 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 170 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Oconee and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oconee

Setting

Landform: Till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 8 inches: silt loam
E - 8 to 16 inches: silt loam
Bt - 16 to 58 inches: silty clay loam
C - 58 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Cowden

Percent of map unit: 10 percent
Landform: Flats
Landform position (two-dimensional): Summit
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

113B—Oconee silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2tp7z
Elevation: 360 to 840 feet
Mean annual precipitation: 37 to 46 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 170 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Oconee and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oconee

Setting

Landform: Till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 8 inches: silt loam

E - 8 to 16 inches: silt loam
Bt - 16 to 58 inches: silty clay loam
C - 58 to 79 inches: silty clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Cowden

Percent of map unit: 10 percent
Landform: Flats
Landform position (two-dimensional): Summit
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

113B2—Oconee silt loam, 2 to 5 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2wk1k
Elevation: 330 to 820 feet
Mean annual precipitation: 38 to 46 inches
Mean annual air temperature: 54 to 58 degrees F
Frost-free period: 180 to 195 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Oconee, eroded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Custom Soil Resource Report

Description of Oconee, Eroded

Setting

Landform: Ground moraines
Landform position (two-dimensional): Backslope, shoulder, summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 8 inches: silt loam
Bt - 8 to 58 inches: silty clay loam
C - 58 to 79 inches: silty clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Darmstadt, eroded

Percent of map unit: 10 percent
Landform: Ground moraines
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Custom Soil Resource Report

470B2—Keller silt loam, 2 to 5 percent slopes, eroded

Map Unit Setting

National map unit symbol: 1vs08
Elevation: 400 to 1,020 feet
Mean annual precipitation: 35 to 40 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 160 to 190 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Keller and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Keller

Setting

Landform: Ground moraines
Landform position (two-dimensional): Backslope, shoulder
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess over paleosol formed in till

Typical profile

A - 0 to 6 inches: silt loam
Bt - 6 to 26 inches: silty clay loam
2Btg - 26 to 67 inches: silty clay loam
2Bg - 67 to 80 inches: silty clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: Loess Upland Prairie (R115CY002IL)
Hydric soil rating: No

Custom Soil Resource Report

882A—Oconee-Darmstadt-Coulterville silt loams, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2ytt1
Elevation: 330 to 820 feet
Mean annual precipitation: 38 to 46 inches
Mean annual air temperature: 54 to 58 degrees F
Frost-free period: 180 to 195 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Oconee and similar soils: 35 percent
Darmstadt and similar soils: 30 percent
Coulterville and similar soils: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oconee

Setting

Landform: Till plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 8 inches: silt loam
E - 8 to 16 inches: silt loam
Bt - 16 to 58 inches: silty clay loam
C - 58 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: C/D
Hydric soil rating: No

Description of Darmstadt

Setting

Landform: Ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess over mixed loess and drift

Typical profile

Ap - 0 to 6 inches: silt loam
E - 6 to 14 inches: silt loam
Bt - 14 to 20 inches: silty clay loam
Btng - 20 to 40 inches: silty clay loam
2Cng - 40 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 16 to 22 inches to natric
Natural drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.02 to 0.06 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 25 percent
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Coulterville

Setting

Landform: Ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess over mixed loess and drift

Typical profile

Ap - 0 to 7 inches: silt loam
Btng - 7 to 23 inches: silty clay loam
Btkng - 23 to 39 inches: silt loam
BCkn - 39 to 68 inches: silt loam
2C - 68 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Cowden

Percent of map unit: 5 percent
Landform: Ground moraines
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

Piasa

Percent of map unit: 5 percent
Landform: Ground moraines, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Interfluve, talf, dip
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

882B2—Oconee-Darmstadt-Coulterville silt loams, 2 to 5 percent slopes, eroded

Map Unit Setting

National map unit symbol: 1vsds

Elevation: 340 to 1,020 feet
Mean annual precipitation: 37 to 45 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 170 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Oconee and similar soils: 40 percent
Darmstadt and similar soils: 29 percent
Coulterville and similar soils: 25 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Oconee

Setting

Landform: Ground moraines
Landform position (two-dimensional): Summit, shoulder
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess

Typical profile

Ap - 0 to 8 inches: silt loam
Bt1 - 8 to 47 inches: silty clay loam
Bt2 - 47 to 65 inches: silty clay loam
Bt3 - 65 to 80 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 10 percent
Available water storage in profile: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Description of Darmstadt

Setting

Landform: Ground moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess

Custom Soil Resource Report

Typical profile

Ap - 0 to 11 inches: silt loam
Btn1 - 11 to 21 inches: silty clay loam
Btn2 - 21 to 39 inches: silty clay loam
Cng - 39 to 62 inches: silt loam
Cg - 62 to 80 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 8 to 19 inches to natric
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.01 to 0.06 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 25.0
Available water storage in profile: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Coulterville

Setting

Landform: Ground moraines
Landform position (two-dimensional): Shoulder, summit, backslope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess

Typical profile

Ap - 0 to 7 inches: silt loam
Btng - 7 to 15 inches: silty clay loam
Btkn - 15 to 68 inches: silty clay loam
2C - 68 to 80 inches: silt loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Sodium adsorption ratio, maximum in profile: 13.0

Available water storage in profile: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Piasa

Percent of map unit: 3 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Cowden

Percent of map unit: 3 percent
Landform: Flats
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

885A—Virden-Fosterburg silt loams, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1vs0t
Elevation: 340 to 1,000 feet
Mean annual precipitation: 37 to 45 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 170 to 200 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Virden and similar soils: 50 percent
Fosterburg and similar soils: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Virden

Setting

Landform: Ground moraines, depressions
Landform position (two-dimensional): Summit, toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear, concave

Across-slope shape: Linear, concave
Parent material: Loess

Typical profile
H1 - 0 to 15 inches: silt loam
H2 - 15 to 74 inches: silty clay loam
H3 - 74 to 80 inches: silty clay loam

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 10 percent
Available water storage in profile: High (about 10.6 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Description of Fosterburg

Setting
Landform: Ground moraines, depressions
Landform position (two-dimensional): Summit, toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Parent material: Loess

Typical profile
H1 - 0 to 13 inches: silt loam
H2 - 13 to 20 inches: silty clay loam
H3 - 20 to 41 inches: silty clay loam
H4 - 41 to 71 inches: silty clay loam
H5 - 71 to 80 inches: silt loam

Properties and qualities
Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 15 percent
Sodium adsorption ratio, maximum in profile: 13.0
Available water storage in profile: Very high (about 12.2 inches)

Custom Soil Resource Report

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Minor Components

Piasa

Percent of map unit:
Landform: Ground moraines, depressions
Landform position (two-dimensional): Summit, toeslope
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: Yes

993A—Cowden-Piasa silt loams, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2tbs0
Elevation: 330 to 840 feet
Mean annual precipitation: 38 to 46 inches
Mean annual air temperature: 52 to 58 degrees F
Frost-free period: 180 to 195 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Cowden and similar soils: 50 percent
Piasa and similar soils: 48 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cowden

Setting

Landform: Ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 8 inches: silt loam
Eg - 8 to 19 inches: silt loam
Btg - 19 to 50 inches: silty clay loam
Cg - 50 to 79 inches: silt loam

Custom Soil Resource Report

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 17 to 21 inches to abrupt textural change
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 5.0
Available water storage in profile: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C/D
Hydric soil rating: Yes

Description of Piasa

Setting

Landform: Ground moraines, depressions
Landform position (two-dimensional): Summit, toeslope
Landform position (three-dimensional): Interfluve, talf, dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess over silty pedisediment

Typical profile

Ap - 0 to 8 inches: silt loam
Eng - 8 to 12 inches: silt loam
Btng - 12 to 48 inches: silty clay loam
2BCng - 48 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 11 to 14 inches to natric
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Low to moderately low (0.01 to 0.06 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 30 percent
Salinity, maximum in profile: Very slightly saline to slightly saline (2.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Very low (about 2.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: D

Hydric soil rating: Yes

Minor Components

Darmstadt

Percent of map unit: 2 percent
Landform: Ground moraines
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

3451cA—Lawson silt loam, cool mesic, 0 to 2 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2vpmb
Elevation: 420 to 890 feet
Mean annual precipitation: 34 to 42 inches
Mean annual air temperature: 46 to 56 degrees F
Frost-free period: 160 to 190 days
Farmland classification: Prime farmland if protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Lawson, cool mesic, frequently flooded, and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lawson, Cool Mesic, Frequently Flooded

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

Ap - 0 to 9 inches: silt loam
A - 9 to 32 inches: silt loam
Cg - 32 to 79 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained

Custom Soil Resource Report

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 12 to 24 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very high (about 12.1 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Ecological site: Silty Floodplain Forest (F108AY019IL), Loamy Floodplain Forest (F115CY020IL)
Hydric soil rating: No

Minor Components

Sawmill, frequently flooded
Percent of map unit: 4 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Wet Loamy Floodplain Forest Acer saccharinum-Populus deltoides/Vitis riparia-Parthenocissus quinquefolia/Pilea pumila-Laportea c (Silver Maple-Eastern Cottonwood/Riverbank Grape-Virginia Creeper/ Canadian Clearweed-Canadian Woodne (F108BY021IL), Ponded Floodplain Marsh (R115CY016IL), Ponded Floodplain Marsh (R108AY018IL)
Hydric soil rating: Yes

Huntsville, frequently flooded
Percent of map unit: 3 percent
Landform: Flood plains
Landform position (three-dimensional): Rise
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Beaucoup, cool mesic, frequently flooded
Percent of map unit: 2 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Ponded Floodplain Marsh (R115CY016IL)
Hydric soil rating: Yes

Birds, frequently flooded
Percent of map unit: 1 percent
Landform: Flood plains
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: Yes

W—Water

Map Unit Composition

Water: 100 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Setting

Landform: Channels, perenial streams, drainageways, lakes, oxbows, rivers

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8w

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Custom Soil Resource Report

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Appendix F

Seed Lists

October 2020

Temporary Vegetation		
Plant Species*	**Seeding Rate PLS**	**Method of Application**
Spring Oats	2.0 bu./acre	Drilled or Broadcast
Virginia Wild Rye	4 (Drilled) or 6 (Broadcast) lbs/acre	Drilled or Broadcast
Canada Wild Rye	4 (Drilled) or 6 (Broadcast) lbs/acre	Drilled or Broadcast
German Millet	20.0 lbs/acre	Drilled or Broadcast
Sorghum/Sudan/Sudex	32.0 lbs/acre	Drilled or Broadcast
* Grasses shown above are suggested grasses which may be planted for temporary cover. Any of the grasses may be planted at the recommended rate to achieve a temporary vegetative cover.		

Permanent Vegetation Mix		
Grasses		
Plant Species*	**Seeding Rate PLS**	**Method of Application**
Little Bluestem	0.35 lbs/acre	Broadcast
Sideoats Grama	0.35 lbs/acre	Broadcast
Praire Junegrass	0.21 lbs/acre	Broadcast
Wildflowers		
Plant Species*	**Seeding Rate PLS**	**Method of Application**
Foxglove Beardtongue	0.015 lbs/acre	Broadcast
Tickseed Lanceleaf Coreopsis	0.15 lbs/acre	Broadcast
Canadian Milkvetch	0.010 lbs/acre	Broadcast
Eastern Purple Coneflower	0.25 lbs/acre	Broadcast
Illinois Bundleflower	0.26 lbs/acre	Broadcast
Butterfly Milkweed	0.031 lbs/acre	Broadcast
Gray Goldenrod	0.0050 lbs/acre	Broadcast
Stiff Goldenrod	0.020 lbs/acre	Broadcast
Smooth Blue Aster	0.040 lbs/acre	Broadcast