

**PROPOSAL TO REGISTER
WARBLER BLUFF
AS A LAND AND WATER RESERVE
COLES COUNTY, ILLINOIS**



Prepared For:
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SITE SUMMARY AND RECOMMENDATION

Warbler Bluff is a ~42-acre natural area in Coles County that is owned and managed by Grand Prairie Friends. Warbler Bluff lies within a forested corridor that extends for several miles along the Embarras River, from north of Lake Charleston to south of Fox Ridge State Park. Warbler Bluff protects and buffers ~1587 ft. of the Embarras River and associated forest habitat.

The Embarras River is recognized as a high-quality stream by the Illinois Natural Areas Inventory providing habitat for several threatened or endangered species of fish, reptile and mussel. State and/or Federally listed aquatic species include, but are not limited to, eastern sand darter (*Ammocrypta pellucidum*), smooth softshell turtle (*Apalone mutica*) and the mussels: monkeyface (*Quadrula metanevra*) and snuffbox (*Epioblasma triquetra*).

Grand Prairie Friends seeks registration in perpetuity of the ~42-acre natural area. Registration of this site will protect these, and other, natural resources and benefit current and future visitors, researchers, and residents of Coles County by preserving the unique natural heritage of East Central Illinois. Grand Prairie Friends and field staff of the Illinois Nature Preserves Commission recommend permanent registration of Warbler Bluff as a Land and Water Reserve.

RESOURCE SUMMARY AND EXISTING BASELINE CONDITIONS FOR WARBLER BLUFF LAND AND WATER RESERVE

Introduction and Site Significance

The proposed Warbler Bluff Land and Water Reserve (LWR) is a ~42-acre property located on the east side of the Embarras River about 3.5 miles East of the City of Charleston in Coles County. It would protect a biologically diverse segment of the Embarras River, which is habitat for several state-threatened or endangered species and the associated upland forest. It was purchased by Grand Prairie Friends (GPF), a not-for-profit conservation organization and land trust, in December 2020 for protection and conservation purposes. The property is ~3 miles northeast of Woodyard Memorial Conservation Area LWR and GPF's Warbler Ridge Conservation Area, which includes Warbler Bottoms North LWR, Warbler Woods North LWR, Warbler Woods NP & LWR, Embarras Ridges LWR, Warbler Landing LWR and Ambraw Woods LWR, and ~1.5 miles south of the J. Virgil Fishel Hillside Marsh Natural Heritage Landmark (NHL). These sites are part of an extensive forested corridor that extends several miles along the Embarras River and includes several areas designated as conservation lands.

Registration of Warbler Bluff as a land and water reserve protects a ~1587 ft. reach of the Embarras River and heavily dissected upland and bottomland forest. The Embarras River is recognized as a high-quality stream by the Illinois Natural Areas Inventory (INAI #0950 & 1120) providing habitat for several threatened or endangered species of fish, reptile and mussel. A total of 72 species of fish have been recorded from the Embarras River in this vicinity, including the state-threatened eastern sand darter (*Ammocrypta pellucidum*) and seven fish Species in Greatest Conservation Need (SGCN) as identified in the Illinois Comprehensive Wildlife Conservation Plan. The Embarras River also provides habitat for three other aquatic SGCN: the state-endangered smooth softshell turtle (*Apalone mutica*) and the mussels: monkeyface (*Quadrula metanevra*, state threatened) and snuffbox (*Epioblasma triquetra*, federally and state-endangered).

Location

Warbler Bluff is located within the Grand Prairie Section of the Grand Prairie Natural Division (Figure 1). It is located on the east side of the Embarras River and adjacent to the south of County Rd. 720 N., about 3.5 miles east of the city of Charleston in Coles County. While It does not shares boundaries with another Nature Preserve (NP) or LWR, Warbler Bluff is ~3 miles north of Woodyard Memorial Conservation Area LWR, Warbler Ridge Conservation Area (WRCA), which contains Ambraw Woods LWR, Warbler Woods North LWR, Warbler Bottoms North LWR, Warbler Woods NP & LWR, Embarras Ridges LWR, Warbler Landing LWR, and

Embarras River LWR at Fox Ridge State Park (Figure 2). The west boundary of Warbler Bluff meets the boundary of the Embarras River. An aerial photo and topographic map of the proposed reserve are provided in (Figures 3-4).

Warbler Bluff and the nearby protected lands are located within a forested corridor that extends for more than eight miles along hills flanking the Embarras River, from an area north of Charleston to south of Fox Ridge State Park. The addition of Warbler Bluff to these other protected lands continues the deliberate protection of the forested corridor along the Embarras River.

Warbler Bluff lies in Section 17, Township 12 North, Range 10 East of the 3rd Principal Meridian in Hutton Township, Coles County, Illinois.

History and Background Information

Grand Prairie Friends purchased Warbler Bluffs in 2020 from Clifford & Lynne Frantz to preserve and manage the property as a natural area, adding it to the corridor of natural areas protected by Grand Prairie Friends and public agencies along the Embarras River in Coles County. Clifford & Lynne maintained the property as a weekend retreat from their home in the Chicago area. A conservation-minded couple, they kept lists of native plants on the property, enjoyed deer hunting and maintained a small camp area.

Natural Characteristics

Topography, Geology, and Soils

The entirety of Warbler Bluff sits on dissected ridges perched above the Embarras River. Highest elevation on the site is ~694 feet above mean sea level and the lowest point ~590 feet above mean sea level, for a total elevation change of ~104 ft.

This area was affected by three different glacial periods. The latest of these was the Wisconsin glacial period. Warbler Bluff occurs at the western extent of the eastern section of the Paris moraine. The Paris moraine is located just north of the Shelbyville moraine and was deposited as the last glaciers retreated from this area. The Embarras River cuts through several moraines in the east central area of the state. The raised elevation, provided by the moraines, relative to the surrounding landscape led to erosion that formed the bluffs and ravines found along the Embarras River in this area. Coles County is the southernmost extent of the Wisconsin glacial period in Illinois. A map showing Warbler Bluff and its juxtaposition to regional moraines is shown in Figure 5.

The soils that underlie Warbler Bluff are typical of upland locations in proximity to rivers. The site contains six soil types: Xenia silt loam, Landes fine sandy loam, Lawson silt loam, Senachwine silt loam and Lenzburg loam. These soil types occur with slopes ranging from 0 to

60 percent. A summary and map of the soils on the property obtained from the Web Soil Survey are shown in Figure 6 (Web Soil Survey).

Hydrology

Warbler Bluff protects a ~1587 ft. (~483 m.) segment of the Embarras River. The Embarras River, for its entire Coles Co. reach, is a large unmodified natural stream typically 25 to 75 feet in width. The substrate consists of sand and gravel with some bedrock, cobble, and silt present. Stream habitats include extensive stretches of sand bottom, deep pools, abrupt bends, fast riffles, sandy and gravelly raceways, and sand bars. The reserve also contains seasonally wet branches of streams that drain the ridges toward the Embarras River.

Cultural Resources

Information regarding cultural/archeological resources has been provided by Illinois Department of Natural Resources, Office of Realty and Capital Planning Archeologist, Dawn Cobb. Ms. Cobb found that:

“There is a recorded archaeological survey and site in the proposed nature preserve. The attached – for planning purposes only – shows the site location. It also appears to extend into the cultivated field directly south but outside of the proposed NP. The survey was conducted for a proposed IDOT borrow pit but apparently another borrow location was chosen. There’s not much information about the type of archaeological site other than it appears to be prehistoric with a historic component. Other nearby sites include 3 small lithic scatters that had chert flaking debris left behind after a short-term occupation of the area or even an opportunistic use of the landform (e.g., making or sharpening a stone tool). One site dated to the Late Woodland period and had projectile points and other artifacts diagnostic of an extended period of use for the site like a seasonal camp. Given the proximity to the river there could be other archaeological sites present nearby or within the proposed NP but are unrecorded.

A review of the historical plat maps (1869 to 1952) showed no structures on the parcel. An old road is shown on the 1933 and 1958 USGS 15min topo maps, as is Rocks Park, but no structures are present. Actually, The Rocks Park is shown north of the river on these topo maps. I suspect that the old road in the proposed NP could be a timber haul road.”

Natural Communities and Flora

Natural communities at Warbler Bluff include Dry-mesic Upland Forest, Mesic Upland Forest, Mesic Floodplain Forest and Developed Land. All forest communities are Grade C. A map of the natural communities and land uses is provided in Figure 7.

A floristic quality assessment and vascular plant inventory was opportunistically conducted between August 1994 and April 2020, finding 144 native and 23 exotic plant species. Warbler Bluff has a floristic quality index (FQI) of 42.6 when native and non-native species are considered. Sites with an FQI greater than 20 may be degraded but generally have potential for some level of recovery, while sites with an FQI greater than 35 are at least regionally noteworthy and are often clearly distinct from the heavily degraded matrix that predominates the surrounding landscape. The full Floristic Quality Assessment including a list of plants known from the site can be found in Appendix 1.

Dry-mesic Upland Forest occurs along the tops of the ridges at the highest points of the reserve. Characteristic plants are white oak (*Quercus alba*), red oak (*Quercus rubra*), black oak (*Quercus velutina*), shagbark hickory (*Carya ovata*) and flowering dogwood (*Cornus florida*).

Mesic Upland Forest occurs along ravine slopes and is the dominant natural community. Characteristic plants are sugar maple (*Acer saccharum*), red oak (*Quercus rubra*), paw paw (*Asimina triloba*) and Ohio buckeye (*Aesculus glabra*).

Mesic Floodplain Forest occurs along an intermittent unnamed creek. Characteristic plants are *Ulmus sp.*, silver maple (*Acer saccharinum*), hackberry (*Celtis occidentalis*), bur oak (*Quercus macrocarpa*).

Developed land occurs at the uppermost, flat area of the site and down a north facing slope. Species composition and stand age indicate the area with the least topographical gradient was cleared and opened a few decades previous. The north facing slope area was likely cleared in recent decades to accommodate a more open, unobstructed view. A small cabin is located near the top of the north facing slope. Grand Prairie Friends intends to remove or demolish the structure.

Terrestrial Fauna

Formal surveys for amphibians, reptiles, birds or mammals have not occurred. However, during a site visit, there was an opportunistic sighting of an eastern box turtle (*Terrapene carolina*), which is identified as a SGCN by the Illinois Wildlife Action Plan (Illinois Department of Natural Resources 2015).

Aquatic Fauna

Seventy-two species of fish have been identified from the Embarras River in the vicinity of Warbler Bluff (Appendix 2 & 3). Species include six SGCN, two of which are listed as state-threatened: eastern sand darter and American brook lamprey (*Lethenteron appendix*, Illinois Endangered Species Protection Board 2020).

Mussel surveys have been conducted upstream and downstream of Warbler Bluff. Results from a recent survey are provided in Appendix 4. This survey was conducted approximately 5 miles downriver from Warbler Bluff, where the river flows through Fox Ridge

State Park. The survey identified 11 living species of mussel, a relatively high total for mussel diversity, including the pistolgrip (*Tritogonia verrucosa*) and flutedshell (*Lasmigona costata*) both SGCN (Illinois Department of Natural Resources 2015). Relic shells of the federally endangered snuffbox, the state threatened purple wartyback (*Cyclonaias tuberculata*), and the round hickorynut (*Obovaria subrotunda*), which is now extirpated from Illinois (Illinois Endangered Species Protection Board 2015) have been found in other surveys.

Endangered and Threatened Species

The state-threatened eastern sand darter has been recorded in the Embarras River at multiple locations in the vicinity of Warbler Bluff. Surveys conducted near Lake Charleston in 2007 counted more than 100 individuals. This fish occurs in sandy runs of small and medium rivers with high water quality. It is known from 36 occurrences in Illinois, mainly in the eastern part of the state.

From this stretch of the Embarras River there are also records of two additional state-listed fish species and one reptile. The state-threatened American brook lamprey was last observed approximately five miles downriver from Warbler Bluff in 1979. The state-endangered harlequin darter (*Etheostoma histrio*) was last observed near Charleston Dam, ~2.5 miles downriver, in 1984 and may be extirpated from this river. The state endangered smooth softshell turtle was most recently observed in June of 2019. The smooth softshell is declining statewide and its presence emphasizes the importance of this stretch of the Embarras River.

Reserve Design and Management

Warbler Bluff and the nearby protected lands are located within a forested corridor that extends for more than eight miles along hills flanking the Embarras River, from an area north of Charleston to south of Fox Ridge State Park. The addition of Warbler Bluff to these other protected lands continues the deliberate protection of the forested corridor along the Embarras River.

Management

Warbler Bluff will be managed in accordance with the site management plan which provides a description and schedule of management activities (appended to the registration agreement). Management goals are to: 1) protect, maintain, and enhance the registry features, including the Embarras River and its diverse aquatic communities, and the populations and habitats of state-listed species and Species in Greatest Need of Conservation that use the site; 2) maintain and restore upland forest communities that exhibit the ecological processes and biodiversity that are historically characteristic of these communities; 3) identify and control exotic species and invasive native species; 4) provide allowable uses.

The primary activities that will be used to maintain and restore biodiversity and forest structure are tree stand thinning/improvement, application of prescribed fire and the removal of exotic and invasive plant species. Exotic species will be controlled in accordance with the Illinois Nature Preserves Commission Vegetation Management Guidelines.

Use and Disturbance

Most of the forested areas are free of the typical exotic shrubs common in east central Illinois, e.g. bush honeysuckle, multi-floral rose, etc. Evidence exists of historic logging activities, but the site has recovered well. The area where undesirable woody vegetation is most prevalent is in the south-central portion of the reserve where topographic gradient is minimal. Evaluation of historic (1938) aerial photography shows this area was previously cleared for crop production or livestock pasturing (Figure 8). It appears this area was allowed to reforest naturally as tree age structure is fairly even and young relative to the surrounding forest community.

A small cabin sits in a small (~1/2 ac) opening that historically has been maintained with mowing (Figure 9). Grand Prairie Friends intends to remove or demolish the structure as time and resources allow.

A clear cut, north facing slope extends to the north of the maintained area. This area has scattered, young, early successional tree species with an herbaceous layer of brome grass.

Grand Prairie Friends has completed stewardship activities to address these management issues with relatively few exotic/invasive species remaining and substantial effort made to control mesic, shade tolerant tree species that establish in the absence of natural disturbance (e.g. fire).

Potential for Restoration

The potential for restoration is high. The application of prescribed fire and control of exotic/invasive species (significant effort has already been invested in this task) should enhance natural community function, benefit conservative plant species and maintain the forest community as suitable habitat for a variety of forest-dependent wildlife.

Allowable Uses and Reserved Rights

Grand Prairie Friends reserves the following rights on Warbler Bluff LWR with INPC approval; 1) Deer population control using recreational hunters in accordance with the rules for land and water reserves and applicable state game regulations; 2) Construct and maintain visitor parking lots with rock base and expand the parking lot if needed, not to exceed 100 ft. x 100 ft. dimensions; 3) Erect informational trail signs and kiosks; 4) In consultation with and approval by INPC staff, create a multi-modal trail that connects with other, nearby Grand Prairie Friends properties. Trail may accommodate hikers, bikers and ATV/UTV access, be no-more

than 15-20 ft. wide and has the opportunity to comply with the Americans with Disabilities Act (ADA). Trail route will avoid impacts to high quality and/or significant resources, steep slopes, highly erodible soils and any state or federally listed threatened or endangered organism, that currently occurs or may be discovered in the future; 5) Construct and maintain hiking trails. Trails will be approximately 4 feet wide and have dirt substrate. Trails may be widened in places to accommodate UTV access for natural resource management purposes such as stewardship and prescribed burning and will use standard trail maintenance measures (rock, waterbars, foot bridges, etc.) to maintain trail system. Hiking trails will also avoid impacts to high quality and/or significant resources, steep slopes, highly erodible soils and any state or federally listed threatened or endangered organism, that currently occurs or may be discovered in the future; 6) Allow structured education activities including site visits by organized groups and scientific research with appropriate Grand Prairie Friends and INPC approval; 7) Remove or demolish the cabin structure. Final disposition of the cabin will occur with consultation from INPC staff and will avoid impacts to significant features.

Photo documentation of Warbler Bluff was completed along the property boundaries. Points are shown in Figure 10 and photos are shown in Appendix 5.

The only known easement associated with this parcel is related to Illinois Consolidated Telephone Company, its successors and assigns, the right, privilege, and authority to enter upon the hereinafter described land to construct, operate, maintain, replace and remove a communication system consisting of such underground cables, and other appurtenances as the Grantee may from time to time require on the property in the NW 1/4 of Section 17, Township 12 North, Range 10 East.

Threats Analysis

Currently there are no known land development activities planned in the immediate vicinity of Warbler Bluff. Water pollution may enter the Embarras River from upstream sources and is a potential threat to aquatic animals and plants that live in and near the river. Exotic plants such as bush honeysuckle (*Lonicera sp.*), autumn olive (*Elaeagnus umbellata*), multiflora rose (*Rosa multiflora*), and garlic mustard (*Alliaria petiolata*) are present in natural areas and edges. These prolific species will expand and increase, especially into disturbed areas, unless control efforts occur.

Integration with the Comprehensive Wildlife Conservation Plan

The Illinois Comprehensive Wildlife Conservation Plan (Illinois Department of Natural Resources 2005) provides a detailed, science-based, comprehensive plan to manage public and private lands to benefit all Illinois wildlife, and especially those with declining populations. The plan identifies several “campaigns” and provides priority actions for these. Conservation of

Warbler Bluff supports action steps identified for both the Forest Campaign and Streams Campaign.

Protection and stewardship of this site as a Land and Water Reserve will fulfill the Forest Campaign actions to “maintain and enhance the composition of Illinois’ forested habitats” and to “continue removal and control of invasive exotic plants”. The buffering of the Embarras River by Warbler Bluff will contribute to fulfillment of the Streams Campaign action to “buffer and restore channels of the Vermilion (Wabash), Embarras and Little Wabash rivers and their tributaries to benefit the high diversity of aquatic SGCN’s in the Wabash River Natural Division”.

References

Illinois Department of Natural Resources. 2005. The Illinois comprehensive wildlife conservation plan and strategy. Illinois Department of Natural Resources, Springfield, Illinois. 344 pp.

Illinois Department of Natural Resources. 2015. 2015 Implementation guide to the Illinois wildlife action plan. Illinois Department of Natural Resources, Springfield, Illinois. 380 pp.

Illinois Endangered Species Protection Board. 2015. Checklist of endangered and threatened animals and plants of Illinois. Illinois Endangered Species Protection Board, Springfield, Illinois. 18 pp. Published online at <http://www.dnr.state.il.us/espb/index.htm>.

NatureServe. 2018. Biotics 5 database. NatureServe, Arlington, Virginia. (Accessed: December 7, 2018).

Schwegman, J. 1997. Illinois' natural divisions. The Illinois Steward, Urbana, Illinois. 12 pp.

[Web Soil Survey]. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at the following link: <https://websoilsurvey.sc.egov.usda.gov/>. Accessed 12/05/2018.

**RESOURCE SUMMARY AND EXISTING BASELINE CONDITIONS
FOR
WARBLER BLUFF LAND AND WATER RESERVE**

Each signatory below attests to the accuracy of the baseline conditions described in the above report. This natural resource inventory is an accurate representation of the conditions of the property at the time the land was proposed as a land and water reserve.

Sarah Livesay
Executive Director, Grand Prairie Friends

Date

John D. Griesbaum
Natural Areas Preservation Specialist, Illinois Nature Preserves Commission

Date

Natural Divisions of Illinois

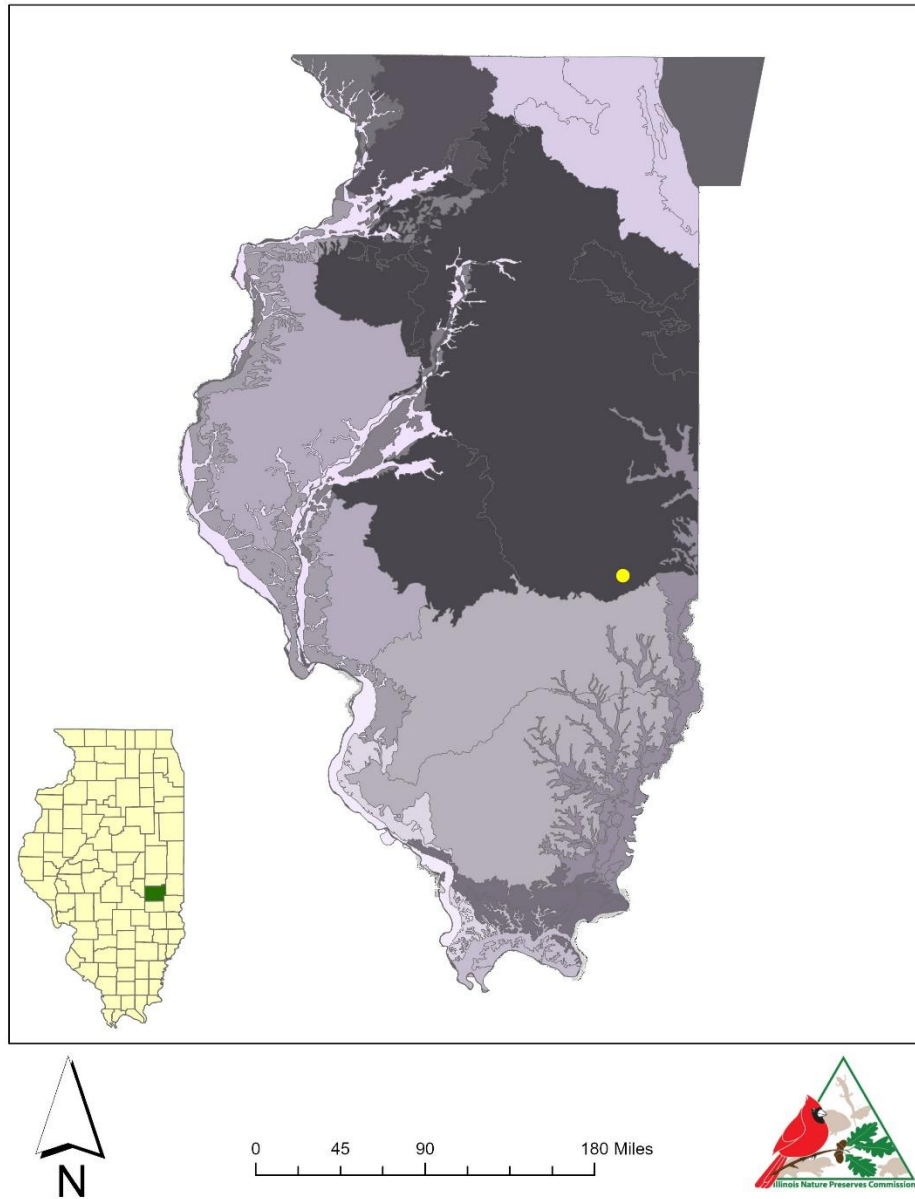


Figure 1. Warbler Bluff LWR is shown as the yellow dot within the Grand Prairie Section of the Grand Prairie Natural Division in Coles County, Illinois. This lies just north of the Effingham Plain Section of the Southern Till Plain Division. Map from Schwegman (1997).

Area Protected Lands

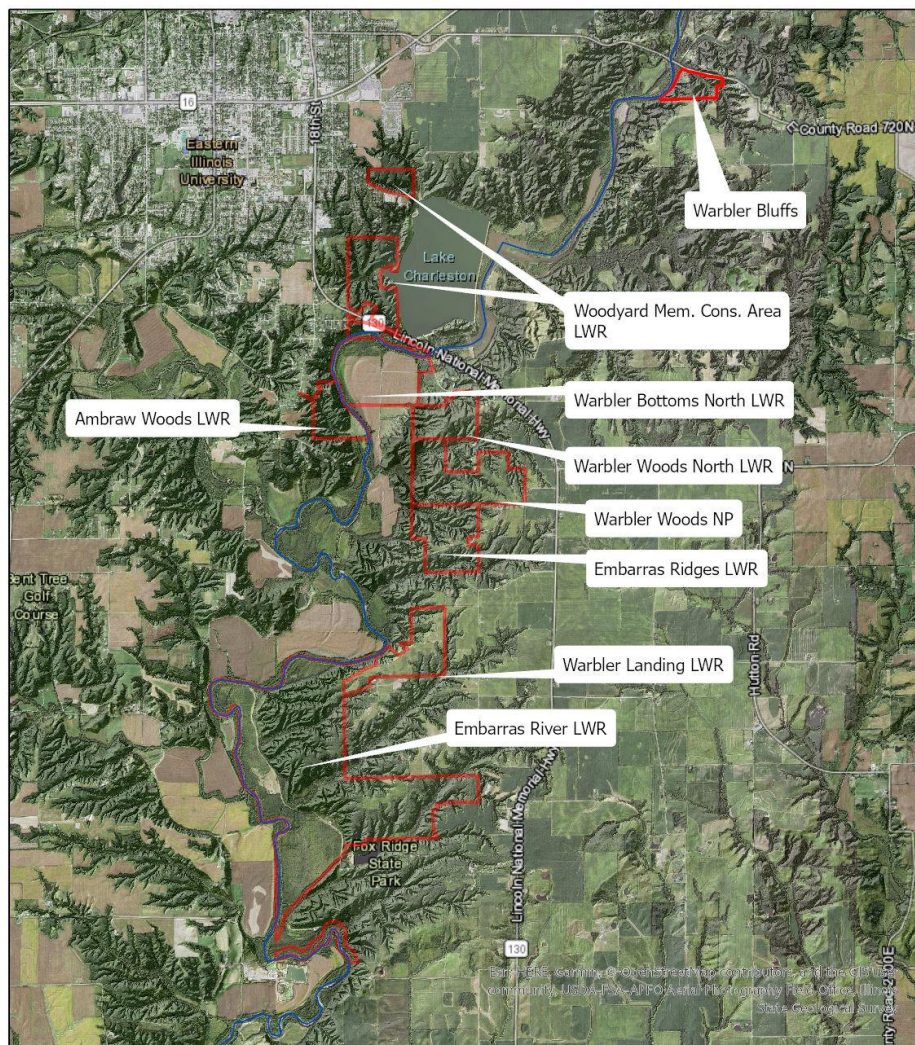
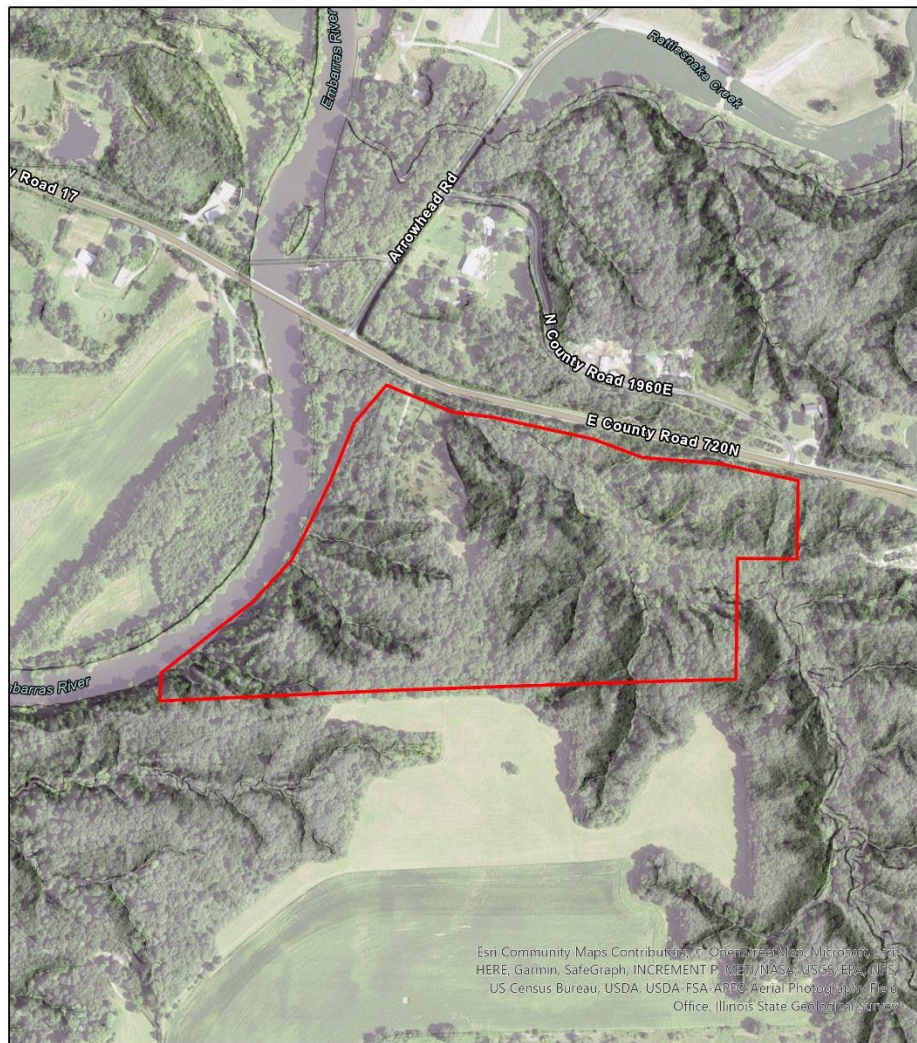


Figure 2. Warbler Bluff shown in relation to surrounding conservation areas owned by Grand Prairie Friends and public entities.

Warbler Bluff LWR - Aerial

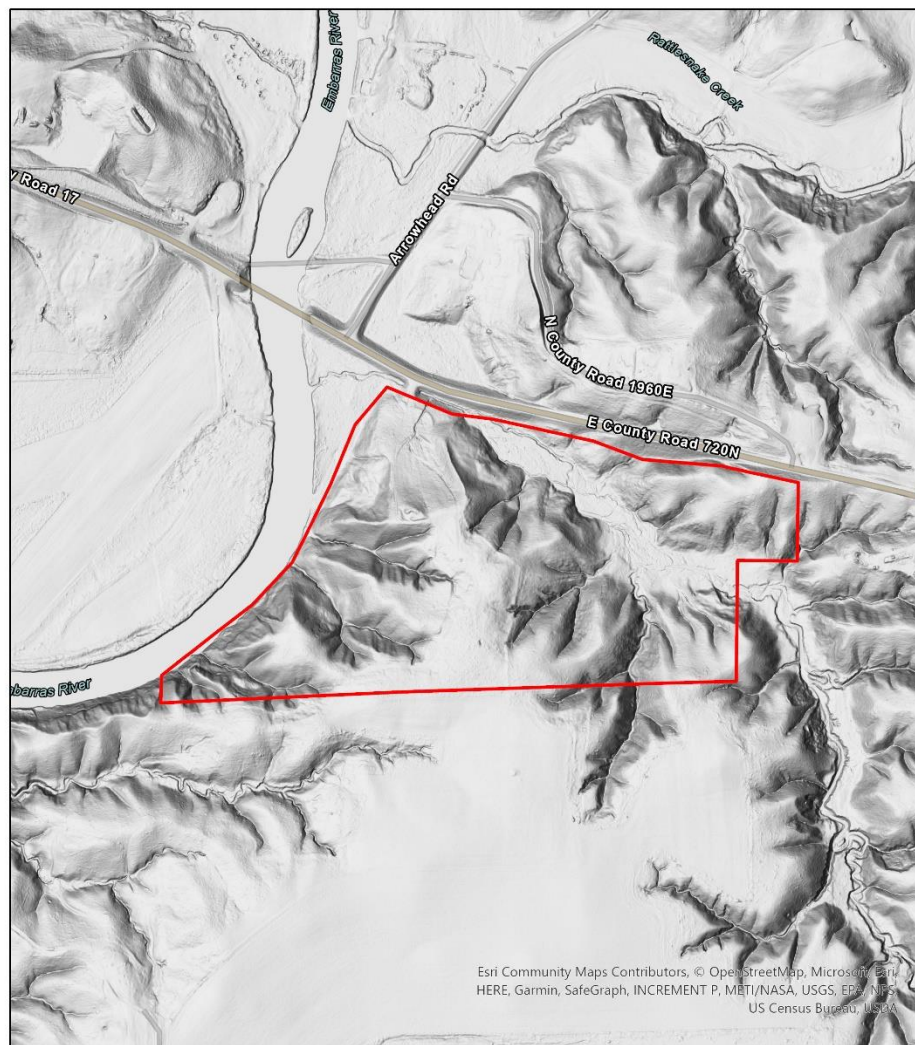


0 0.1 0.2 0.4 Miles



Figure 3. Aerial image of Warbler Bluff. Boundary is approximate and shown in red.

Warbler Bluff LWR - Topography



0 0.1 0.2 0.4 Miles



Figure 4. Topographic map of Warbler Bluff, Coles County, Illinois. Boundaries are approximate and shown in red.

Moraines of Coles County

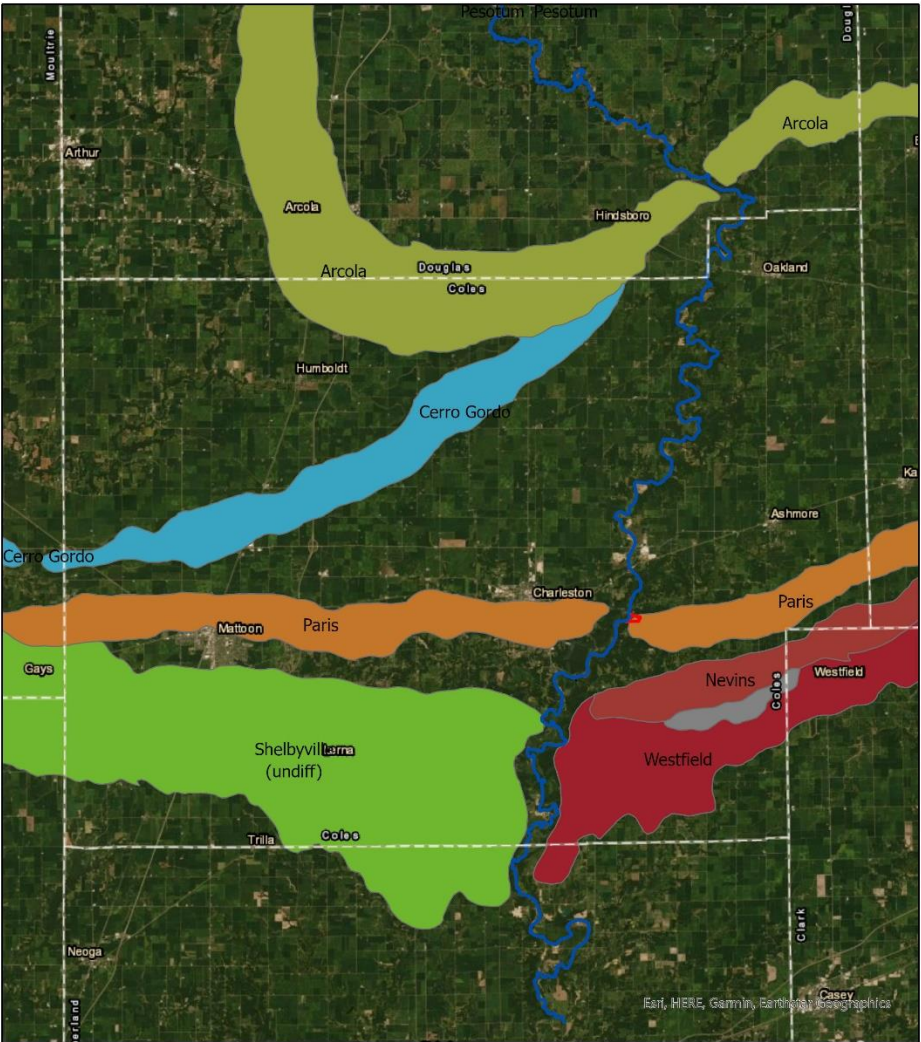


Figure 5. Warbler Bluff (red dot) shown in relation to regional moraines

Warbler Bluff LWR - Soils

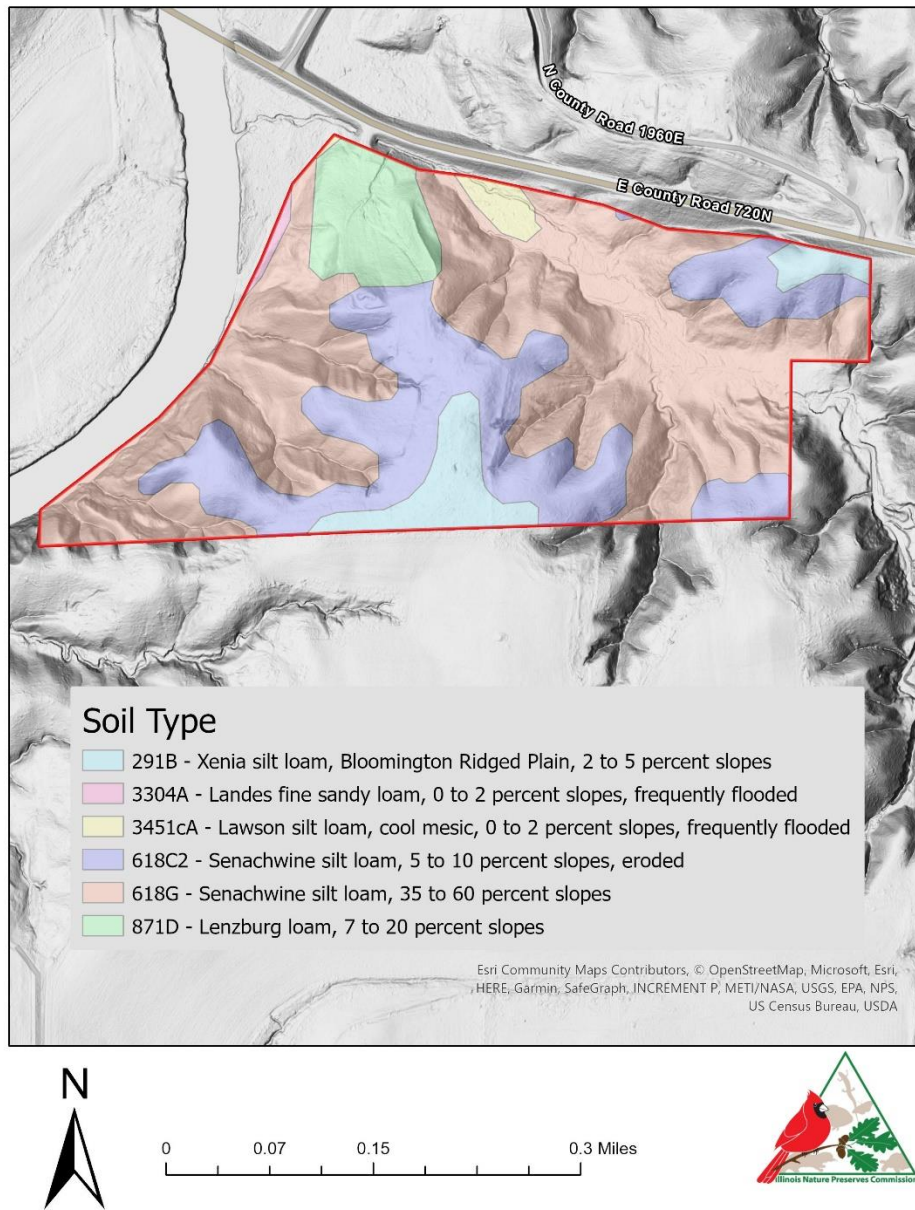


Figure 6. Warbler Bluff soils map showing location of soil types within the site

Warbler Bluff LWR - Natural Communities

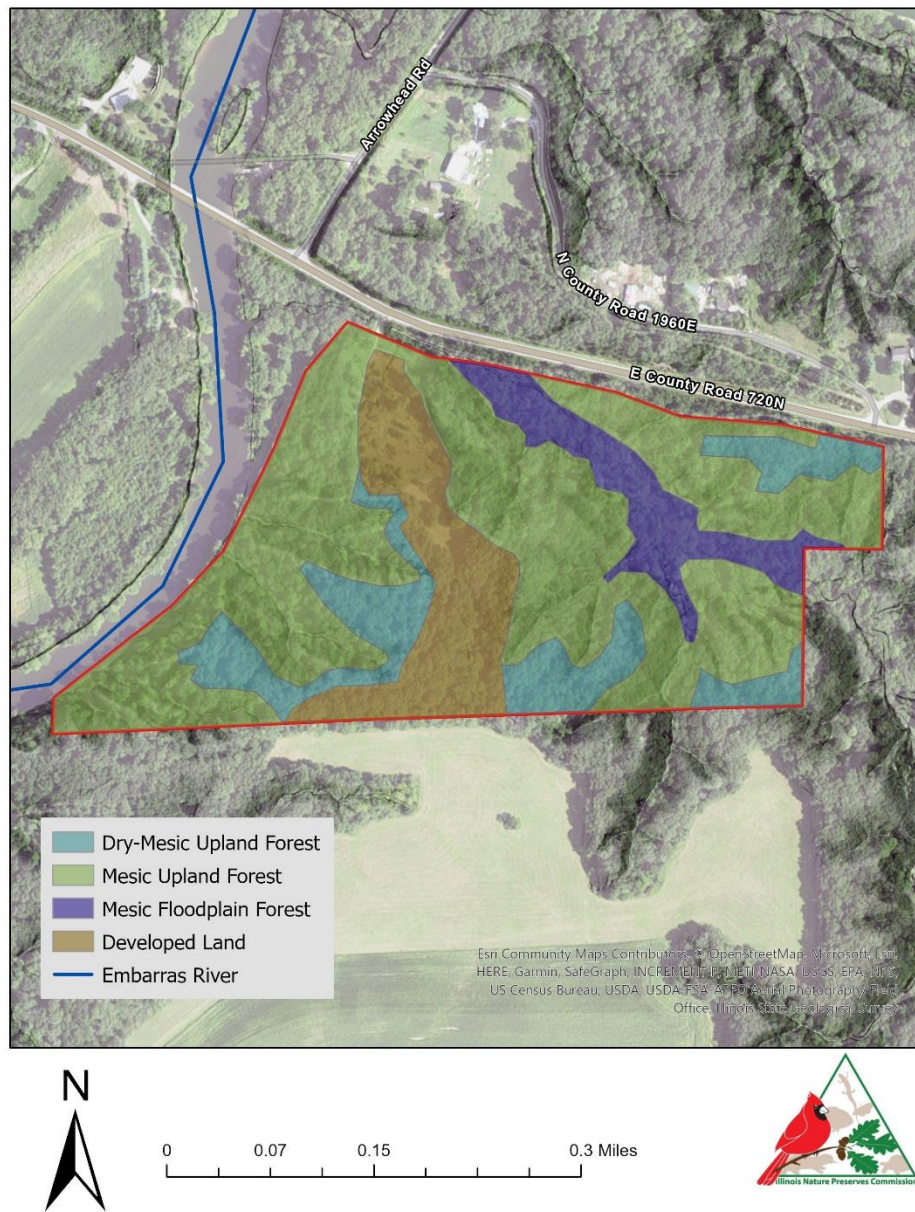
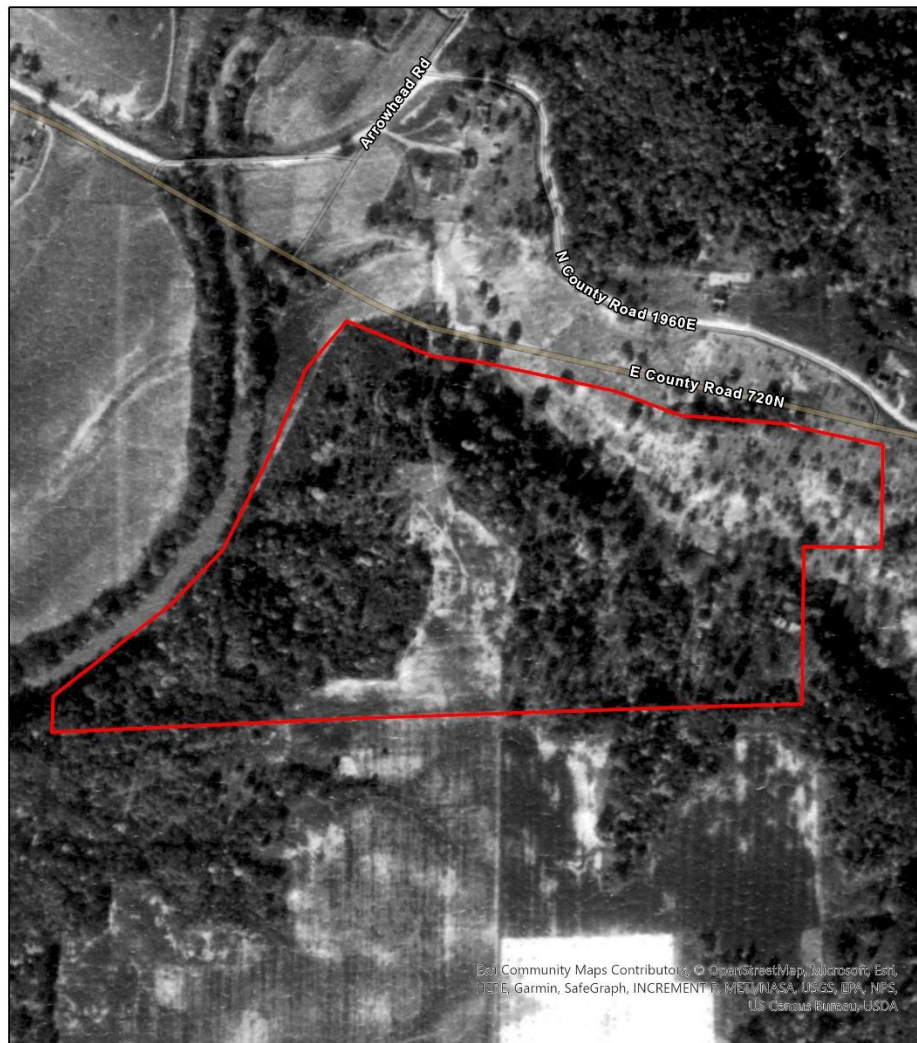


Figure 7. Natural communities of Warbler Bluff

Warbler Bluff LWR - 1938



0 0.07 0.15 0.3 Miles



Figure 8. 1938 Landcover of Warbler Bluff



Figure 9. Cabin at Warbler Bluff. Grand Prairie Friends intends to remove or demolish the structure as time and resources allow.

Warbler Bluff LWR - Photo Points

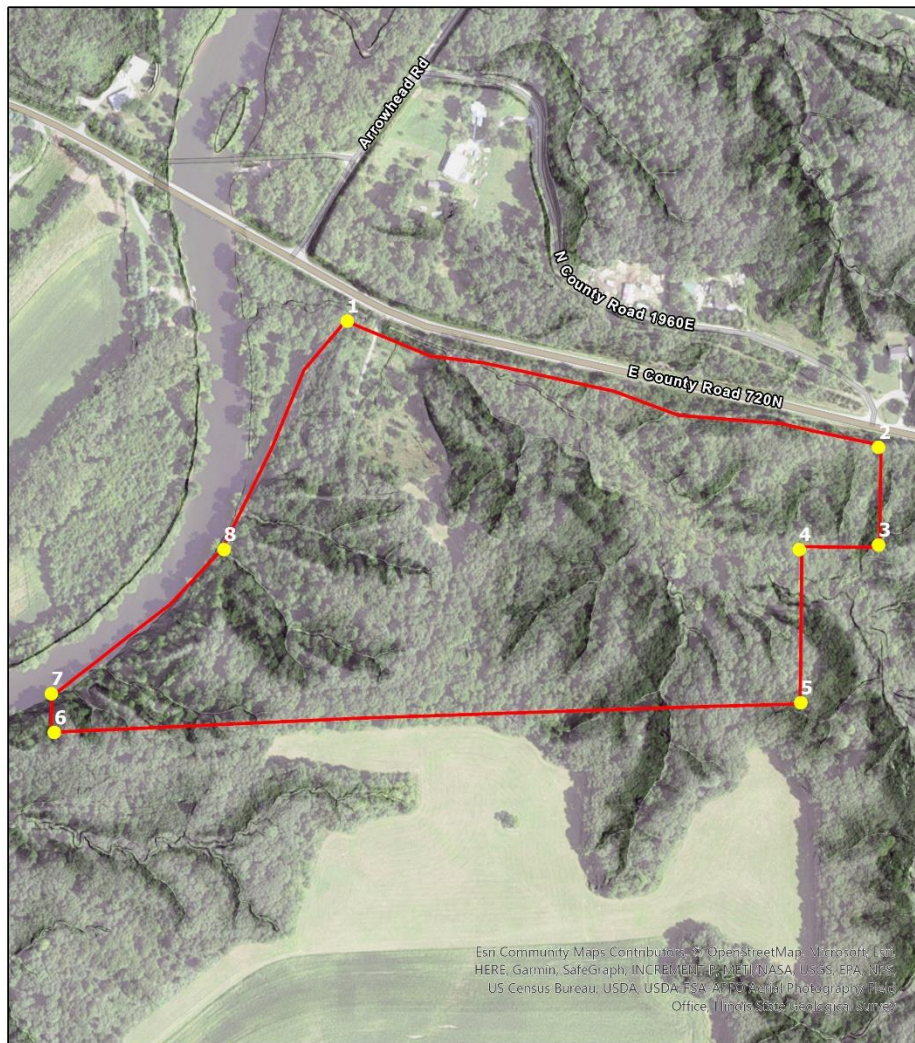


Figure 10. Location of photo points around property boundary of Warbler Bluff.

Appendix 1

Floristic Quality Assessment and Vascular Plant Inventory



Inventory Assessment

[Edit This Inventory](#)

[Download Report](#)

[Done](#)

Frantz property

» Date & Location:

2020-04-13

Frantz

Charleston

Coles, Illinois, United States

» FQA Database:

Region: **Illinois**

Year Published: **1997**

Description:

Taft, J. B., Wilhelm, G. S., Ladd, D. M., & Masters, L. A. 1997. Floristic quality assessment for vegetation in Illinois, a method for assessing vegetation integrity. Westville: Illinois Native Plant Society.

» Details:

Practitioner: **Jack Shouba**

Latitude:

Longitude:

Weather Notes:

Duration Notes:

Community Type Notes:

Other Notes: Combined Aug. 1, 1994, Oct. 29, 2001, Aug. 24, 2015 lists plus undated flowers list (common names only, so species is sometimes uncertain). Additions 4/10/20.

This assessment is **private** (viewable only by you).

» **Conservatism-Based Metrics:**

Total Mean C: 3.3
Native Mean C: 3.8
Total FQI: 42.6
Native FQI: 45.6
Adjusted FQI: 35.3
% C value 0: 16.8%
% C value 1-3: 31.7%
% C value 4-6: 43.1%
% C value 7-10: 8.4%
Native Tree Mean C: 3.6
Native Shrub Mean C: 3.6
Native Herbaceous Mean C: 3.9

» **Species Richness:**

Total Species: 167
Native Species: 144 (86.2%)
Non-native Species: 23 (13.8%)

» **Species Wetness:**

Mean Wetness: 2
Native Mean Wetness: 1.8

» **Physiognomy Metrics:**

Tree: 29 (17.4%)
Shrub: 14 (8.4%)
Vine: 3 (1.8%)
Forb: 107 (64.1%)
Grass: 9 (5.4%)
Sedge: 1 (0.6%)
Rush: 0 (0%)
Fern: 4 (2.4%)
Bryophyte: 0 (0%)

» **Duration Metrics:**

Annual: 11 (6.6%)
Perennial: 146 (87.4%)
Biennial: 10 (6%)

Native Annual: 9 (5.4%)
Native Perennial: 131 (78.4%)
Native Biennial: 4 (2.4%)

» **Species:**

| Scientific Name | Family | Acronym | Native? | C | W | Physiognomy | Duration | Common Name |
|-------------------------|--------|---------|------------|---|----|-------------|-----------|--------------------|
| Acer negundo | n/a | ACENEG | native | 1 | -2 | tree | perennial | boxelder |
| Acer saccharum | n/a | ACESAU | native | 4 | 3 | tree | perennial | sugar maple |
| Achillea millefolium | n/a | ACHMIL | non-native | 0 | 3 | forb | perennial | common milfoil |
| Actaea pachypoda | n/a | ACTPAC | native | 7 | 5 | forb | perennial | dolls-eyes |
| Adiantum pedatum | n/a | ADIPED | native | 6 | 1 | fern | perennial | maidenhair fern |
| Aesculus glabra | n/a | AESGLA | native | 5 | -1 | tree | perennial | ohio buckeye |
| Agrimonia gryposepala | n/a | AGRGRY | native | 3 | 2 | forb | perennial | tall agrimony |
| Ambrosia artemisiifolia | n/a | AMBART | native | 0 | 3 | forb | annual | common ragweed |
| Amelanchier arborea | n/a | AMEARB | native | 7 | 3 | tree | perennial | juneberry |
| Andropogon gerardii | n/a | ANDGER | native | 5 | 1 | grass | perennial | big bluestem |
| Anemone virginiana | n/a | ANEVIR | native | 4 | 5 | forb | perennial | tall anemone |
| Angelica atropurpurea | n/a | ANGATR | native | 6 | -5 | forb | perennial | angelica |
| Antennaria neglecta | n/a | ANTNEG | native | 4 | 5 | forb | perennial | cats foot |
| Apocynum sibiricum | n/a | APOSIB | native | 2 | -1 | forb | perennial | indian hemp |
| Arisaema triphyllum | n/a | ARITRI | native | 4 | -2 | forb | perennial | indian turnip |
| Asarum canadense | n/a | ASACAN | native | 5 | 5 | forb | perennial | canada wild ginger |
| Asclepias syriaca | n/a | ASCSYR | native | 0 | 5 | forb | perennial | common milkweed |
| Asimina triloba | n/a | ASITRI | native | 4 | 0 | tree | perennial | papaw |
| Aster novae-angliae | n/a | ASTNOV | native | 4 | -3 | forb | perennial | new england aster |
| Aster pilosus | n/a | ASTPIL | native | 0 | 4 | forb | perennial | hairy aster |
| Aster shortii | n/a | ASTSHO | native | 6 | 5 | forb | perennial | shorts aster |

| | | | | | | | | |
|--|-----|--------|------------|---|----|-------|-----------|------------------------|
| <i>Baptisia lactea</i> | n/a | BAPLAC | native | 6 | 3 | forb | perennial | white wild indigo |
| <i>Barbarea vulgaris</i> | n/a | BARVUL | non-native | 0 | 0 | forb | biennial | winter cress |
| <i>Bidens frondosa</i> | n/a | BIDFRO | native | 1 | -3 | forb | annual | common beggars ticks |
| <i>Boehmeria cylindrica</i> | n/a | BOECYC | native | 3 | -5 | forb | perennial | false nettle |
| <i>Botrychium virginianum</i> | n/a | BOTVIR | native | 4 | 3 | fern | perennial | rattlesnake fern |
| <i>Bromus inermis</i> | n/a | BROINE | non-native | 0 | 5 | grass | perennial | hungarian brome |
| <i>Bromus pubescens</i> | n/a | BROPUB | native | 5 | 2 | grass | perennial | woodland brome |
| <i>Cacalia atriplicifolia</i> | n/a | CACATR | native | 5 | 5 | forb | perennial | pale indian plantain |
| <i>Campanula americana</i> | n/a | CAMAME | native | 4 | 0 | forb | annual | american bellflower |
| <i>Carex pensylvanica</i> | n/a | CXPENP | native | 5 | 5 | sedge | perennial | pennsylvania oak sedge |
| <i>Carum carvi</i> | n/a | CARCAV | non-native | 0 | 5 | forb | biennial | caraway |
| <i>Carya ovata</i> | n/a | CAROVV | native | 4 | 3 | tree | perennial | shagbark hickory |
| <i>Cassia fasciculata</i> | n/a | CASFAS | native | 1 | 4 | forb | annual | golden cassia |
| <i>Ceanothus americanus</i> | n/a | CEAAME | native | 8 | 5 | shrub | perennial | new jersey tea |
| <i>Cercis canadensis</i> | n/a | CERCAN | native | 3 | 3 | tree | perennial | eastern redbud |
| <i>Circaea lutetiana v. canadensis</i> | n/a | CIRLUT | native | 2 | 3 | forb | perennial | enchanters nightshade |
| <i>Cirsium discolor</i> | n/a | CIRDIS | native | 3 | 5 | forb | biennial | pasture thistle |

| | | | | | | | | |
|-------------------------|-----|--------|------------|---|----|-------|-----------|--------------------------|
| Claytonia virginica | n/a | CLAVIR | native | 1 | 3 | forb | perennial | spring beauty |
| Cornus alternifolia | n/a | CORALT | native | 7 | 5 | tree | perennial | alternate-leaved dogwood |
| Cornus drummondii | n/a | CORDRU | native | 2 | 0 | shrub | perennial | rough-leaved dogwood |
| Cornus florida | n/a | CORFLO | native | 5 | 4 | tree | perennial | flowering dogwood |
| Cornus stolonifera | n/a | CORSTS | native | 4 | -3 | shrub | perennial | red osier dogwood |
| Coronilla varia | n/a | CORVAR | non-native | 0 | 5 | forb | perennial | crown vetch |
| Corylus americana | n/a | CORAME | native | 4 | 0 | shrub | perennial | american filbert |
| Crataegus crus-galli | n/a | CRACRU | native | 2 | 0 | tree | perennial | cock-spur hawthorn |
| Cryptotaenia canadensis | n/a | CRYCAN | native | 1 | 0 | forb | perennial | honewort |
| Cystopteris protrusa | n/a | CYSPRO | native | 4 | 3 | fern | perennial | hybrid fragile fern |
| Daucus carota | n/a | DAUCAR | non-native | 0 | 4 | forb | biennial | queen annes lace |
| Dentaria laciniata | n/a | DENLAC | native | 4 | 4 | forb | perennial | toothwort |
| Desmodium canadense | n/a | DESCAD | native | 5 | 1 | forb | perennial | showy tick trefoil |
| Dianthus armeria | n/a | DIAARM | non-native | 0 | 5 | forb | annual | deptford pink |
| Dicentra cucullaria | n/a | DICCUC | native | 5 | 5 | forb | perennial | dutchmans breeches |
| Diospyros virginiana | n/a | DIOVIN | native | 2 | 0 | tree | perennial | persimmon |
| Echinacea pallida | n/a | ECHPAL | native | 7 | 5 | forb | perennial | pale purple coneflower |

| | | | | | | | | |
|--|-----|--------|------------|----|----|-------|-----------|----------------------------|
| <i>Elaeagnus umbellata</i> | n/a | ELAUMB | non-native | 0 | 5 | shrub | perennial | autumn olive |
| <i>Elymus hystrix</i> | n/a | ELYHYS | native | 5 | 5 | grass | perennial | bottlebrush grass |
| <i>Elymus virginicus</i> | n/a | ELYVIR | native | 4 | -2 | grass | perennial | virginia wild rye |
| <i>Erigeron annuus</i> | n/a | ERIANN | native | 1 | 1 | forb | biennial | annual fleabane |
| <i>Erythronium americanum</i> | n/a | ERYAME | native | 7 | 5 | forb | perennial | yellow adders tongue |
| <i>Eupatorium altissimum</i> | n/a | EUPALT | native | 2 | 3 | forb | perennial | tall boneset |
| <i>Eupatorium coelestinum</i> | n/a | EUPCOE | native | 3 | -1 | forb | perennial | mistflower |
| <i>Eupatorium purpureum</i> | n/a | EUPPUR | native | 5 | 0 | forb | perennial | purple joe pye weed |
| <i>Eupatorium rugosum</i> | n/a | EUPRUG | native | 2 | 3 | forb | perennial | white snakeroot |
| <i>Euphorbia corollata</i> | n/a | EUPCOR | native | 3 | 5 | forb | perennial | flowering spurge |
| <i>Frasera carolinensis</i> | n/a | FRACAR | native | 8 | 5 | forb | biennial | american columbo |
| <i>Fraxinus pennsylvanica</i> v. <i>subintegerrima</i> | n/a | FRAPES | native | 2 | -3 | tree | perennial | green ash |
| <i>Galearis spectabilis</i> | n/a | GALSPE | native | 7 | 5 | forb | perennial | showy orchis |
| <i>Galium concinnum</i> | n/a | GALCON | native | 4 | 3 | forb | perennial | shining bedstraw |
| <i>Galium lanceolatum</i> | n/a | GALLAN | native | 10 | 5 | forb | perennial | lance-leaved wild licorice |
| <i>Gentianella quinquefolia</i> v. <i>occidentalis</i> | n/a | GENQUI | native | 7 | 0 | forb | annual | stiff gentian |
| <i>Geranium maculatum</i> | n/a | GERMAC | native | 4 | 3 | forb | perennial | wild geranium |
| <i>Geum canadense</i> | n/a | GEUCAN | native | 2 | 0 | forb | perennial | white avens |

| | | | | | | | | |
|----------------------------------|-----|--------|------------|---|----|-------|-----------|-----------------------|
| <i>Gleditsia triacanthos</i> | n/a | GLETRI | native | 2 | 0 | tree | perennial | honey locust |
| <i>Hackelia virginiana</i> | n/a | HACVIR | native | 1 | 1 | forb | perennial | stickseed |
| <i>Helianthus strumosus</i> | n/a | HELSTR | native | 3 | 5 | forb | perennial | pale-leaved sunflower |
| <i>Heliopsis helianthoides</i> | n/a | HELHEL | native | 4 | 5 | forb | perennial | false sunflower |
| <i>Hepatica nobilis v. acuta</i> | n/a | HEPNOA | native | 7 | 5 | forb | perennial | sharp-lobed hepatica |
| <i>Impatiens capensis</i> | n/a | IMPCAP | native | 2 | -3 | forb | annual | spotted touch-me-not |
| <i>Isopyrum biternatum</i> | n/a | ISOBIT | native | 5 | 0 | forb | perennial | false rue anemone |
| <i>Juglans nigra</i> | n/a | JUGNIG | native | 4 | 3 | tree | perennial | black walnut |
| <i>Juncus tenuis</i> | n/a | JUNTEN | native | 0 | 0 | forb | perennial | path rush |
| <i>Lactuca floridana</i> | n/a | LACFLO | native | 4 | 1 | forb | biennial | blue lettuce |
| <i>Lamium purpureum</i> | n/a | LAMPUR | non-native | 0 | 5 | forb | annual | purple dead nettle |
| <i>Laportea canadensis</i> | n/a | LAPCAN | native | 2 | -3 | forb | perennial | canada wood nettle |
| <i>Lespedeza hirta</i> | n/a | LESHIR | native | 6 | 5 | forb | perennial | hairy bush clover |
| <i>Lespedeza virginica</i> | n/a | LESVIR | native | 5 | 5 | forb | perennial | slender bush clover |
| <i>Liatris aspera</i> | n/a | LIAASP | native | 7 | 5 | forb | perennial | rough blazing star |
| <i>Lindera benzoin</i> | n/a | LINBEB | native | 5 | -2 | shrub | perennial | spicebush |
| <i>Liparis liliifolia</i> | n/a | LIPLIL | native | 4 | 4 | forb | perennial | purple twayblade |
| <i>Lobelia inflata</i> | n/a | LOBINF | native | 4 | 4 | forb | annual | indian tobacco |
| <i>Lobelia siphilitica</i> | n/a | LOBSIP | native | 4 | -4 | forb | perennial | great blue lobelia |

| | | | | | | | | |
|------------------------------|-----|--------|------------|---|----|-------|-----------|--------------------------|
| <i>Lonicera maackii</i> | n/a | LONMAA | non-native | 0 | 5 | shrub | perennial | amur honeysuckle |
| <i>Lysimachia nummularia</i> | n/a | LYSNUM | non-native | 0 | -4 | forb | perennial | moneywort |
| <i>Maclura pomifera</i> | n/a | MACPOM | non-native | 0 | 3 | tree | perennial | hedge apple |
| <i>Melilotus alba</i> | n/a | MELALB | non-native | 0 | 3 | forb | biennial | white sweet clover |
| <i>Melilotus officinalis</i> | n/a | MELOFC | non-native | 0 | 3 | forb | biennial | yellow sweet clover |
| <i>Melissa officinalis</i> | n/a | MELOFN | non-native | 0 | 5 | forb | perennial | common balm |
| <i>Mertensia virginica</i> | n/a | MERVIR | native | 5 | -3 | forb | perennial | virginia bluebells |
| <i>Monarda fistulosa</i> | n/a | MONFIS | native | 4 | 3 | forb | perennial | wild bergamot |
| <i>Ostrya virginiana</i> | n/a | OSTVIR | native | 4 | 4 | tree | perennial | hop hornbeam |
| <i>Oxalis dillenii</i> | n/a | OXADIL | native | 0 | 3 | forb | perennial | common wood sorrel |
| <i>Panax quinquefolius</i> | n/a | PANQUI | native | 7 | 5 | forb | perennial | ginseng |
| <i>Panicum latifolium</i> | n/a | PANLAT | native | 5 | 3 | grass | perennial | broad-leaved panic grass |
| <i>Penstemon digitalis</i> | n/a | PENDIG | native | 4 | 1 | forb | perennial | foxglove beard tongue |
| <i>Phleum pratense</i> | n/a | PHLPRA | non-native | 0 | 3 | grass | perennial | timothy |
| <i>Phlox divaricata</i> | n/a | PHLDIV | native | 5 | 3 | forb | perennial | blue phlox |
| <i>Physalis heterophylla</i> | n/a | PHYHET | native | 2 | 5 | forb | perennial | clammy ground cherry |
| <i>Phytolacca americana</i> | n/a | PHYAME | native | 1 | 1 | forb | perennial | pokeweed |

| | | | | | | | | |
|---------------------------------------|-----|--------|------------|---|----|-------|-----------|-----------------------|
| <i>Platanus occidentalis</i> | n/a | PLAOCC | native | 3 | -3 | tree | perennial | buttonwood |
| <i>Podophyllum peltatum</i> | n/a | PODPEL | native | 4 | 3 | forb | perennial | may apple |
| <i>Polygonum virginianum</i> | n/a | POLVIG | native | 3 | 0 | forb | perennial | virginia knotweed |
| <i>Polystichum acrostichoides</i> | n/a | POLACR | native | 5 | 5 | fern | perennial | christmas fern |
| <i>Populus deltoides</i> | n/a | POPDEL | native | 2 | -1 | tree | perennial | eastern cottonwood |
| <i>Potentilla simplex</i> | n/a | POTSIM | native | 3 | 4 | forb | perennial | common cinquefoil |
| <i>Prunella vulgaris</i> | n/a | PRUVUV | non-native | 0 | 0 | forb | perennial | lawn prunella |
| <i>Prunus serotina</i> | n/a | PRUSER | native | 1 | 3 | tree | perennial | wild black cherry |
| <i>Ptelea trifoliata</i> | n/a | PTETRT | native | 4 | 2 | shrub | perennial | wafer ash |
| <i>Pycnanthemum pilosum</i> | n/a | PYCPIL | native | 6 | 5 | forb | perennial | hairy mountain mint |
| <i>Pycnanthemum virginianum</i> | n/a | PYCVIR | native | 5 | -4 | forb | perennial | common mountain mint |
| <i>Quercus alba</i> | n/a | QUEALB | native | 5 | 3 | tree | perennial | white oak |
| <i>Quercus macrocarpa</i> | n/a | QUEMAC | native | 5 | 1 | tree | perennial | burr oak |
| <i>Quercus prinoides v. acuminata</i> | n/a | QUEPRA | native | 5 | 4 | tree | perennial | chinkapin oak |
| <i>Quercus rubra</i> | n/a | QUERUB | native | 5 | 3 | tree | perennial | northern red oak |
| <i>Quercus velutina</i> | n/a | QUEVEL | native | 5 | 5 | tree | perennial | black oak |
| <i>Ranunculus abortivus</i> | n/a | RANABO | native | 1 | -2 | forb | annual | little-leaf buttercup |
| <i>Robinia pseudo-acacia</i> | n/a | ROBPSE | native | 1 | 4 | tree | perennial | black locust |
| <i>Rosa carolina</i> | n/a | ROSCAR | native | 4 | 4 | shrub | perennial | pasture rose |

| | | | | | | | | |
|---------------------------------|-----|--------|------------|---|----|-------|-----------|---------------------------|
| <i>Rosa multiflora</i> | n/a | ROSMUL | non-native | 0 | 3 | shrub | perennial | japanese rose |
| <i>Rubus allegheniensis</i> | n/a | RUBALL | native | 2 | 2 | shrub | perennial | common blackberry |
| <i>Rubus occidentalis</i> | n/a | RUBOCC | native | 2 | 3 | shrub | perennial | black raspberry |
| <i>Rudbeckia hirta</i> | n/a | RUDHIR | native | 2 | 3 | forb | perennial | black-eyed susan |
| <i>Rudbeckia triloba</i> | n/a | RUDTRI | native | 3 | 1 | forb | annual | brown-eyed susan |
| <i>Rumex crispus</i> | n/a | RUMCRP | non-native | 0 | -1 | forb | perennial | curly dock |
| <i>Salix exigua</i> | n/a | SALEXI | native | 1 | -5 | shrub | perennial | sandbar willow |
| <i>Salix nigra</i> | n/a | SALNIG | native | 3 | -5 | tree | perennial | black willow |
| <i>Sanguinaria canadensis</i> | n/a | SANCAD | native | 5 | 4 | forb | perennial | bloodroot |
| <i>Sanicula gregaria</i> | n/a | SANGRE | native | 2 | -1 | forb | perennial | clustered black snakeroot |
| <i>Sassafras albidum</i> | n/a | SASALB | native | 2 | 3 | tree | perennial | sassafras |
| <i>Schizachyrium scoparium</i> | n/a | SCHSCO | native | 5 | 4 | grass | perennial | little bluestem |
| <i>Scrophularia marilandica</i> | n/a | SCRMAR | native | 4 | 4 | forb | perennial | late figwort |
| <i>Scutellaria parvula</i> | n/a | SCUPAR | native | 6 | 3 | forb | perennial | small skullcap |
| <i>Silphium perfoliatum</i> | n/a | SILPER | native | 4 | -2 | forb | perennial | cup plant |
| <i>Sisyrinchium albidum</i> | n/a | SISALB | native | 4 | 3 | forb | perennial | common blue-eyed grass |
| <i>Smilax hispida</i> | n/a | SMIHIS | native | 3 | 0 | vine | perennial | bristly green brier |
| <i>Solidago canadensis</i> | n/a | SOLCAN | native | 1 | 3 | forb | perennial | canada goldenrod |

| | | | | | | | | |
|--|-----|--------|------------|---|----|-------|-----------|------------------------|
| <i>Solidago flexicaulis</i> | n/a | SOLFLE | native | 6 | 3 | forb | perennial | broad-leaved goldenrod |
| <i>Solidago nemoralis</i> | n/a | SOLNEM | native | 3 | 5 | forb | perennial | old field goldenrod |
| <i>Solidago ulmifolia</i> | n/a | SOLULM | native | 5 | 5 | forb | perennial | elm-leaved goldenrod |
| <i>Sorghastrum nutans</i> | n/a | SORNUT | native | 4 | 2 | grass | perennial | indian grass |
| <i>Stachys tenuifolia</i> v. <i>hispida</i> | n/a | STATEH | native | 5 | -5 | forb | perennial | marsh hedge nettle |
| <i>Taraxacum officinale</i> | n/a | TAROFF | non-native | 0 | 3 | forb | perennial | common dandelion |
| <i>Teucrium canadense</i> v. <i>virginicum</i> | n/a | TEUCAV | native | 3 | -2 | forb | perennial | american germander |
| <i>Toxicodendron radicans</i> | n/a | TOXRAD | native | 1 | 3 | vine | perennial | poison ivy |
| <i>Tradescantia virginiana</i> | n/a | TRAVIR | native | 7 | 5 | forb | perennial | virginia spiderwort |
| <i>Trifolium pratense</i> | n/a | TRIPRA | non-native | 0 | 2 | forb | perennial | red clover |
| <i>Trillium recurvatum</i> | n/a | TRIREC | native | 5 | 4 | forb | perennial | red trillium |
| <i>Ulmus americana</i> | n/a | ULMAME | native | 5 | -2 | tree | perennial | american elm |
| <i>Ulmus rubra</i> | n/a | ULMRUB | native | 3 | 0 | tree | perennial | slippery elm |
| <i>Urtica dioica</i> | n/a | URTDIO | native | 2 | -1 | forb | perennial | tall nettle |
| <i>Verbascum thapsus</i> | n/a | VERTHA | non-native | 0 | 5 | forb | biennial | woolly mullein |
| <i>Verbena stricta</i> | n/a | VERSTR | native | 2 | 5 | forb | perennial | hoary vervain |
| <i>Verbena urticifolia</i> | n/a | VERURT | native | 3 | -1 | forb | perennial | white vervain |
| <i>Vernonia fasciculata</i> | n/a | VERFAS | native | 5 | -3 | forb | perennial | common ironweed |
| <i>Veronicastrum virginicum</i> | n/a | VERVIM | native | 6 | 0 | forb | perennial | culvers root |

| | | | | | | | | |
|-------------------|-----|--------|------------|---|----|-------|-----------|-----------------|
| Viburnum dentatum | n/a | VIBDEN | non-native | 0 | 5 | shrub | perennial | arrow-wood |
| Vitis riparia | n/a | VITRIP | native | 2 | -2 | vine | perennial | riverbank grape |

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Appendix 2

Fish Survey – All species known from Embarrass River between Lake Charleston and Fox Ridge
State Park

Fish species identified from the Embarras River between Lake Charleston and Fox Ridge SP. Data were provided by IDNR Stream Biologist Trent Thomas. Abbreviations for species status are as follows: ST - State-Threatened, SGNC - Species in Greatest Need of Conservation (Illinois Department of Natural Resources 2015, Illinois Endangered Species Protection Board 2015).

| Common Name | Scientific Name | Status |
|--------------------------|------------------------------------|----------|
| Skipjack herring | <i>Alosa chrysochloris</i> | |
| Rock bass | <i>Ambloplites rupestris</i> | |
| Yellow bullhead | <i>Ameiurus natalis</i> | |
| Bowfin | <i>Amia calva</i> | |
| American eel | <i>Anguilla rostrata</i> | ST, SGNC |
| Freshwater drum | <i>Aplodinotus grunniens</i> | |
| Central stoneroller | <i>Campostoma anomalum</i> | |
| Unidentified Stoneroller | <i>Campostoma sp.</i> | |
| River carpsucker | <i>Carpionodes carpio</i> | |
| Quillback | <i>Carpionodes cyprinus</i> | |
| Highfin carpsucker | <i>Carpionodes velifer</i> | |
| White sucker | <i>Catostomus commersoni</i> | |
| Grass carp* | <i>Ctenopharyngodon idella</i> | |
| Spotfin shiner | <i>Cyprinella spiloptera</i> | |
| Steelcolor shiner | <i>Cyprinella whipplei</i> | |
| Carp* | <i>Cyprinus carpio</i> | |
| Gizzard shad | <i>Dorosoma cepedianum</i> | |
| Grass pickerel | <i>Esox americanus</i> | |
| Greenside darter | <i>Etheostoma blennioides</i> | |
| Rainbow darter | <i>Etheostoma caeruleum</i> | |
| Fantail darter | <i>Etheostoma flabellare</i> | |
| Johnny darter | <i>Etheostoma nigrum</i> | |
| Eastern sand darter | <i>Etheostoma pellucidum</i> | ST, SGNC |
| Orangethroat darter | <i>Etheostoma spectabile</i> | |
| Blackstripe topminnow | <i>Fundulus notatus</i> | |
| Goldeye | <i>Hiodon alosoides</i> | |
| Mooneye | <i>Hiodon tergisus</i> | SGNC |
| Silvery minnow | <i>Hybognathus nuchalis</i> | |
| Northern hog sucker | <i>Hypentelium nigricans</i> | |
| Silver carp* | <i>Hypophthalmichthys molitrix</i> | |
| Silver lamprey | <i>Ichthyomyzon unicuspis</i> | SGNC |
| Channel catfish | <i>Ictalurus punctatus</i> | |
| Smallmouth buffalo | <i>Ictiobus bubalus</i> | |
| Bigmouth buffalo | <i>Ictiobus cyprinellus</i> | |
| Black buffalo | <i>Ictiobus niger</i> | |
| Brook silverside | <i>Labidesthes sicculus</i> | |
| American brook lamprey | <i>Lampetra appendix</i> | ST, SGNC |
| Spotted gar | <i>Lepisosteus oculatus</i> | |

| | | |
|--|--|------|
| Longnose gar | <i>Lepisosteus osseus</i> | |
| Shortnose gar | <i>Lepisosteus platostomus</i> | |
| Green sunfish | <i>Lepomis cyanellus</i> | |
| Warmouth | <i>Lepomis gulosus</i> | |
| Orangespotted sunfish | <i>Lepomis humilis</i> | |
| Bluegill | <i>Lepomis macrochirus</i> | |
| Bluegill x Green sunfish hybrid | <i>Lepomis macrochirus</i> x <i>L. cyanellus</i> | |
| Longear sunfish | <i>Lepomis megalotis</i> | |
| Longear sunfish x Green sunfish hybrid | <i>Lepomis megalotis</i> x <i>L. cyanellus</i> | |
| Longear sunfish x Bluegill hybrid | <i>Lepomis megalotis</i> x <i>L. macrochirus</i> | |
| Redear sunfish | <i>Lepomis microlophus</i> | |
| Striped shiner | <i>Luxilus chrysocephalus</i> | |
| Ribbon shiner | <i>Lythrurus fumeus</i> | SGNC |
| Redfin shiner | <i>Lythrurus umbratilis</i> | |
| Spotted bass | <i>Micropterus punctulatus</i> | |
| Largemouth bass | <i>Micropterus salmoides</i> | |
| Black bass spp. | <i>Micropterus</i> spp. | |
| Spotted sucker | <i>Minytrema melanops</i> | |
| White bass | <i>Morone chrysops</i> | |
| Silver redhorse | <i>Moxostoma anisurum</i> | |
| Golden redhorse | <i>Moxostoma erythrurum</i> | |
| Shorthead redhorse | <i>Moxostoma macrolepidotum</i> | |
| Golden shiner | <i>Notemigonus crysoleucas</i> | |
| Emerald shiner | <i>Notropis atherinoides</i> | |
| Silverjaw minnow | <i>Notropis buccatus</i> | |
| Sand shiner | <i>Notropis ludibundus</i> | |
| Rosyface shiner | <i>Notropis rubellus</i> | |
| Brindled madtom | <i>Noturus miurus</i> | |
| Logperch | <i>Percina caprodes</i> | |
| Blackside darter | <i>Percina maculata</i> | |
| Slenderhead darter | <i>Percina phoxocephala</i> | |
| Dusky darter | <i>Percina sciera</i> | |
| Unidentified lamprey | <i>Petromyzontidae</i> sp. | |
| Suckermouth minnow | <i>Phenacobius mirabilis</i> | |
| Bluntnose minnow | <i>Pimephales notatus</i> | |
| Bullhead minnow | <i>Pimephales vigilax</i> | |
| White crappie | <i>Pomoxis annularis</i> | |
| Black crappie | <i>Pomoxis nigromaculatus</i> | |
| Flathead catfish | <i>Pylodictis olivaris</i> | |
| Creek chub | <i>Semotilus atromaculatus</i> | |

* Exotic species

Appendix 3

Fish Survey Data

Results from a recent fish survey conducted at three sampling locations along the Embarras River between Lake Charleston and Fox Ridge SP. Each survey was conducted for 60 electrode minutes. Data were provided by IDNR Stream Biologist Trent Thomas.

| Location | | Embarras River | Fox Ridge SP | Charleston Dam Tailwater |
|-------------------------------------|-----------------------------|-------------------------|--------------------------|--------------------------|
| Distance from Warbler Bottoms North | | ~2.3-mile S (downriver) | ~3.4-miles S (downriver) | ~0.3-miles N (upriver) |
| Sampling Year | | 1978 | 2006 | 2011 |
| Common Name | Scientific Name | | | |
| Shortnose gar | Lepisosteus platostomus | 1 | 1 | 3 |
| Longnose gar | Lepisosteus osseus | 1 | 3 | 4 |
| Spotted gar | Lepisosteus oculatus | | | 1 |
| Bowfin | Amia calva | 1 | | |
| American eel ^{a,b} | Anguilla rostrata | | | 1 |
| Gizzard shad | Dorosoma cepedianum | 26 | 60 | 9 |
| Goldeye | Hiodon alosoides | 1 | | |
| Grass carp* | Ctenopharyngodon idella | | | 2 |
| Silver carp* | Hypophthalmichthys molitrix | | | 24 |
| Carp* | Cyprinus carpio | 17 | 3 | 2 |
| Central stoneroller | Campostoma anomalum | | | 1 |
| Redfin shiner | Lythrurus umbratilis | | 1 | |
| Ribbon shiner ^b | Lythrurus fumeus | 11 | | |
| Spotfin shiner | Cyprinella spiloptera | 25 | 8 | 196 |
| Steelcolor shiner | Cyprinella whipplei | 3 | 10 | 25 |
| Bluntnose minnow | Pimephales notatus | 204 | | 2 |
| Bullhead minnow | Pimephales vigilax | | 3 | 10 |
| Silverjaw minnow | Notropis buccatus | 9 | | |
| Bigmouth buffalo | Ictiobus cyprinellus | 1 | | 5 |
| Smallmouth buffalo | Ictiobus bubalus | | 2 | 22 |
| Black buffalo | Ictiobus niger | | 2 | 3 |
| Quillback | Carpodes cyprinus | 3 | 4 | 3 |
| River carpsucker | Carpodes carpio | 13 | 29 | 58 |
| Highfin carpsucker | Carpodes velifer | 3 | 4 | 6 |
| Spotted sucker | Minytrema melanops | 4 | | |
| Northern hog sucker | Hypentelium nigricans | 2 | | |

| | | | | |
|---------------------------|---------------------------------|-----|-----|-----|
| Shorthead redhorse | <i>Moxostoma macrolepidotum</i> | 33 | 5 | 13 |
| Golden redhorse | <i>Moxostoma erythrurum</i> | 19 | 8 | 5 |
| Silver redhorse | <i>Moxostoma anisurum</i> | 18 | 7 | 3 |
| Channel catfish | <i>Ictalurus punctatus</i> | 17 | 5 | 1 |
| Flathead catfish | <i>Pylodictis olivaris</i> | 3 | | 8 |
| Blackstripe topminnow | <i>Fundulus notatus</i> | 13 | | 1 |
| Brook silverside | <i>Labidesthes sicculus</i> | 13 | | 1 |
| Black crappie | <i>Pomoxis nigromaculatus</i> | | | 5 |
| White crappie | <i>Pomoxis annularis</i> | | | 3 |
| Largemouth bass | <i>Micropterus salmoides</i> | 2 | 2 | 1 |
| Spotted bass | <i>Micropterus punctulatus</i> | 28 | 11 | 6 |
| Black bass spp. | <i>Micropterus</i> spp. | 1 | | |
| Green sunfish | <i>Lepomis cyanellus</i> | 3 | | 1 |
| Bluegill | <i>Lepomis macrochirus</i> | 1 | | 10 |
| Redear sunfish | <i>Lepomis microlophus</i> | | | 1 |
| Longear sunfish | <i>Lepomis megalotis</i> | 30 | 14 | 20 |
| Dusky darter | <i>Percina sciera</i> | | 1 | 1 |
| Slenderhead darter | <i>Percina phoxocephala</i> | | | 4 |
| Logperch | <i>Percina caprodes</i> | 1 | | 3 |
| Freshwater drum | <i>Aplodinotus grunniens</i> | 1 | 4 | 8 |
| Number of Species | | 31 | 22 | 38 |
| Number of Individual Fish | | 508 | 187 | 472 |

* Exotic species

a State-threatened species

b Species in Greatest Need of Conservation

Appendix 4

Mussel Survey Data

Results from a mussel survey conducted on August 21, 2014 on the Embarras River in Fox Ridge State Park (39.4203, -88.1775). The survey was conducted by kayak by S.A. Douglass and A.P. Stodola and included 2 man-hours of search effort. Abbreviations for species status are as follows: FE - Federallly Endangered, ST - State-Threatened, SGNC - Species in Greatest Need of Conservation, X - Extirpated from Illinois (Illinois Department of Natural Resources 2015, Illinois Endangered Species Protection Board 2015). Data were obtained from a printout provided by the Illinois Natural History Survey from its Mollusk Collection Records.

| Scientific Name | Common Name | Subfamily | Status (2015) | Number of Individuals | | |
|--------------------------------|--------------------|-------------|---------------|-----------------------|---------------|-------|
| | | | | Living | Recently Dead | Relic |
| <i>Actinonaias ligamentina</i> | mucket | Lampsilinae | | 2 | 0 | 0 |
| <i>Cyclonaias tuberculata</i> | purple wartyback | Amblesinae | ST, SGNC | 0 | 0 | 1 |
| <i>Epioblasma triquetra</i> | snuffbox | Lampsilinae | FE, SGNC | 0 | 0 | 1 |
| <i>Lampsilis cardium</i> | plain pocketbook | Lampsilinae | | 4 | 0 | 0 |
| <i>Lampsilis teres</i> | yellow sandshell | Lampsilinae | | 4 | 1 | 0 |
| <i>Lasmigona complanata</i> | white heelsplitter | Anodontinae | | 3 | 0 | 0 |
| <i>Lasmigona costata</i> | flutedshell | Anodontinae | SGNC | 0 | 1 | 0 |
| <i>Leptodea fragilis</i> | fragile papershell | Lampsilinae | | 3 | 0 | 0 |
| <i>Obovaria subrotunda</i> | round hickorynut | Lampsilinae | X | 0 | 0 | 1 |
| <i>Pleurobema sintoxia</i> | round pigtoe | Amblesinae | | 0 | 1 | 0 |
| <i>Potamilus alatus</i> | pink heelsplitter | Lampsilinae | | 5 | 0 | 0 |
| <i>Quadrula pustulosa</i> | pimpleback | Amblesinae | | 5 | 0 | 0 |
| <i>Quadrula quadrula</i> | mapleleaf | Amblesinae | | 1 | 1 | 0 |
| <i>Tritogonia verrucosa</i> | pistolgrip | Amblesinae | SGNC | 24 | 0 | 0 |
| <i>Truncilla donaciformis</i> | fawnsfoot | Lampsilinae | | 1 | 0 | 0 |
| <i>Truncilla truncata</i> | deertoe | Lampsilinae | | 2 | 0 | 0 |

Appendix 5

Photo Points Description



Photo point 1 – Looking EAST



Photo point 1 – Looking WEST



Photo point 2 – Looking SOUTH



Photo point 3 – Looking NORTH



Photo point 4 – Looking EAST



Photo point 5 – Looking NORTH



Photo point 6 –Looking EAST

Photo point 5 – Looking WEST





Photo point 6 – Looking NORTH



Photo point 7 – Looking EAST



Photo point 7 – Looking SOUTH



Photo point 8 – Looking NORTH



Photo point 8 – Looking SOUTH