Portage Manor

An Ecological Assessment

Prepared for:
St. Joseph County Board of Commissioners
227 W Jefferson Boulevard
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Executive Summary

This report is an ecological assessment of the St. Joseph County-owned property known as Portage Manor, which operated as the St. Joseph County home/farm for over a century until its closure in July 2023. At the time of this writing, the county is considering options for repurposing or developing the property, and this report intends to inform county leaders and residents of the property's ecological health and well-being.

Work on this report began in May 2024, with field surveys and historical research lasting into November 2024. This study's primary focus was to quantify the health of Portage Manor's habitats, vegetation, and breeding birds, but we also recorded additional observed species of animals and fungi, including invertebrates, mammals, and reptiles.

This image, map, and chart-intensive report also contains substantial information on the property's natural and cultural history. Included are sections detailing glaciation, geology, soil analysis, watersheds, wetlands, pre-settlement human history, the historic nearby portage trail, the original township survey, and information about the lives and activities of the first European settlers.

The results of the biological inventories are quantified and analyzed with survey data listed in several appendices. The discussion section of this report contains a discourse on the results of the biological studies, provides educated opinions on what the data means and how development would impact the property, and discusses the merits of converting the property into parkland. The report's conclusion summarizes our findings, provides recommendations on how Portage Manor could be best ecologically managed, and suggests additional studies.

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Introduction

On March 16, 2021, a fire and explosion rocked the woods and caught the attention of the residents, caretakers, and neighbors of Portage Manor, the historic St. Joseph County farm turned county-operated assisted care living facility. As firefighters doused the blaze and county officials arrived to survey the scene, it became apparent that the incident exposed the presence of a previously unknown yet sizeable homeless encampment within the woods of the county-owned property (Dits 2021).

That incident became the catalyst for a sequence of events that included the cessation of the lease of the county-owned farm fields, proposed plans for a controversial housing development (Barnes 2021), (Sheckler 2021), and talks of converting the property into a park or nature preserve (Dits 2021). In July 2023, the county permanently closed the facility, and on June 18, 2024, at the urging of County Commissioner Derek Dieter and support from the public, the county commission approved this ecological study of the county-owned lands surrounding the former facility (SJCC 2024).

Figure 1. Workers and volunteers work to clean up a former homeless emcampment on Portage Manor's south side in March of 2021 (Derek Dieter photo).

This ecological study is a powerful asset for those responsible for Portage Manor's future. It provides never-before-compiled baseline data on the property's plants, animals, and ecosystems. It provides insight into how the property's past use impacted present conditions, identifies threats, suggests stewardship strategies, and should serve as the basis for a long-term, comprehensive management plan.

The culmination of four months of historical research, field surveys, data compilation, and analysis, this report takes the reader on a journey through time. The story of Portage Manor's ecology begins in the last ice age and continues through Native American habitation, European settlement and clearing of the land, and centuries of agriculture before arriving at the present. We also delve into soils and hydrology before providing the results of a comprehensive assessment of the 17 habitats and sub-habitats that comprise the Portage Manor complex, their corresponding vegetation, breeding bird species, and additional observations of mammals and invertebrates. We then analyze the data and discuss the property's threats, opportunities, management strategies, potential uses, and suggestions for additional studies.

Location and Use

The property known as Portage Manor consists of approximately 119 acres of land in St. Joseph County, Indiana, within Portage Civil Township and within Sections 26 and 27 of Survey Township 38 North Range 2 East of 2nd Meridian. The property's borders are Boland Drive on the south, Portage Avenue on the west, the Indiana Toll Road on the north, and the South Bend water treatment facility on the east. At the time of this writing, the county is transferring ownership of the Manor's three-acre cemetery (located in the southeastern portion of the property and excluded from this study and the stated 119 acres) to Portage Township.

The property's land use has changed over the years. St. Joseph County purchased the western portion of the property (in section 27) in 1906 and the eastern portion (in section 26) in 1911 or 1912 for use as a new county home/farm and agriculture comprised most of the land use for several decades. In the mid-late 20th century, as farming declined, the county repurposed a field in the northeastern portion into a highway garage and began leasing another portion to the Chet Waggoner Little League. On July 21, 2023, after more than a century of use as the St. Joseph county home, Portage Manor was permanently closed, and aside from the highway department and baseball complex, the property is currently unoccupied.

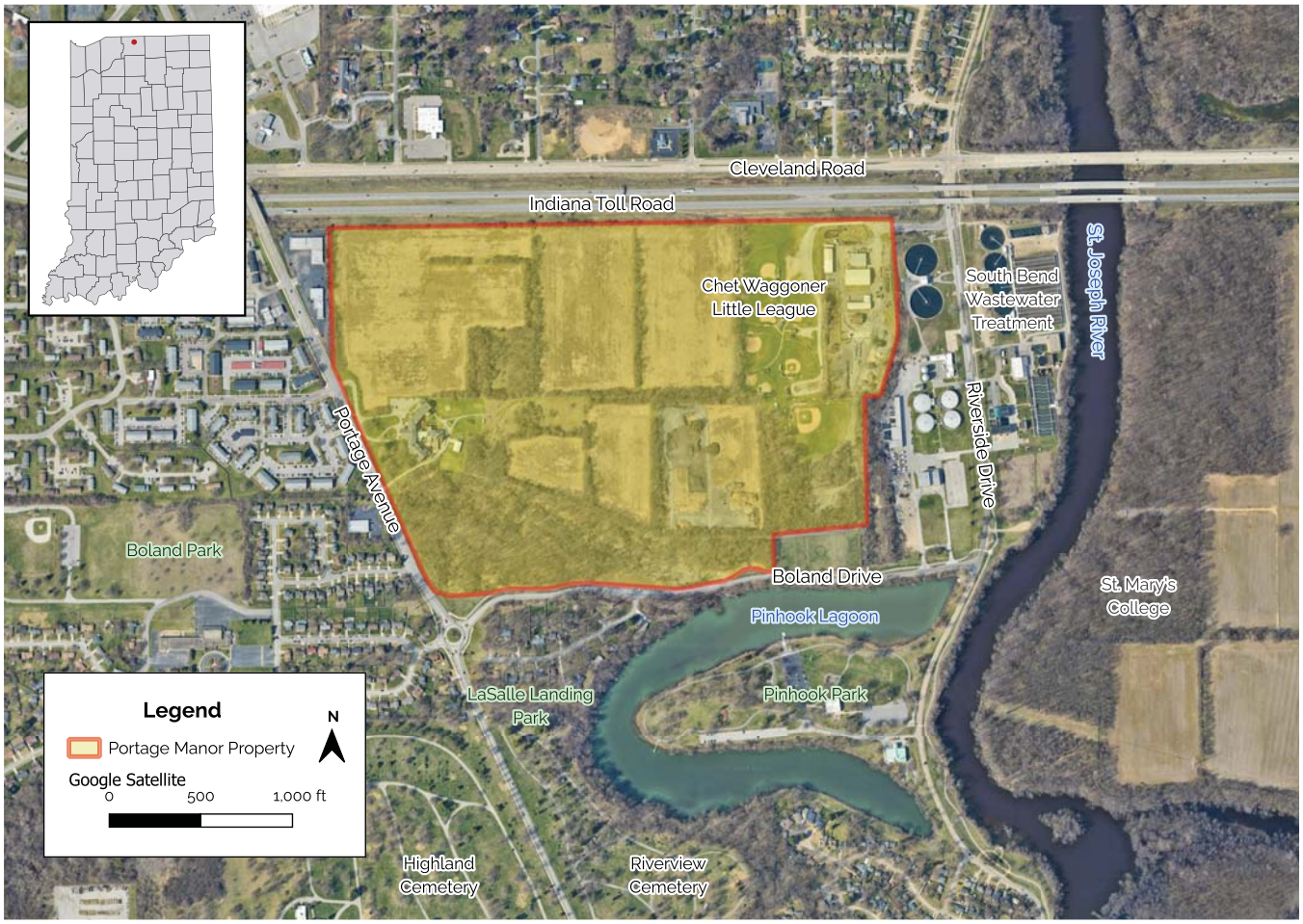


Figure 2. The geographical location of the Portage Manor property

Natural History

Glaciation and Geology

Like much of Indiana, glaciation from the Wisconsin Stage of the last ice age, which lasted from about 50,000 to 10,000 years ago, created the modern geological landscape of Portage Manor. Approximately 16,000 years ago, three lobes of the Laurentide Ice Sheet converged on Indiana: The Lake Michigan Lobe from the northwest, the Saginaw Lobe from the north, and the Erie Lobe from the northeast. Portage Manor lies on the edge of the Kalamazoo Moraine, the farthest eastern extent of the Lake Michigan Lobe, the geological feature that created Lake Michigan.

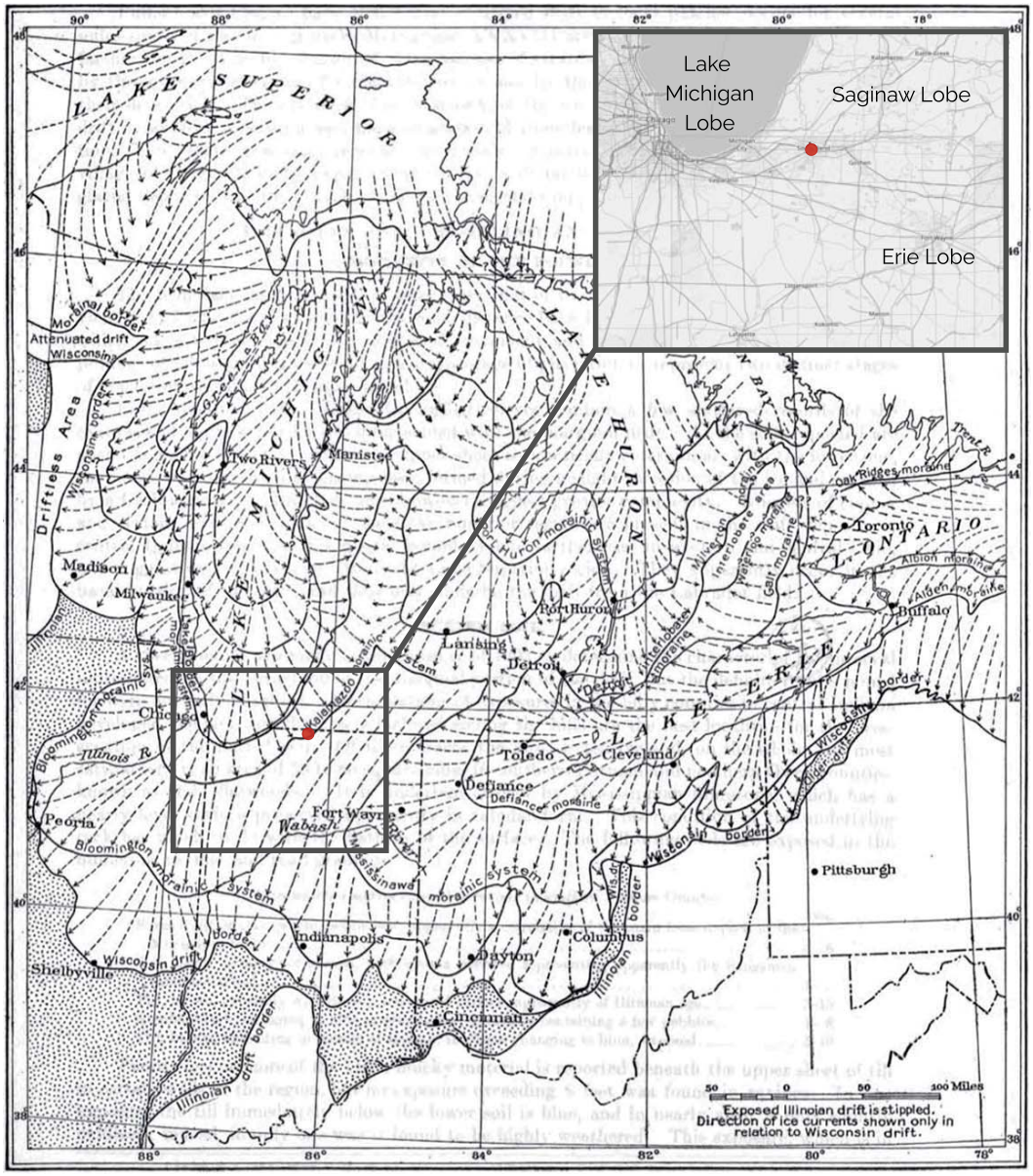


Figure 3. Graphical representation of the Laurentide Ice Sheet showing the glacial forces that created the Portage Manor property.

As the ice age ended and the glaciers receded, tremendous proglacial meltwaters flowed through the county, eventually helping form the modern-day St. Joseph and Kankakee Rivers. North of Portage Manor, a meltwater channel following the course of modern-day Juday Creek joined the St. Joseph River at what is now Wheelock Park. Approximately one mile to the south, another meltwater channel, originating from the area near where Cleveland Road crosses the St. Joseph Valley Parkway, flowed southeast through the present-day airport industrial complex through the southern portion of the Manor property (thus creating the ravine) before entering the river in what is now the Pinhook Lagoon.

As a result of this glacial activity, Portage Manor is a geologically diverse property containing five distinct geological forms. In addition to the ravine (containing an ephemeral stream maintained by meteoric rains and floodwater management), the southeastern portion of the property lies within the St. Joseph River Valley. Upland from the river valley are three outwash plains that rise in elevation from east to west. Closest to the river valley, a terrace representing the lowest outwash plain can be viewed from Boland Drive west of the cemetery, where the land rises steeply to the north. From there, the land rises gradually into a smooth meltwater plain before rising again just east of Portage Avenue.

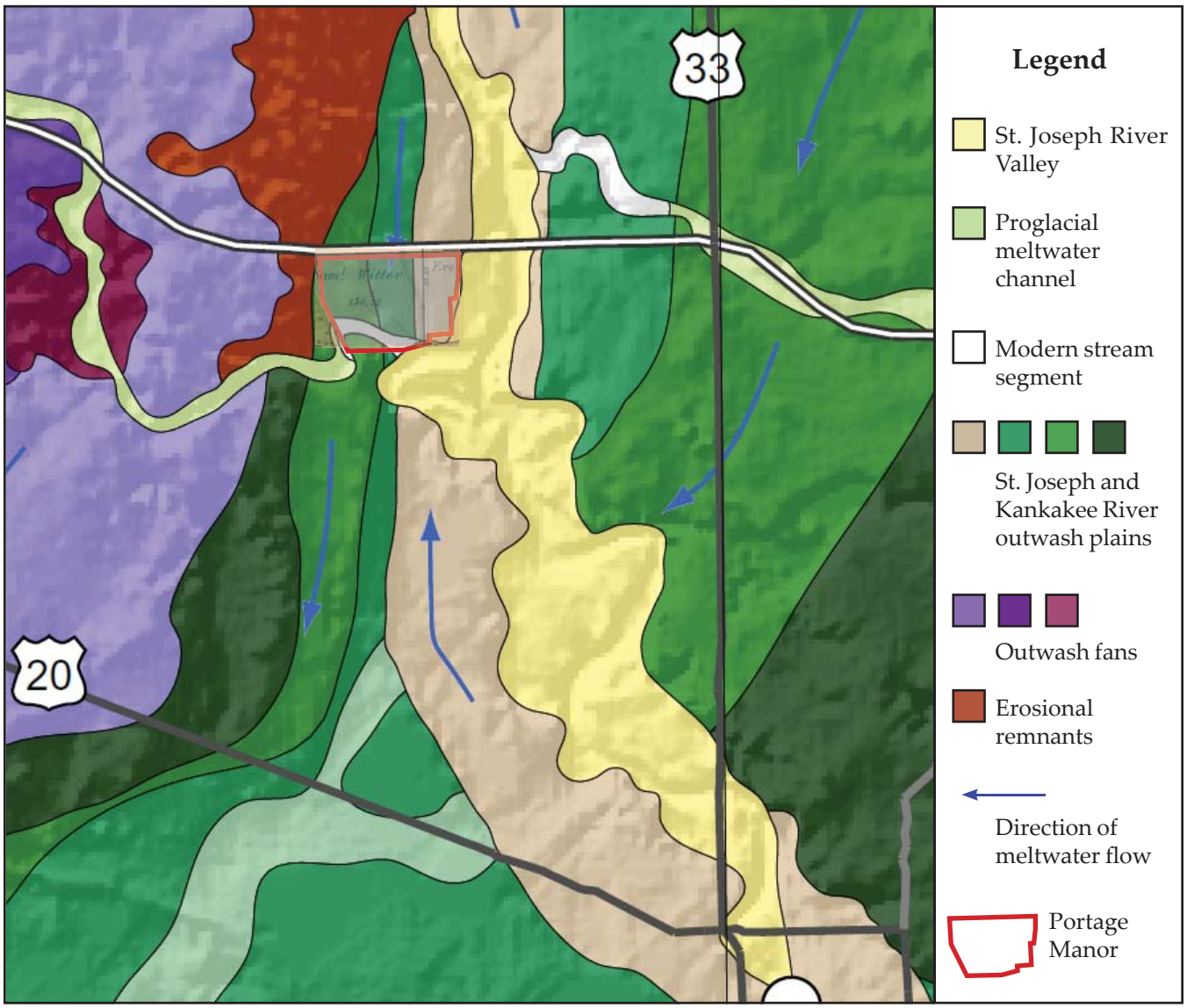


Figure 4. Late Wisconson Episode glaciation geology of the area surrounding Portage Manor

Figure 5. The bottom of the ravine containing the remains of an ancient proglacial meltwater channel and a contemporary ephemeral drainage stream

Figure 6. Looking west by northwest from Boland Drive just west of the cemetery, where the stream's outfall enters the St. Joseph River Valley. The grade on the left likely represents the fill from the construction of Boland Drive.

Figure 7. Boland Drive at the southeastern corner of the Portage Manor. The visible rising ground on the right represents the line where the lowest terrace of the glacial outwash plains (represented by beige in Figure 3) meets the St. Joseph River Valley (pale yellow).

Figure 8. The northeasternmost agricultural field facing west. This vantage shows the transition between the lowest glacial outwash terrace (beige in Figure 3) and the mid-level terrace (medium green).

Figure 9. Looking west by northwest from the southwesternmost farm field to where the land rises to the third and highest outwash plain (yellowish-green in Figure 3).

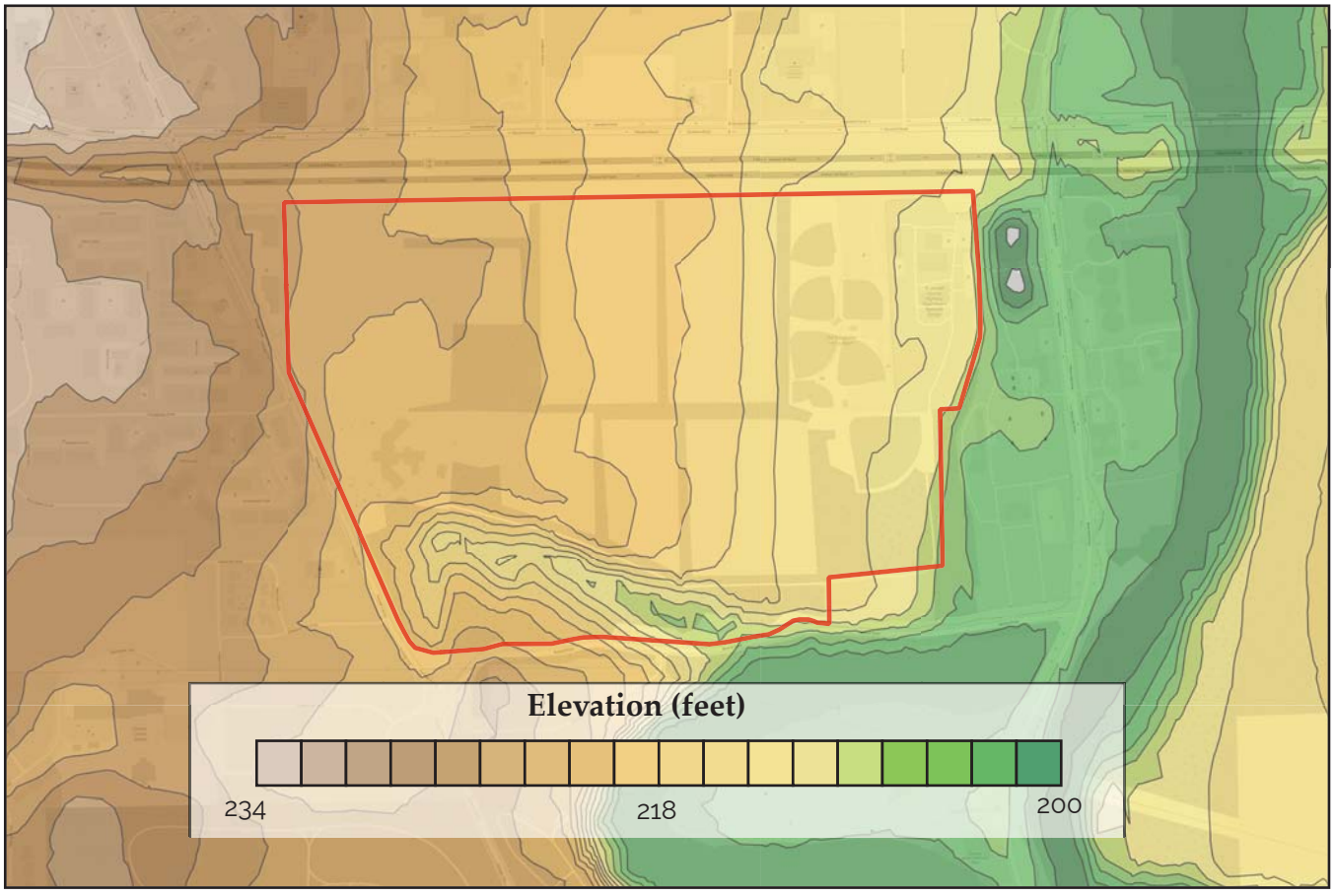
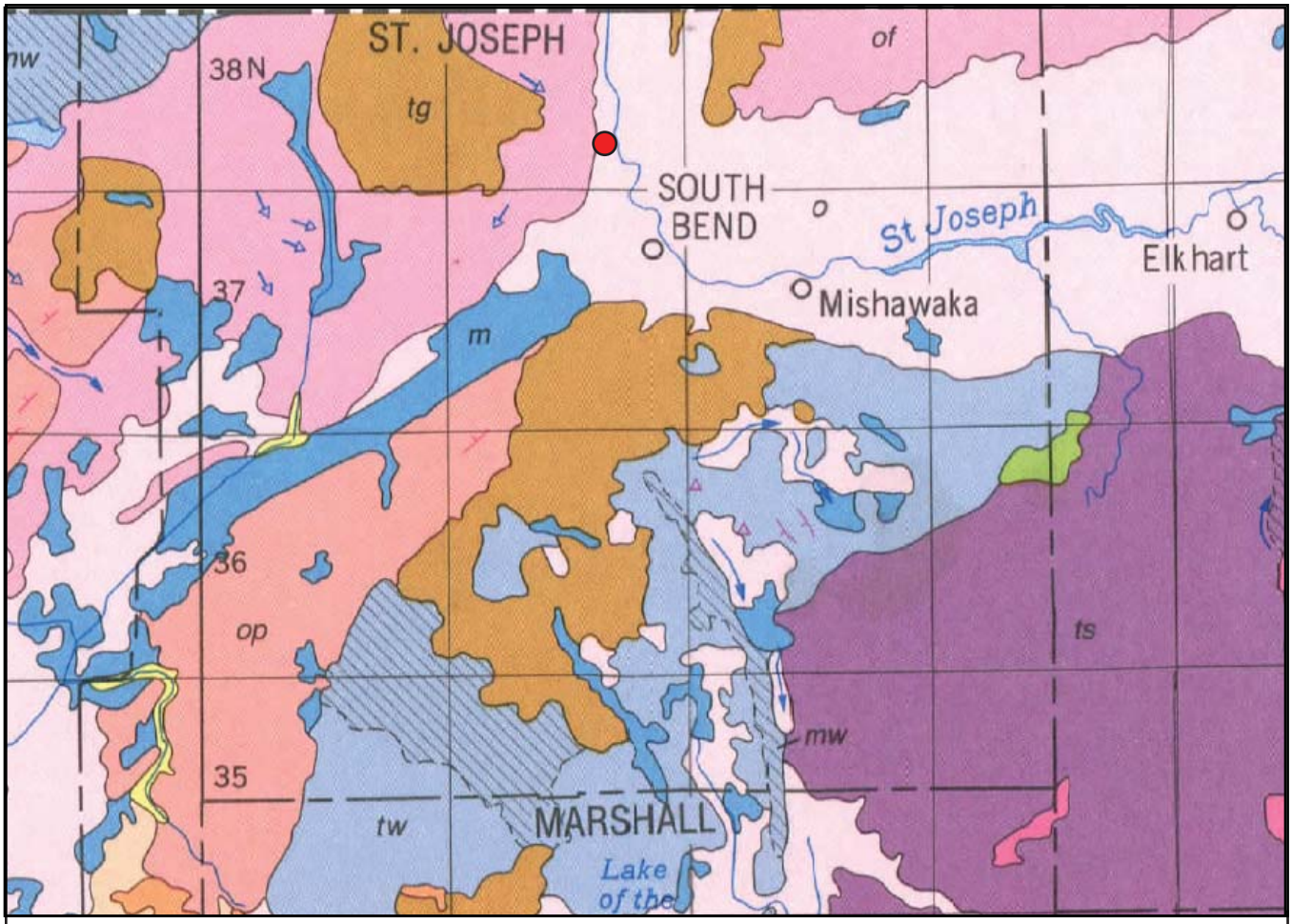


Figure 10. Current land elevations iderived from current Google Earth imagery



Legend

HOLOCENE AGE (~75,000–11,700 BP) DEPOSITS

- A — Alluvial silt, sand, and gravel along present streams and colluvium along valley margins
- M — Muck, peat, and marl

WISCONSONIAN AGE (~11,650 BP–PRESENT) DEPOSITS

Till of Lake Michigan Lobe

- TW — Clay loam to silt-loam till
- MW — Morainal topography

Till of Saginaw Lobe

- TS — Morainal topagraphy with loam to silty-clay-loam till

Complex Drift

- TG — Mixed drift; till and stratified drift in chaotic form

Outwash Associations

- OF — Fan-form sand and gravel outwash deposits
- OP — Intensely pitted fan-form and kame terrace sand and gravel outwash deposits
- O — Undifferentiated (mainly valley train) sand and gravel outwash deposits

Lacustrine Association

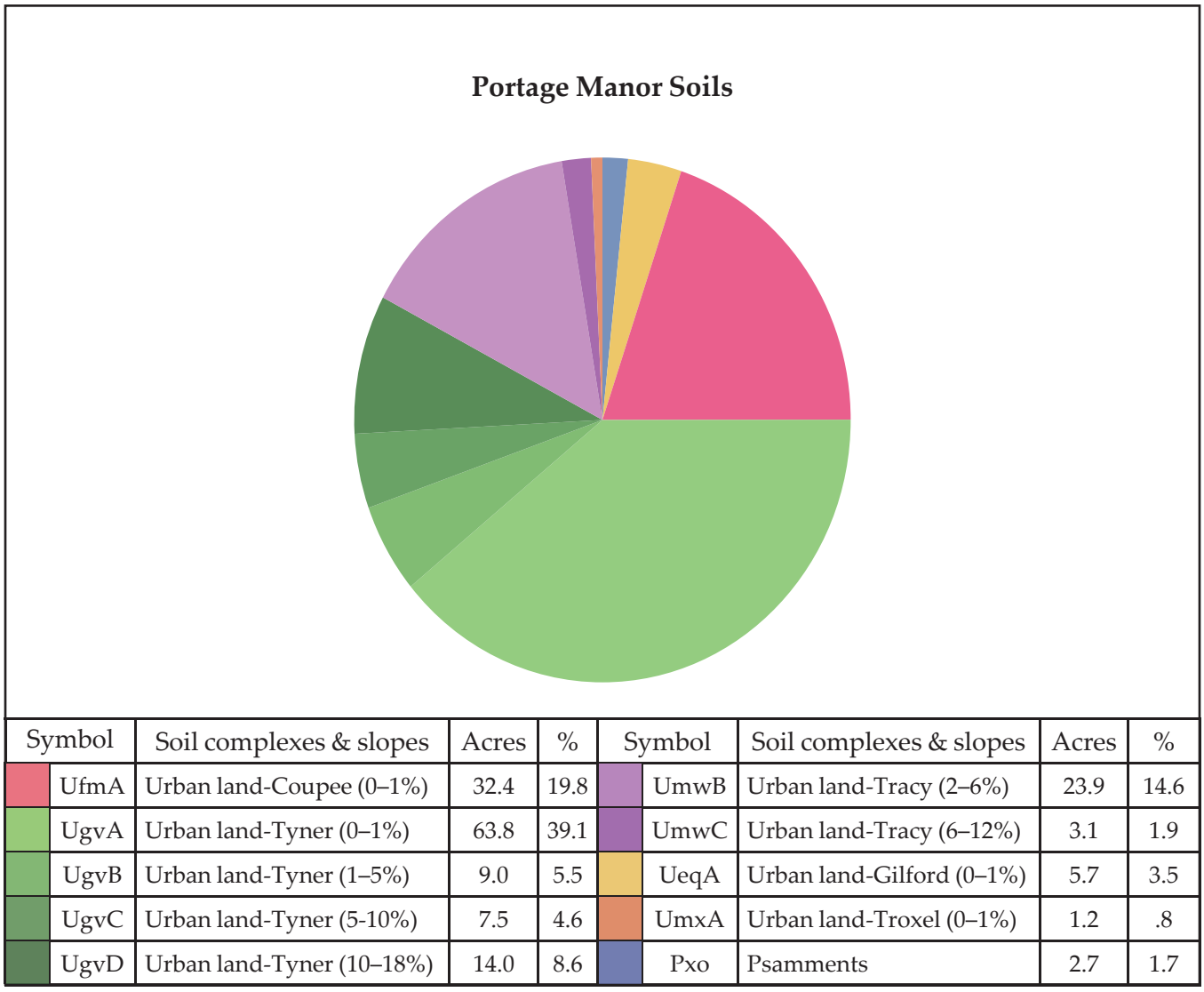
- LC — Lake silt and clay; slack-water deposits of shallow postglacial lakes

Figure 11. Quaternary geology of St. Joseph County, Indiana

Soil Composition

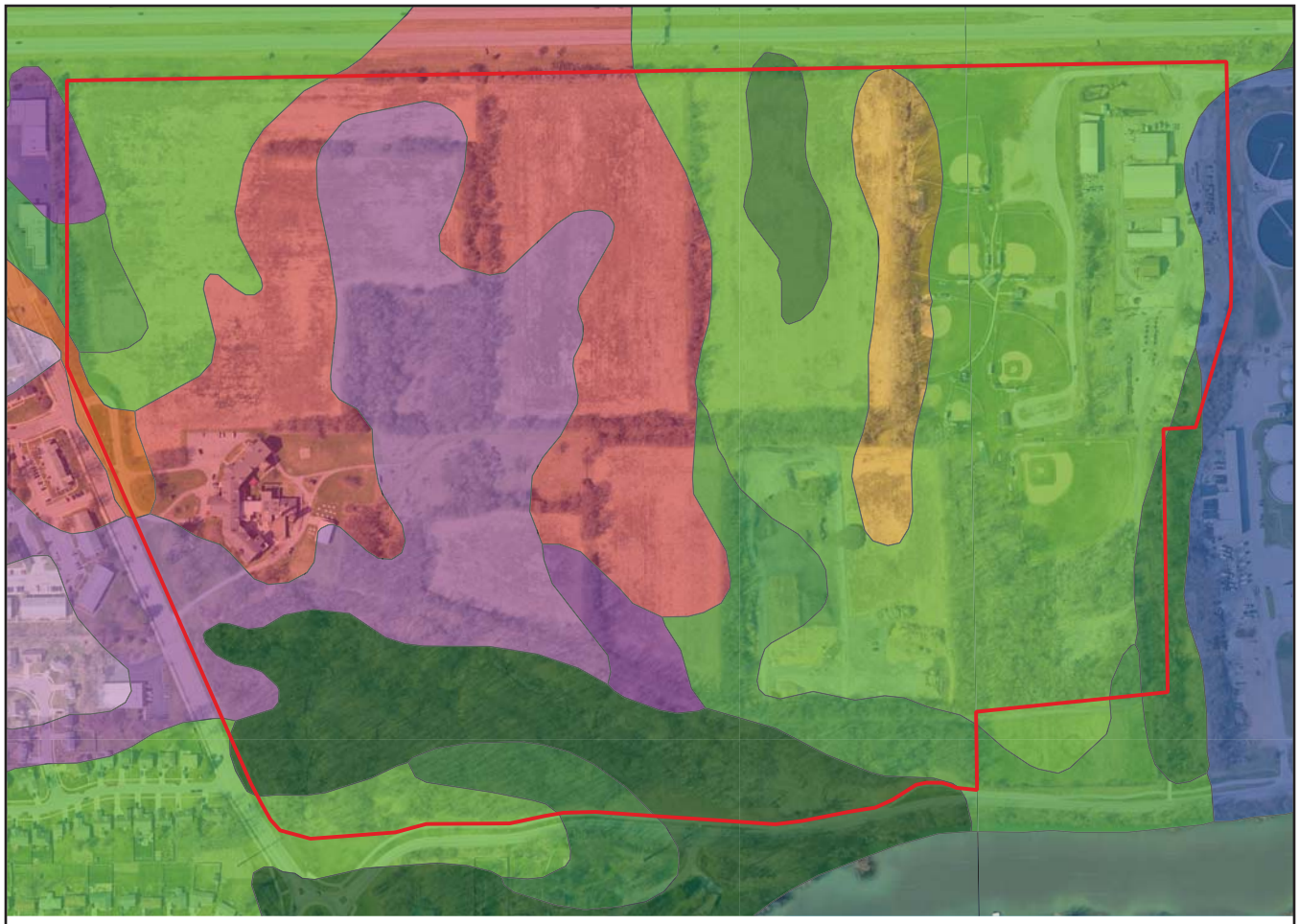
The United States Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) classifies the soil at Portage Manor and adjacent St. Joseph County-owned property to be of six different primary types. Five of the six types are urban soil complexes, and the sixth is a psamment. In soil science terminology, complexes are a grouping of two or more soil types (called series) impractical to subdivide into greater detail aside from their relative slopes. Psamments are sandy deposits of soil lacking distinctive horizons. At Portage Manor, psamments occur only on the far eastern portion of the property, nearest the St. Joseph River in the area currently utilized by the county highway department.

Urban soils are those heavily modified by human activities. Introduced exotic materials, covering by impervious surfaces, and mixing of soil layers by heavy machinery are examples of anthropogenic circumstances leading to significant unnatural changes in soil composition. Urban complex soils contain any of those above conditions while retaining portions or areas with their natural characteristics.



Symbol	Soil complexes & slopes	Acres	%	Symbol	Soil complexes & slopes	Acres	%
UfmA	Urban land-Coupee (0–1%)	32.4	19.8	UmwB	Urban land-Tracy (2–6%)	23.9	14.6
UgvA	Urban land-Tyner (0–1%)	63.8	39.1	UmwC	Urban land-Tracy (6–12%)	3.1	1.9
UgvB	Urban land-Tyner (1–5%)	9.0	5.5	UeqA	Urban land-Gilford (0–1%)	5.7	3.5
UgvC	Urban land-Tyner (5-10%)	7.5	4.6	UmxA	Urban land-Troxel (0–1%)	1.2	.8
UgvD	Urban land-Tyner (10–18%)	14.0	8.6	Pxo	Psamments	2.7	1.7

Figure 12. Portage Manor soil types, acres, and percentages



Legend

Urban land-Tyner complex (Ugv)

UgvA (0–1% slopes) UgvB (1–5% slopes) UgvC (6–10% slopes) UgvC (10–18% slopes)

Urban land-Tracy complex (Umw)

UmwA (0–2% slopes) UmwB (2–6% slopes) UmwC (6–12% slopes)

Urban land-Coupee complex (Umw) **Urban land-Gilford complex (Ueq)** **Urban land-Troxel complex (Umx)**

UfmA (0–1% slopes) UeqA (0–1% slopes) UmxA (0–1% slopes)

Pxo—Psamments County property boundary

Figure 13. Soil map of the county-owned property in and around Portage Manor

Soil Series Descriptions and Profiles

The five non-urban/non-Psamment soil types at Portage Manor contain two to four master layers or "horizons," designated by capital letters. The uppermost horizon, symbolized by the letter A, represents the topsoil. Below the A horizon lies the E (elluviated) horizon. Present only in the Coupee and Tracy series soils — the E horizon is a mineral-deficient layer caused by water movement leaching organic materials from the soil. Below the E horizon are the B (subsoil) horizon and C (substratum) layer.

Soil profiles may also contain additional uppercase letters. Two uppercase letters used together (e.g., AB, BC) represent transitional laters, where two master horizons form a layer containing elements of both.

Lowercase letters represent subordinate horizons. For example, the lowercase letter p, coupled with A (Ap), indicates plowed topsoil. The lowercase letter g, found in the Gilford series, represents the presence of gley, a sticky clay typically found in waterlogged soils. The lowercase letter t, often part of the B horizon (Bt), signifies illuvial clay deposits, and the lowercase letter w (Bw) indicates a weakly developed horizon.

Soil profiles also contain numbers, which, depending on their placement, can represent two different meanings. Numbers following subordinate horizons (e.g., Bt1, Bt2, etc.) indicate subdivisions within the layer. Numbers used before horizons (e.g., 2Bt3, 2C, etc.) indicate lithological discontinuities (i.e., significant changes in particle size or mineralogy).

The following are the USDA profiles and condensed descriptions of the five non-urban/non-Psamment soil types at Portage Manor.

Urban land-Tyner Complex

The Urban land-Tyner soil complex comprises Portage Manor's most sizeable soil group, covering 94.3 acres. With slopes varying from 0–18%, the lands covered by this deep, well-drained sandy outwash plain complex include portions of the northwestern and northeastern agricultural fields, the areas currently used by the county highway department, Chet Waggoner Little League, all of the ravine, and the slopes and terraces adjacent to it. The Tyner soil series is historically associated with deciduous forests.

Ap horizon — Dark brown loamy sand, light brown dry; weak fine granular structure; very friable; many fine and few medium roots throughout; 2 percent gravel; very strongly acid; abrupt smooth boundary.

Bw1 horizon — Strong brown loamy sand; weak medium subangular blocky structure; very friable; few medium roots throughout; 4 percent gravel; moderately acid; clear wavy boundary.

Bw2 horizon — Yellowish brown fine sand; weak medium and coarse subangular blocky structure; very friable; few medium roots throughout; 2 percent gravel; moderately acid; clear wavy boundary.

Bw3 horizon — Yellowish brown sand; weak coarse subangular blocky structure; very friable; few medium roots throughout; 1 percent gravel; moderately acid; clear wavy boundary.

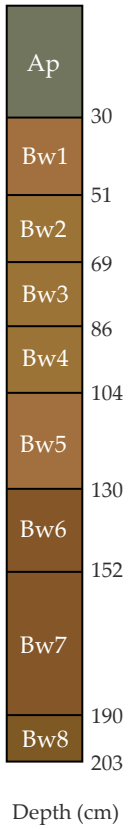


Figure 14. Tyner series soil profile

Bw4 horizon — Yellowish brown (10YR 5/6) sand; weak coarse subangular blocky structure; very friable; few medium roots throughout; 3 percent gravel; slightly acid; clear wavy boundary.

Bw5 horizon — Strong brown sand; single grain; loose; 9 percent gravel; slightly acid; clear wavy boundary.

Bw6 horizon — Strong brown sand; single grain; loose; 2 percent gravel; slightly acid; clear wavy boundary.

Bw7 horizon — Strong brown coarse sand; single grain; loose; 4 percent gravel; slightly acid; clear wavy boundary.

Bw8 horizon — Brown sand; single grain; loose; 5 percent gravel; neutral.

Urban land-Coupee Complex

At 32.4 acres, the second-largest soil complex is another deep, well-drained, outwash plain soil consisting of sandy loam, but without the steep elevation changes of the Urban land-Tyner complex. The Urban land-Coupee Complex forms an upside-down "U" comprising most of the north-central agricultural field, a portion of the southeast and northwest fields, and all of the land of the Portage Manor home before tailing off to the west. Unlike the other soils at Portage Manor, the Coupee complex is historically associated with prairie grasses, indicating that the area likely contained a peninsula of tallgrass prairie. The "type location" for this soil, that is, its namesake location, is three miles east of New Carlisle on the now-extinct Terre Coupee prairie.

Ap horizon — Black silt loam, very dark brown crushed, very dark grayish brown dry; moderate fine granular structure; friable; neutral, abrupt smooth boundary.

A horizon — Black silt loam, very dark brown crushed, very dark grayish brown dry; moderate medium granular structure; friable; moderately acid; clear wavy boundary.

E horizon — Brown silt loam; moderate medium and fine subangular blocky structure; friable; many very fine pores with moderate continuity; common distinct very dark brown organic coatings in pores and old root channels; common distinct very dark grayish brown organic coatings on faces of peds; strongly acid; clear wavy boundary.

Bt1 horizon —Brown clay loam; moderate medium subangular blocky structure; firm; common very fine pores with moderate continuity; common faint dark brown clay films on faces of peds; common distinct very dark grayish brown organic coatings in pores and old root channels; few fine and medium gravel 12 mm (1/2 inch) or less in diameter; moderately acid; clear wavy boundary.

Bt2 horizon — Dark yellowish brown clay loam; moderate coarse and medium subangular blocky structure; firm; few fine pores with moderate continuity; common faint brown clay films on faces of peds; common distinct dark brown organic coatings in pores; few medium gravel about 1.2 cm (1/2 inch) in diameter; moderately acid; clear wavy boundary.

2Bt3 horzon — Brown stratified loamy sand, sand, and coarse sand; weak coarse subangular blocky structure and single grain; very friable and loose; few distinct very dark grayish brown clay films on gravel and bridging between sand grains in the upper part; 15 percent gravel and shale fragments; strongly acid; clear wavy boundary.

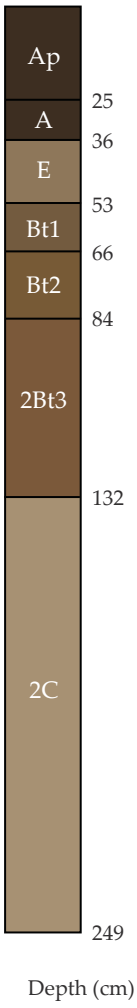


Figure 15. Coupee series soil profile

2C horizon — Stratified pale brown fine sand, sand, and very channery sand (50 percent fine shale fragments); below 183 cm (72 inches) material is banded light brownish gray sand and brown loamy sand containing about 8 percent shale fragments; single grain; loose; strongly acid.

Urban land-Tracy Complex

n the center of the Coupee complex's upside-down "U" is the Urban land-Tracy complex, consisting of 27 acres, including the old orchard, the southwest agricultural field, and the bluff along the north side of the ravine before leading west across Portage Avenue. This complex is another deep, well-drained soil consisting of coarse sandy loam. The Tracy complex is historically associated with mixed woods of deciduous and evergreen trees.

A horizon —Very dark brown (sandy loam, very dark grayish brown crushed, grayish brown dry; moderate medium and coarse granular structure; friable; 1 percent fine gravel, dominantly shale; strongly acid; abrupt smooth boundary.

E horizon — Brown loam; weak medium platy structure; friable; common fine vesicular voids; faint very dark gray dry, sand coatings on faces of peds, color disappears when moistened; few very dark grayish brown worm casts; 3 percent fine gravel, dominantly shale; very strongly acid; clear wavy boundary.

Bt1 horizon — Brown sandy loam; weak medium and fine subangular blocky structure; friable; common faint brown clay films on faces of peds and as linings in voids; faint gray very fine sand coatings on faces of peds; few very dark grayish brown worm casts; 5 percent fine gravel, dominantly shale; very strongly acid; clear wavy boundary.

Bt2 horizon — Brown sandy loam; moderate medium subangular blocky structure; friable; few fine voids; many faint brown clay films on faces of peds and as linings in voids; common distinct dark brown organic coatings on faces of peds; 13 percent fine gravel, dominantly shale; very strongly acid; clear wavy boundary.

Bt3 horizon — Brown sandy loam; moderate medium and coarse subangular blocky structure; friable; many faint brown clay films on faces of peds and as linings in voids; common distinct dark brown organic coatings on faces of peds; 13 percent fine and medium gravel, dominantly shale; very strongly acid; clear wavy boundary.

Bt4 horizon — Brown sandy loam; weak medium and coarse subangular blocky structure; friable; horizon has a 1 inch thick layer of brown gravelly sandy loam; common distinct brown clay films on faces of peds and as linings in voids; 14 percent fine gravel, dominantly shale; very strongly acid; clear wavy boundary.

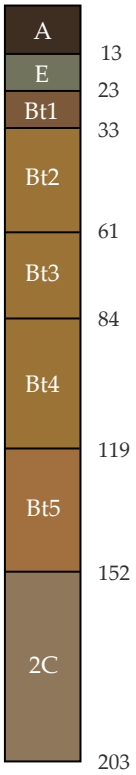


Figure 16. Tracy series soil profile

Bt5 horizon — Stratified brown gravelly sandy clay loam and brown gravelly loamy sand; weak coarse subangular blocky structure; firm and loose; common distinct dark brown clay films on faces of peds; common prominent dark brown clay films on surfaces of shale fragments and on cleavage planes; the gravelly loamy sand strata are 2 to 6 cm (1 to 1 1/2 inches) thick and there are 3 strata in horizon; few shale channers, 1.3 to 5 cm (1/2 to 2 inches) in length and 0.6 cm (1/4 inch) thick; 23 percent gravel, dominantly shale; very strongly acid; clear wavy boundary.

2C horizon — Brown stratified loamy sand, sand, and gravelly sand; single grain; loose; moderately acid.

Urban land-Gilford Complex

This complex containing poorly drained, coarse loam forms a narrow, 5.7-acre band on the eastern portion of the property where the northeasternmost agricultural field meets the Chet Waggoner Little League and where the lowest and mid-level outwash terraces converge, as shown in Figure 7. The Gilford complex is historically associated with trees and herbaceous plants of saturated soils.

Ap horizon — Black sandy loam, dark gray dry; moderate fine granular structure; friable; slightly acid; abrupt smooth boundary.

A horizon —Very dark gray sandy loam, gray dry; weak fine subangular blocky structure; friable; slightly acid; gradual wavy boundary.

Bg1 horizon — Gray sandy loam; weak medium subangular blocky structure; friable; common fine prominent yellowish brown masses of oxidized iron in the matrix; moderately acid; clear irregular boundary.

Bg2 horizon — Gray sandy loam; moderate medium subangular blocky structure; firm; common fine prominent yellowish brown masses of oxidized iron in the matrix; slightly acid; clear wavy boundary.

BCg horizon — Gray loamy sand; weak fine subangular blocky structure; very friable; common medium prominent strong brown masses of oxidized iron; neutral; clear wavy boundary.

Cg1 horizon — Gray sand; single grain; loose; neutral; clear wavy boundary.

Cg2 horizon — Gray coarse sand and sand; single grain; loose; strongly effervescent; moderately alkaline.

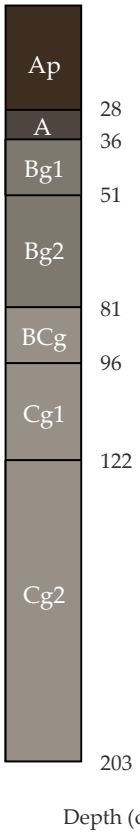


Figure 17. Gilford series soil profile

Urban land-Troxel Complex

The smallest soil complex at Portage Manor at only 1.2 acres, the Troxel series consists of deep, silty, well-drained soils at the bottom of slopes and is historically associated with prairie grasses. At Portage Manor, the small strip of Troxel complex soil bisects the Coupee complex along the incline where the driveway runs parallel to Portage Avenue.

Ap horizon — Black silt loam, dark grayish brown dry; weak very fine granular structure; friable; many very fine roots; slightly acid; abrupt smooth boundary.

A1 horizon — Black silt loam, dark grayish brown dry; moderate fine granular structure; friable; many very fine roots; slightly acid; abrupt smooth boundary.

A2 horizon — Black (silt loam, dark grayish brown dry; moderate fine granular structure; friable; common very fine roots; moderately acid; clear smooth boundary.

A3 horizon — very dark brown silt loam, grayish brown (dry; moderate very fine granular structure; friable; common very fine roots; moderately acid; clear smooth boundary.

BA horizon — Brown silt loam; moderate very fine subangular blocky structure; friable; common very fine roots; common distinct very dark grayish brown organic coatings on faces of peds; moderately acid; clear smooth boundary.

Bt1 horizon — Brown silty clay loam; moderate fine and medium subangular blocky structure; firm; few very fine roots; common distinct dark brown clay films on faces of peds; common sand grains; moderately acid; clear smooth boundary.

2Bt2 horizon — 60 percent brown and 40 percent dark yellowish brown clay loam; moderate medium subangular blocky structure; firm; few very fine roots; common distinct dark brown clay films on faces of peds; 5 percent gravel; moderately acid; clear smooth boundary.

2Bt3 horizon — Brown gravelly sandy loam; weak medium subangular blocky structure; friable; common distinct dark brown clay films on faces of peds; 17 percent gravel; slightly acid; clear smooth boundary.

2Bt4 horizon — Dark yellowish brown stratified loamy sand and sandy loam; weak coarse subangular blocky structure; very friable; few distinct brown clay films on faces of peds and in pores; 8 percent gravel; slightly acid; abrupt smooth boundary.

2Bt5 horizon — 55 percent dark yellowish brown and 45 percent brown clay loam; weak medium angular blocky structure; firm; few distinct dark brown clay films on faces of peds and in pores; 10 percent gravel; slightly acid; abrupt smooth boundary.

2BC horizon — 55 percent dark brown and 45 percent brown gravelly sandy clay loam; weak coarse angular blocky structure; friable; 18 percent gravel; slightly alkaline.

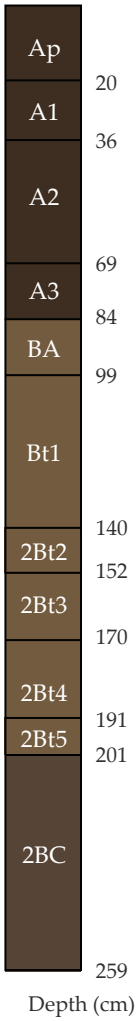


Figure 18. Troxel series soil profile

Figure 19. The area east of the building containing the Urban land-Troxel soil complex

Watershed

The entirety of the Portage Manor property lies within the St. Joseph River watershed. Its specific hydrological unit codes are as follows:

Hydrological Unit Level and Code		Name	Size (Acres)[1]
2	04	Great Lakes	11,548,895.26
4	0405	Southeastern Lake Michigan	8,177,193.54
6	040500	Southeastern Lake Michigan	8,177,193.54
8	04050001	St. Joseph (MI)	1,088,416.13
10	0405000126	Brandywine Creek — St. Joseph River	116,106.34
11	04050001240	n/a	94,369.20
12	0405000126	Pinhook Lake-St. Joseph River	19,071.91
14	04050001240040	St. Joseph River Airport	18,203.20

1 Methods of computing sizes vary with unit levels. Check with official agencies for exact information.

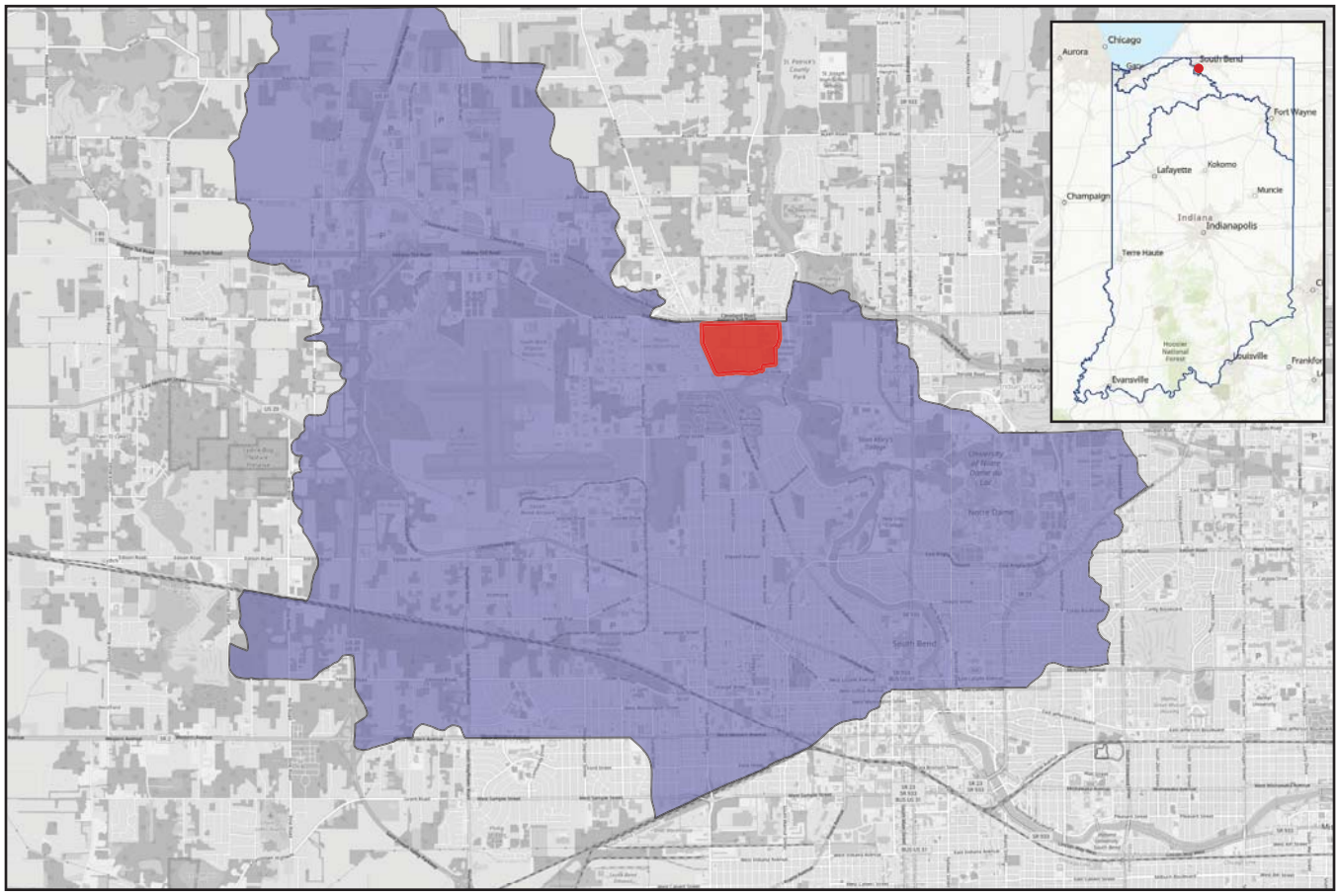


Figure 20. Hydrologic unit code 14 level map showing location of Portage Manor within "St. Joseph River - Airport" portion of the Great Lakes watershed.

National Wetland Inventory

The United States Fish and Wildlife Service maintains a National Wetlands Inventory. The Portage Manor complex contains three areas designated by the Service as "wetlands."

Legend		
#	Code	Description
1	PFO1A	A forested (FO), palustrine (P) wetland with broad-leaf deciduous trees and shrubs (1) that is temporarily flooded (A).
2	PUBF	A freshwater pond, a form of palustrine (P) wetland with an unconsolidated bottom (UB), which is semi-permanently flooded (F).
3	PUBGx	A freshwater pond, a form of palustrine (P) wetland with an unconsolidated bottom (UB), which has been excavated (x) and is intermittently flooded (G).
4	L1UBH	Limnetic (1) lacustrine (L) system with an unconsolidated bottom (UB) that is permanently flooded (H).
5	R2UBH	Riverine (R) system with a lower perennial (2) subsystem, and an unconsolidated bottom (UB) that is permanently flooded (H).

Figure 21. The United States Fish and Wildlife Service's wetland map of Portage Manor and surrounding areas, including Pinhook Lagoon (4) and the St. Joseph River (5).

Natural Regions of Indiana

In 1985, the Indiana Department of Natural Resources Natural Heritage Program published a map of Indiana describing 12 unique natural regions and 20 subregions (Homoya et al. 1985). The Portage Manor property lies within the area recognized as the Northern Lakes Region.

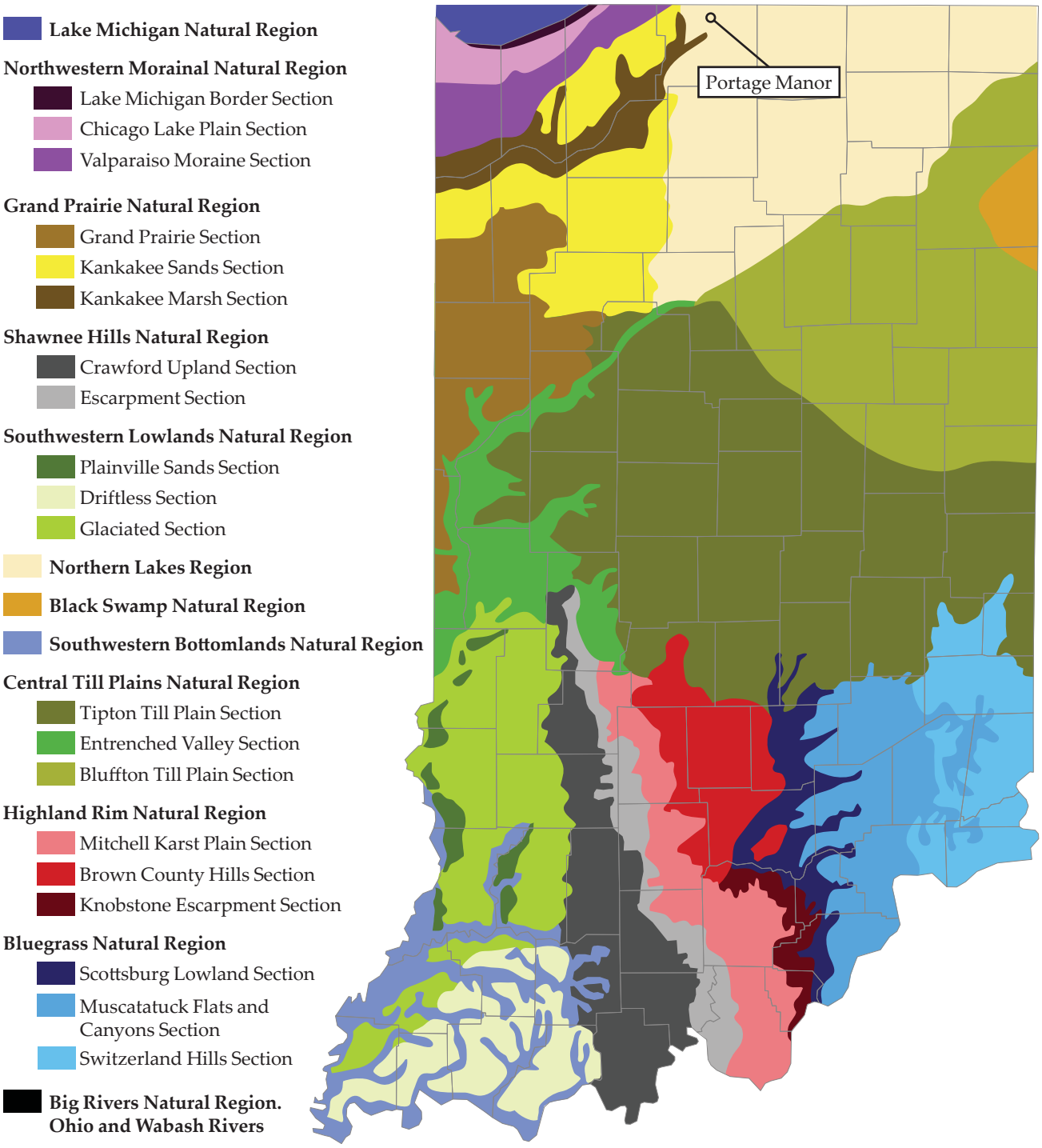


Figure 22. Portage Manor's location within the Natural Regions of Indiana

Cultural History

First People

The last ice age also coincided with the arrival of humans (*Homo sapiens*) in North America. Although historians debate the range of years and routes, a widely accepted theory is that ancient Asian people entered North America on a land bridge through the Bering Straights and made their way into what is now the central United States by way of an "ice-free corridor" existing west of the Laurentide Ice Sheet, to become Indiana's first human inhabitants.

According to a publication produced by the Indiana Department of Natural Resources, Indiana's first human inhabitants are thought to have been nomadic hunters known as Paleoindians (Jones and Johnson 2016). From approximately 10,000 to 7500 BCE, they inhabited all parts of Indiana, but probably never in one place for long or in large numbers, as their hunting lifestyles caused them to follow herds of large, ice-age mammals.

Following the time of the Paleoindians came the Archaic Period, which lasted from approximately 6000 to 700 BCE. The characteristics of this period include post-ice-age warming/climate stabilization, longer settlements, rising populations, technological increases in tool design, and increased plant consumption. The Late Archaic Period is likely when the first semi-permanent settlements came to the area now occupied by St. Joseph County.

As people settled and became less nomadic, trade increased due to a growing need for exotic goods and materials. The Late Archaic Period marks the first time in Midwestern history that there is evidence of the transportation of goods from the Great Lakes and Gulf Coast (Justice 2006), most likely accomplished via water routes (Sells 2021).

Following the Archaic Period came the Woodland Period, which lasted from approximately 1000 BCE to 1200 CE. One of the defining traits of the period was the development and widespread use of pottery (Sells 2021). Trade between groups increased within the Middle Woodland Period, giving rise to the Hopewell tradition, a network of Native American cultures throughout the Illinois River and Mississippi River valleys. The tendency of Hopewell people to settle along rivers supports the belief that waterways served as vital trade routes (Sells 2021).

Figure 23. Map of the Hopewell Interaction Sphere showing locations of the various Hopewell cultures

Portages: Vital Transportation Connectors

As river transportation and trade among cultures increased, so did the need to connect the waterways. Portages, human-made paths connecting two waterbodies (presumably following the shortest path possible), became increasingly important trade routes.

The southern Lake Michigan area contained two such portages. Located near modern-day Chicago, Illinois, the Chicago Portage was a seven-mile path that connected the Chicago and Des Plaines Rivers. The second portage was an approximately three-mile path that connected the St. Joseph and Kankakee Rivers. Both portages provided a vital connection between the Great Lakes and the Mississippi River and eventually to the Gulf of Mexico. Although the time of their construction is unknown, the author of a recent book about the Chicago Portage suggests that the Middle Woodland period is when it became a "significant trade route" (Sells 2021).

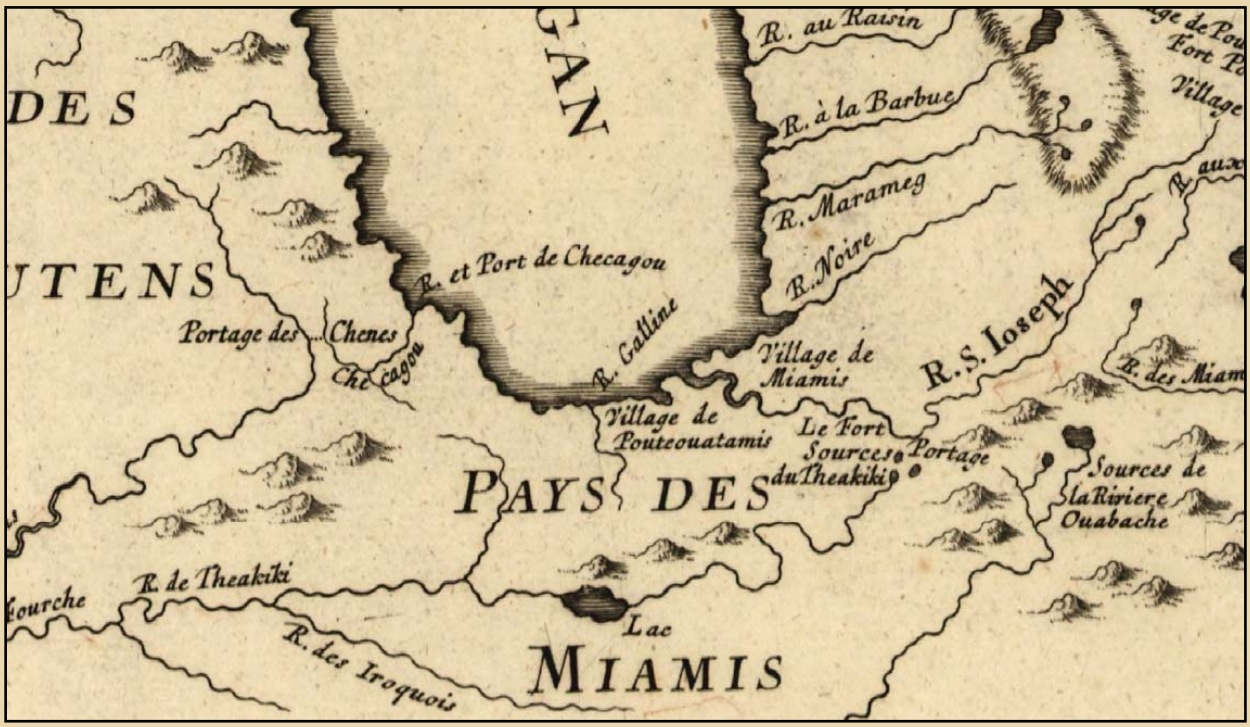


Figure 24. A portion of a late 17th-century map of North America by German cartographer Johann Baptist Homann showing the Chicago and South Bend Portages

The Late Woodland Period (500–1200 CE) saw several notable changes. Bows and arrows first came about, and settlements became increasingly smaller, more disbursed, and sedentary as food such as corn, beans, and squash became cultivated agricultural crops (Jones and Johnson 2016).

The Mississippian Period (1000–1650) represents the last pre-European contact cultures. Characteristics of this period include increasingly developed settlements, including fortified villages, large-scale agriculture, and "an extensive and sophisticated trade network" (Sells 2021). In the years prior to European contact, the Miami tribe inhabited the Michiana area, followed by the Potawatomi. Given Portage Manor's proximity to the St Joseph River portage site, various cultures of Native Americans undeniably existed for many generations in and around the property.

Arrival of Europeans

The first Europeans to explore the lower Lake Michigan area occurred in the 1670s. In 1673, a group led by Louis Joliet and Father Jacques Marquette traveled from St. Ignace through Wisconsin to the lower Mississippi River before returning to Lake Michigan via the Illinois River and the Chicago portage. Six years later, a second group of Frenchmen led by explorer René-Robert Cavelier, Sieur de La Salle, followed a different route, which led them up the St. Joseph River (then called Miami River after the tribe who lived nearby) to the start of the former portage trail at current-day Riverview Cemetery (located opposite the southwestern extent of South Bend's Pinhook Park lagoon).

Throughout the years, much has been written and speculated about the early French explorers' awareness, arrival, and time in St. Joseph County. In the 1899 book The St. Joseph-Kankakee Portage, author George Baker suggests that explorer Louis Joliet and Jesuit missionary Jacques Marquette may have known of the existence of the portage six years prior (Baker 1899), which seems likely, as by all accounts, LaSalle's group didn't accidentally discover the portage, but instead, had planned his trip around it and was aided and accompanied by a Native American guide. The author also suggested that Marquette used the portage as part of a return trip on a later expedition (Baker 1899).

Figure 25. The ravine that was the start of the portage trail

In the 1879 book LaSalle and the Discovery of the Great West, author and researcher Francis Parkman, working from newly obtained voyage documents, provided additional details about LaSalle's time in current-day St. Joseph County. Parkman's account confirms that LaSalle's party missed the portage and added that their guide was from the Mohegan Tribe. After missing the landing, Parkman described how LaSalle ventured into the woods to search for the trail, got lost, and didn't return until the following day at 4 p.m. After spending the second night near the St. Joseph River Portage, the company set off on land along the portage trail the following morning (Parkman 1879).

Figure 26. Plaque commemorating the location of the portage at current-day Riverview Cemetery

Three hundred yards west of the portage ravine in Highland Cemetery lies another LaSalle-related landmark, the site of the "Council Oak." According to popular belief (mostly local), in 1681, in response to French concerns over the Iroquois raids on western tribes, LaSalle called for a gathering of tribes, including the Potawatomi, Miami, and Illinois (CPN 2016). For the location of this meeting, he allegedly chose an easy-to-find, century-old bur oak (*Quercus macrocarpa*) tree near the portage. Although age and storms eventually toppled the tree in the 1990s, portions of its stump and a commemorative plaque remain, and it endures as a legend to the thousands of children who took field trips to visit it.

Figure 27. Council Oak stump and commemorative marker at Highland Cemetery

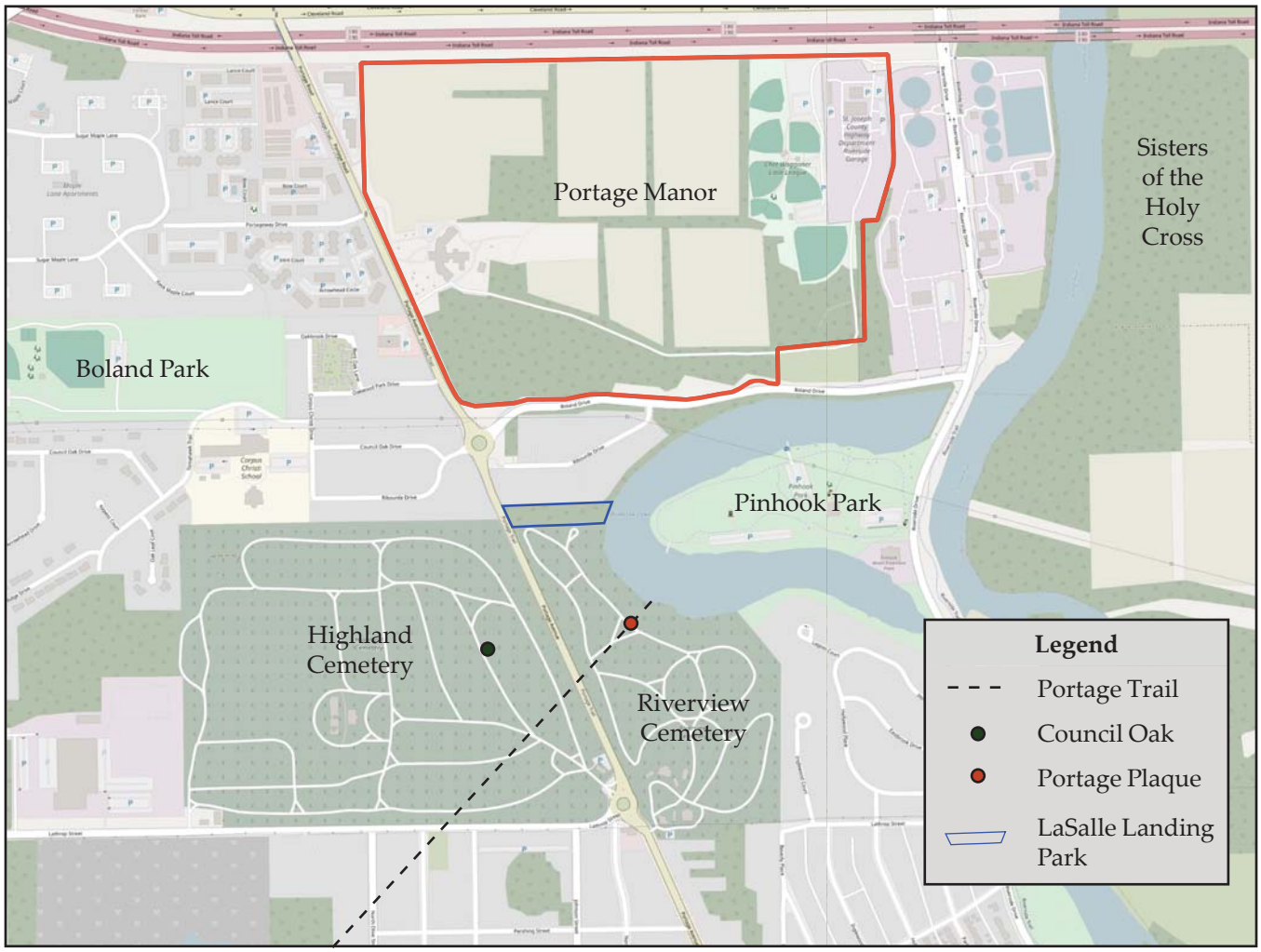
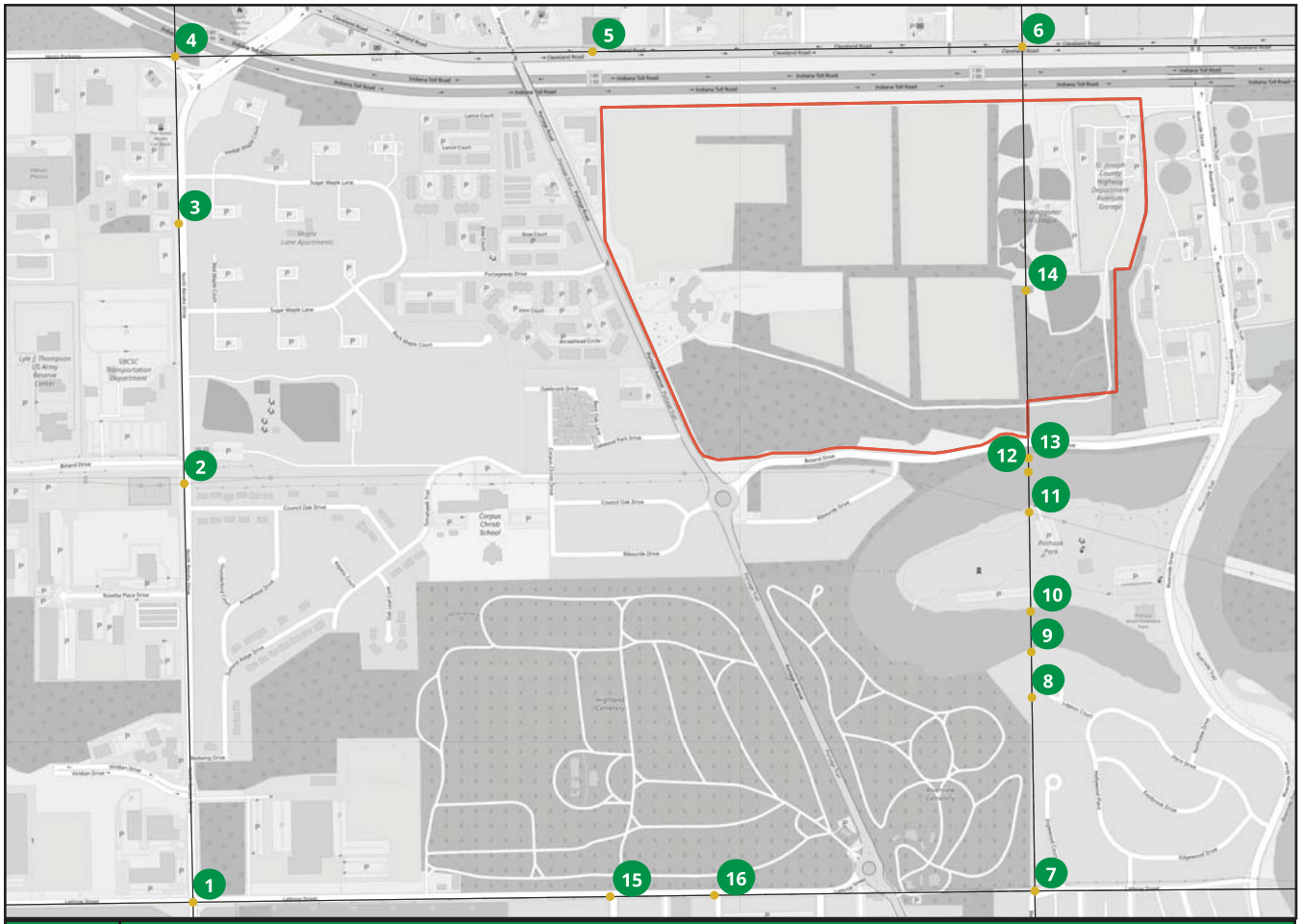


Figure 28. Historial portage-related landmarks and contemporary properties in relation to Portage Manor

Original Township Survey

The first coordinated measurements and descriptions of the land near Portage Manor came in 1829 when surveyors platted the geographical township of 38 North Range 2 East of 2nd Meridian. From 1803 to approximately 1834, survey crews traversed the Indiana Territory, mapping and recording the territory's (later state's) geographical features. These early records provide the earliest coordinated empirical data from which we may gain insight into the property's pre-settlement land cover.

The following map provides such insight. The map's numbered points refer to the specific spots where surveyor William Brookfield and team set posts and took notes. Because the surveyors worked from south to north and east to wset, the map's sequential numbers don't follow a clockwise pattern.



Point	Survey Notes
Travelling north between sections 27 and 28	
1	Intersection of township sections 27, 28, 33, and 34.
2	Raised a mound and set a 1/4 section post 40 links north of point 1.
3	64.85 links north of point 1, a burr oak 14-inches in diameter. Left the prairie.
4	80 links north of point 1 at the Intersection of sections 21, 22, 27, and 28. A white oak 15-inches in diameter. Preceeding land (to the south) first rate and containing white, yellow (chinkapin), and red oaks.

Point	Survey Notes
Travelling east from point 4 between sections 22 and 27, then backtracking west again for accuracy	
5	Set a 1/4 section post 40 links east of point 4, a bur oak 16-inches in diameter.
6	Intersection of township sections 22, 23, 27, and 28. A white oak 18-inches in diameter. Lands "rolling" and first rate containing white, yellow, red, and black oak.
Travelling north between sections 26 and 27	
7	Intersection of township sections 27, 28, 33, and 24.
8	18.5 links north of point 7, a red oak 8-inches diameter.
9	Met St. Joseph River (now Pinhook Lagoon). River 390 links (257 ft.) wide. Set a meander point near 7-inch diameter "maple" and 12-inch diameter "Lynn" (basswood).
10	Left river near a 15-inch diameter cedar.
11	To St. Joseph River (Pinhook Lagoon). River 507 links (334 ft.) wide. Set a meander post. Nearby trees were 6-inch diameter hickory and 9-inch diameter hickory.
12	Set a 1/4 section post in river.
13	Left the river and set a meander post near a yellow oak and a white oak.
14	A bur oak 6-inches in diameter.
Travelling east from point 4 between sections 27 and 34, then backtracking west again for accuracy	
15	Set a 1/4 section post
16	Left prairie. Surveyors note that land between point 16 and 7 is rolling and first rate with timber consisting of bur oak, white oak, yellow oak, and hickory.

Figure 29. Map and descriptions of the points recorded in the original township survey from fall of 1829.

Analysis

From this survey, we can identify and gain insight into at least four pre-settlement ecosystems in this section.

1. **The St. Joseph River —** Points 9–13 identify the original oxbow in the St. Joseph River a century before a WPA project separated it from the rest of the river to form Pinhook Park.
2. **Riparian areas —** The above points identify the trees growing along the river as maple, basswood, hickory, and two species of oaks.
3. **Prairie —** The area west of the Manor contained the eastern extent of the now-extinct Portage Prairie, an extensive grassland that extended beyond the current-day South Bend Airport. Points 3 and 16 detail locations where the prairie ended.
4. **Oak openings —** Points 4, 6, 14, and 16 describe the areas that were neither riparian nor prairie. Based on their location (just east of the prairie and west of the river), the mentioned trees (bur oak, chinkapin oak, white oak, and hickory), and the soil conditions ("first-rate), we can deduce that these areas were probably "oak openings," a type of fire-dependent savanna ecosystem containing dry to mesic soils, an open to partially open canopy, and containing elements of both prairie and woodland plant species. Historically, oak openings were often present in glacial outwash plains west of rivers, which provided a natural firebreak (Cohen et al. 2020).

European Settlement

Concurrent with the township surveys was a succession of land treaties that resulted in the forced removal of Potawatomi from Indiana in 1838. The Trail of Death, a two-month journey led by the United States government and volunteer militia that escorted the Potawatomi on foot for over 600 miles to modern-day Kansas, resulted in the death of over 40 of their people.

These events cleared the way for settlers to colonize parts of St. Joseph County, and from the 1830s to the early 1900s, several families owned the land currently containing Portage Manor, the County Highway Department's Riverside Garage, Chet Waggoner Little League, and the Wastewater Treatment Plant.

Samuel Witter

Samuel Witter (1785–1866) settled the western portion of the property from Portage Avenue to the township section line that bisects the Chet Waggoner fields in 1833. The Witter family, led by Christopher Witter (1758–1825), immigrated to Union County, Indiana, in 1806 from Lancaster County, Pennsylvania (Biographical... 1899). Samuel and his brother John (1782–1864) later moved to St. Joseph County and were some of the first non-indigenous residents of German Township (Howard 1907), with the latter settling in the heart of the former Portage Prairie in an area now occupied by Blackthorn Golf Club and the Junior Irish Soccer Fields (Stokes 1863).

By all accounts, the Witters were a skilled agrarian family. Christopher Witter was a farmer (Pictorial... 1893), and his youngest child, George, took over the family's homestead and owned 166 acres of land in Union County and additional farmland in Carrol County and was said to be an "extensive farmer" (Biographical... 1899). In St. Joseph County, Samuel was one of the incorporators of the county's first agricultural society, which held its first and only fair in 1841 (History... 1880), and John's son George (nephew of the previously mentioned George Witter) was also a farmer who settled in Warren Township (History... 1880).

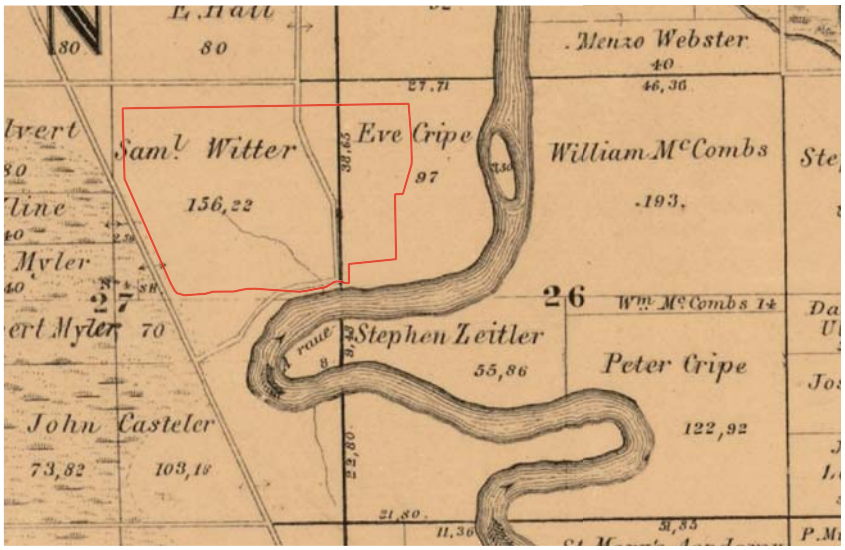


Figure 30. 1863 map of showing Portage Manor and surrounding properies owned by the Witter and Cripe/ McCombs families

John Cripe and Eva Cripe

The eastern portion of the property and beyond, from the township section line to the river, was settled and farmed by a different family. Another Pennsylvania emigrant of German descent, John Cripe, led his family to Ohio and eventually to German Township, where they established a homestead in the early 1830s. At the time of their arrival in St. Joseph County, the Cripes had 11 of their eventual 13 children with them.

The history books provide less information about the Cripes, but the patriarch John (sr.) died in 1847, leaving his widow Eva with the land in Section 26 of German Township. On the 1860 census, Eva lists her occupation as "farmer," and on the 1863 county plat map, Eve Cripe [sic] occupies 97 acres of the northwestern portion

of the township, presumably still farmed by the family. Adjacent to her are parcels owned by son-in-law William McCombs and son Peter Cripe. Eva Cripe died in December of that same year at age 73.

Based on the information currently available, we can determine with a high degree of certainty that these two pioneer families were responsible for clearing and converting most of Portage Manor's land to agriculture between the early 1830s and 1860s. Several members from each family reside in the nearby Historic Cripe-Witter Cemetery, located just north of Cleveland Road adjacent to the German Township Library.

Figure 31. 1864 map of showing Portage Manor and surrounding properies owned by the Witter and Cripe/McCombs families

Several details in the 1863 map deserve additional discussion. The glacial meltwater channel is illustrated on the Witter property to resemble a creek or stream, which it remains today, albeit heavily modified by stormwater redirection. The Witter family likely utilized the stream for cold storage and potentially as a water source for livestock. Secondly, Riverside Drive did not exist until the 1930s. As a result, the road that preceded Boland Drive didn't extend to the St. Joseph River, but instead, it ended at the township section line, where it veered north. From there, the road followed the line for about 320 yards until it reached the poorly drained, saturated Gilford complex soils, where it bent west 150 yards into the higher-elevation/better-drained soils. The redirect of the road resulted in modern-day Lilac Road not strictly following the township section line at its southern point. This road, which ran through the current-day areas identified by this document as the Early Successional Woods, Chet Waggoner Little League, and Northeast Field, was almost certainly never improved beyond a dirt surface, and we have seen no evidence of any remaining remnants.

Thus far, we have been unable to obtain any information about homesteads or other buildings on the Witter or Cripe properties. Unfortunately, unlike the later plat maps, the 1863 map contains no structural information. The precursors to Portage and Lilac Road bordered the Witter property on the west and east, respectively. Therefore, the Witter homestead could have been at either end of the property. Since the Cripe property was accessible by land only by the road following the section line (Lilac Road precursor), their homestead's location was likely in the Early Successional Woods or the southern end of the Chet Waggoner Little League. The presence of many large, centuries-old shade trees near the intersection of these two areas lends credence to this theory.

Rezeau Brown

Following Samuel Witter's death in 1866, Rezeau Brown (1824–1908), another area farmer, took ownership of the land. Brown's family came to St. Joseph County from New Jersey in 1834 when Rezeau was 10 or 11. He learned the masonry trade from his father Abraham and later started a contracting business, which helped construct some of St. Joseph County's earliest buildings, including the first college building at the University of Notre Dame (Howard 1907). In 1852, Rezeau and his wife Nancy purchased a farm in German Township, which she ran while he continued his construction business. Eventually, he gave up contracting and bartered for Witter's property, which he farmed full-time until his retirement in 1893 (Howard 1907).

Jacob Franklin Studebaker

Following the death of Eva Cripe in December 1863, we know little about the land on the east side of Portage Manor until the publication of the *Illustrated Atlas of St. Joseph County* in 1875, which lists the property's owner as "J.F. Studebaker." The youngest of the five Studebaker brothers of manufacturing fame, Jacob Franklin (1844–1887), came to South Bend with his family in 1852. Following work as a farm hand, he moved to Ohio for three years to work as an apprentice in the "carriage trimming" business. After his apprenticeship, Jacob returned to South Bend and studied at the University of Notre Dame for two years before his brothers made him a full partner in the family business in 1868 (Drevet 2021).

Figure 32. Jacob Studebaker

Although his primary residence was a 38-acre homestead on Sunnyside Avenue on South Bend's east side, a clue to Studebaker's ownership of the land on the eastern side of Portage Manor comes from his passion for horses. In particular, the Percheron breed was his prominent interest, and in 1883, along with his older brother John Studebaker, Jacob became two of the founding principals of the Percheron-Norman Horse Company in Greely, Colorado (NPS 1991). Back in South Bend, Jacob was actively involved with the First Baptist Church, and in 1881, Jacob and his wife Harriet held a barn-warming fundraiser for the church at their recently completed horse barn on Sunnyside (Drevet 2021).

Based on this evidence, we may conclude with a relatively high degree of probability that Studebaker used the property on the east side of Portage Manor as stables for his burgeoning horse hobby. In support of our conclusion, the 1875 county atlas includes what appears to be a large structure (stables?) on the property's southwest corner. Unfortunately, Studebaker's ownership of the property was short-lived, as was he. After a short illness, Jacob Studebaker died unexpectedly in Chicago in 1887, at age 42, from "inflammation of the bowels." He was the first of the five Studebaker brothers to pass away and is buried in the South Bend City Cemetery (IJS 1887).

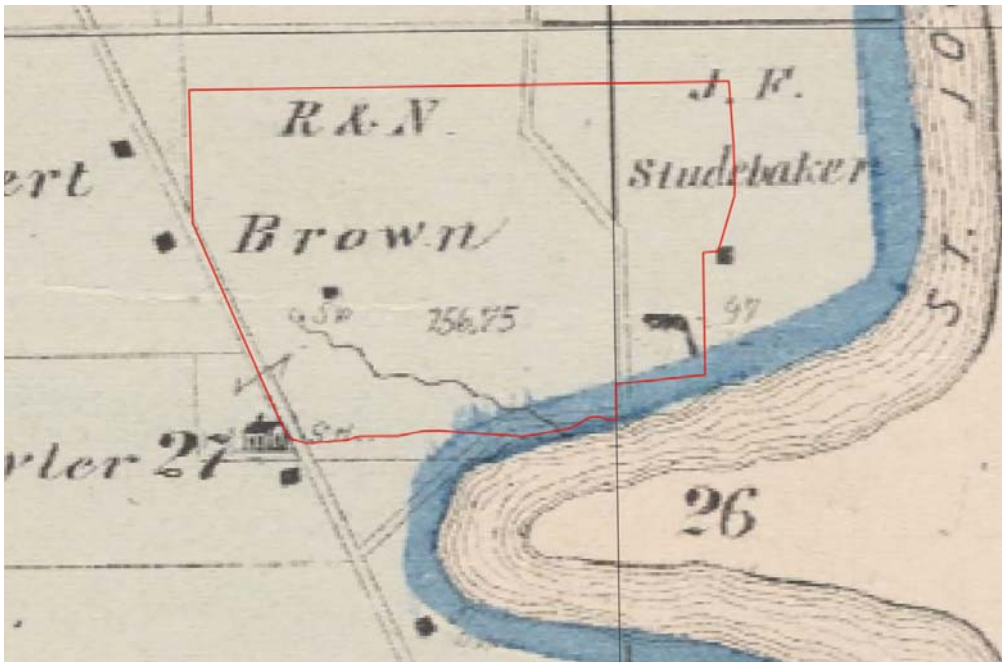


Figure 33. Excerpt of the 1875 *Illustrated Atlas of St. Joesph County*. Note the locations of buildings, including what could potentially have been stables in the southwestern portion of the Studebaker property. The blue line on the map represents the German Township boundary, not water.

Josiah G. Keltner

An early resident of St. Joseph County, Josiah G. Keltner (1828–1908) arrived with his family, led by patriarch Samuel Keltner, in 1844. The elder Keltner was a Pennsylvanian farmer of German descent who immigrated to Ohio in 1813. Several years later, the family moved to Union County, Indiana, before settling in German Township (Howard 1907).

Figure 34. Portrait of Josiah Keltner and his wife Elizabeth

Throughout his life, Josiah was an active farmer in the township. In 1863, he owned 80 acres of land east of the current-day Hurwich Farms Apartments and northeast of the Meijer store in what is now a residential neighborhood (Stokes 1863). By 1875, he expanded his farm eastward to the St. Joseph River and south to the northern border of the Jacob Studebaker property, and he owned additional farmland between Mayflower Road and Portage Avenue in what now consists primarily of commercial property north and south of Cleveland Road (Higgins Belden 1875). Following Studebaker's death, Keltner expanded his farm southward to include the former Studebaker property (Ogle 1895). His property holdings in the township eventually totaled 375 acres (Howard 1907).

Josiah Keltner was a well-known resident of German Township. In addition to his sizeable farm, he was politically and culturally active. A supporter of the Republican Party, Josiah served as justice of the peace, township census-taker, and jury commissioner. Like Studebaker, he was active in the Baptist church and was a deacon for 40 years (Howard 1907).

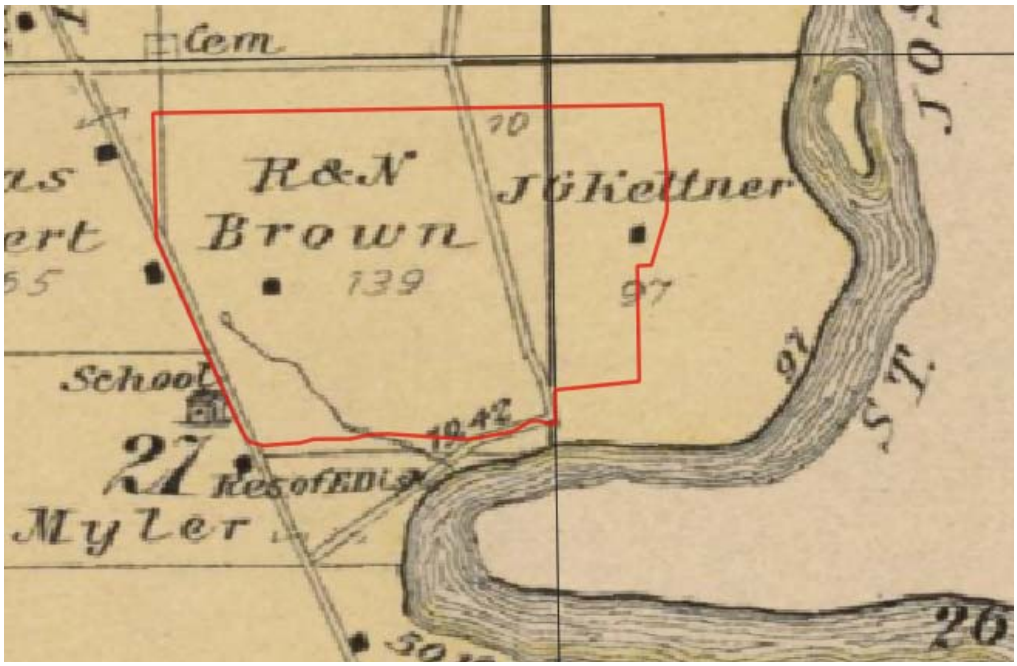


Figure 35. 1895 map showing JG Keltner ownership of the eastern portion of the eventual Portage Manor property. Note the inclusion of buildings, removal of the structure shown on the 1875 map and the straightening of Lilac Road.

St. Joseph County

By the late 1900s, St. Joseph County needed a new location for its county home. Also known as the county farm, asylum, infirmary, and poor farm, the county's first endeavor to create one came in 1838 when it purchased 240 acres of land in German Township, on the Portage Prairie, near the current-day South Bend International Airport. After this initial attempt fell through (due to lack of funding), the county built the first permanent home in 1846, a 200-acre property named White Hall in Centre Township along the Michigan Road, near the settlement known as Nutwood, just west of Palmer Prairie. The White Hall farm lasted only about ten years before the county sold the property and purchased 120 acres in the River Park neighborhood along the intersection of Penn and Portage Townships near current-day Potawatomie Park. This home remained in operation for over 50 years until the Indiana State Board of Charities deemed it "antiquated" and "inadequate." The St. Joseph County Board of Commissioners agreed and felt there were better uses for the River Park area property (Howard 1907).

Ultimately, in 1905, the county settled on purchasing the Rezeau Brown property for the site of its third and final county home. Brown, who retired in 1893, resided at 748 Portage in South Bend's Park Avenue neighborhood until 1903. It is unclear what transpired with the farm from Brown's retirement to when the county obtained it. Most sources state that the county purchased the property from Rezeau Brown (NPS 1991) (who would have been about 77 years old at the time), but according to the obituary of Rezeau's son George W. Brown, the younger Brown "owned the farm which is now the site of what is now the St. Joseph county infirmary, and sold it to the county for that purpose many years ago" (SBT 1939). It seems likely that George Brown operated the farm after his father's retirement and that both Browns had a role in its eventual sale.

Helen M. Garwood

Most historical documents relating to Portage Manor point only to St. Joseph County purchasing the Brown property in 1905. However, Josiah Keltner retained ownership of the eastern portion of the Manor property until he died in 1908. Following his death, his widow Elizabeth sold 31.27 acres of river frontage to the South Bend Power Company, land currently occupied by the city's wastewater treatment facility (SJCA 1955). Upon her death in 1912, ownership of the Keltner farms fell to their daughter Helen (1870–1933). Helen married farmer Ezekiel Garwood in 1888, and he died in 1916.

Following 1911, the next county atlas didn't come about until 1929, and in that publication, the former Cripe/Studebaker/Keltner/Garwood property belonged to St. Joseph County, the majority as part of the county farm. The year of transfer from Helen Garwood to the county is unknown.

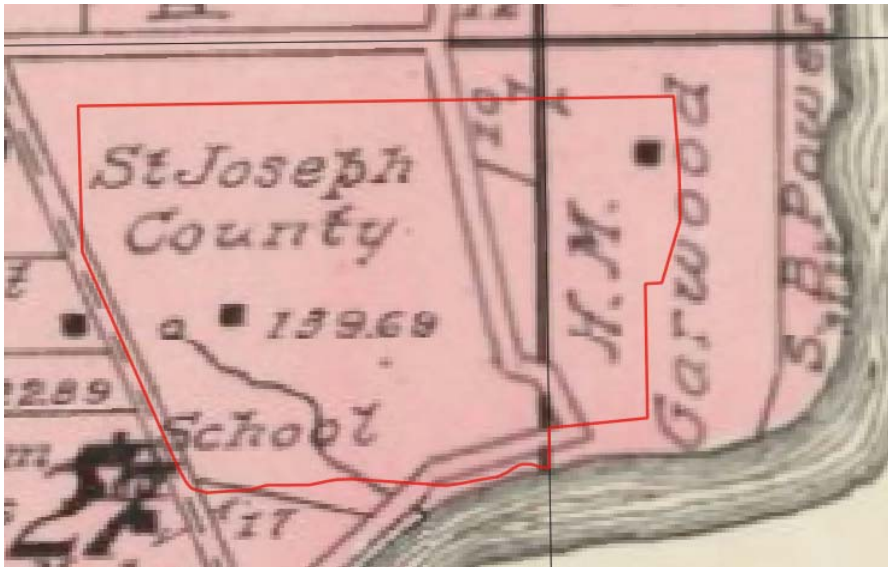


Figure 36. 1911 county atlas showing the H.M. Garwood property and the newly-deeded South Bend Power Company river frontage.

The Mystery of the Portage Cemetery

Portage Cemetery (sometimes called Potters' Field) refers to the cemetery in the former southeastern corner of the Portage Manor property. Although now subdivided and ownership transferred to Portage Township, the graveyard is still noteworthy as it played a formative role in the property's history.

While researching the historical maps and accounts of the cemetery's use, conflicting information came to light. According to the county-produced document *Historical Timeline of the St. Joseph County Home* (SJC 2019) and a historical marker at the cemetery, the first burial in Potters' Field occurred in 1907. However, the location of Potters' Field is in the extreme eastern portion of the county home property, which was not part of the county's original purchase from the Brown family and, until at least 1911, would have been part of the Helen M. Garwood property. Therefore, assuming the 1911 atlas (Ogle 1911) is correct, three possibilities exist:

Figure 37. Engraved stone marking the entrance to Portage Cemetery

1. No burials took place until the county acquired the Garwood property — we consider this unlikely as the county's document (SJC 2019) is specific about the date of the first burial (12/31/1907), and the marker in the cemetery literally has the year 1907 etched in stone.
2. The county home buried people on the property owned by the Garwoods — with over 100 acres of public land at their disposal, there would be no conceivable reason to bury the dead on neighboring private property, with or without permission.
3. The original graves were west of the existing cemetery — considering the township section line runs along the western edge of Potters' Field, and the predecessor of Lilac Road once followed that section line, the most logical conclusion is that the early gravesites (circa 1907–1912), which were unceremonious and for the most part undocumented, occurred west of the current cemetery in an area owned by the county.

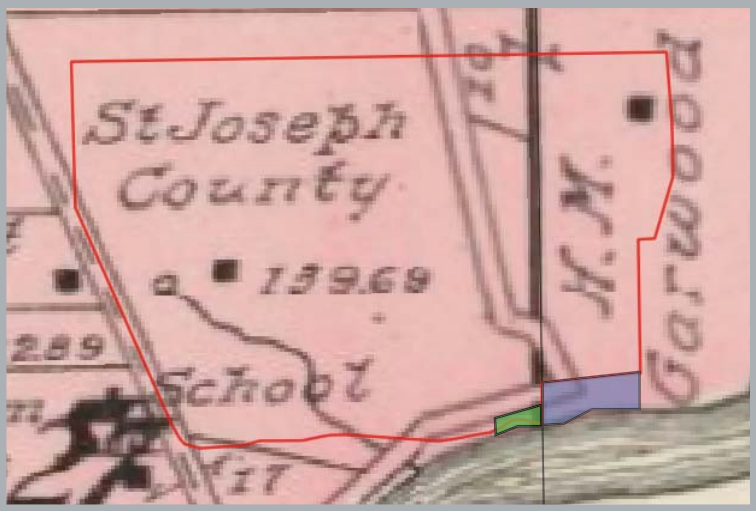


Figure 38. 1911 map showing location of future Portage Cemetery (blue) and potential area of previous gravesites (green)

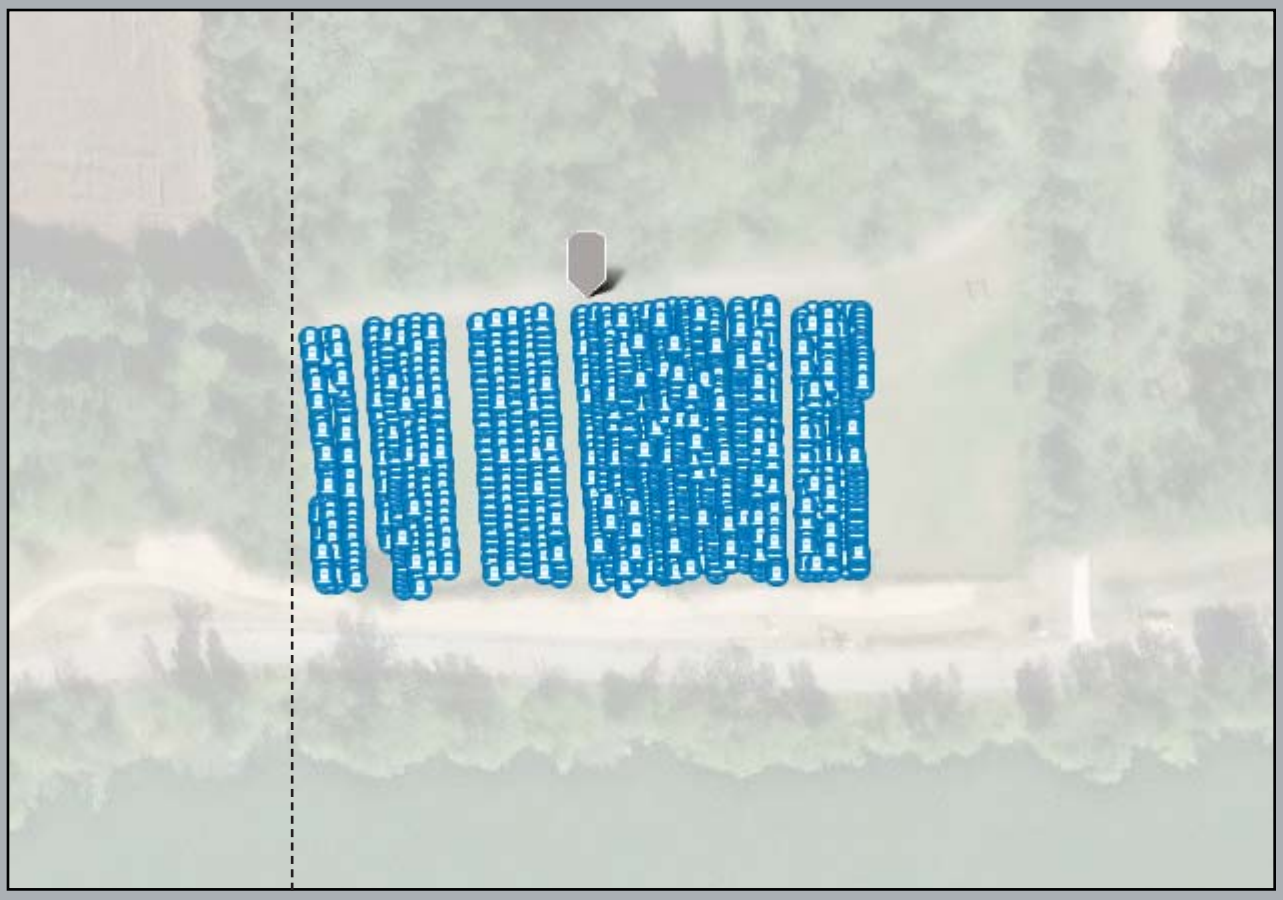
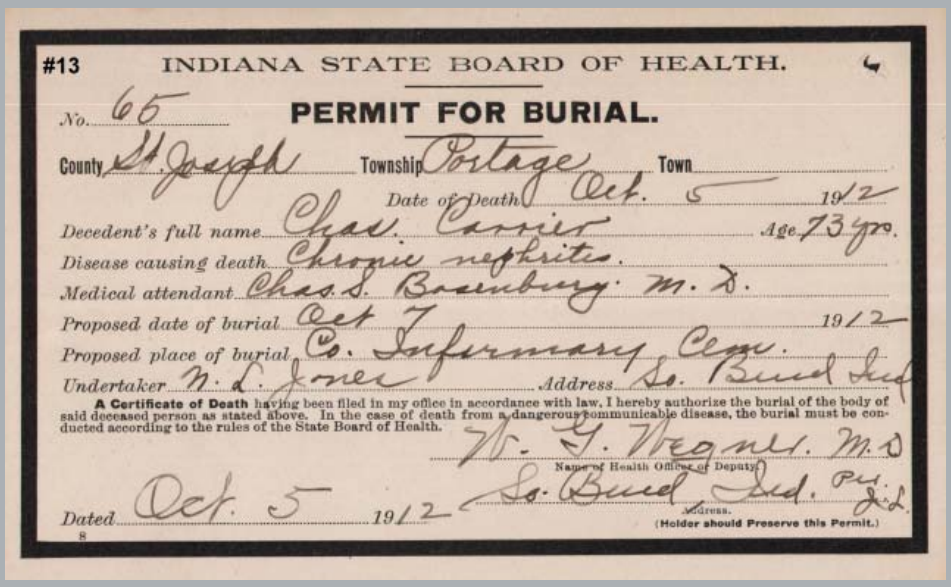


Figure 39. St. Joseph County GIS map showing locations of burials at Portage Cemetery with oldest records along the western perimeter and township section line represented by dashed line.



#13 INDIANA STATE BOARD OF HEALTH. 4

No. 65

PERMIT FOR BURIAL.

County St. Joseph Township Portage Town

Date of Death Oct. 5 1912

Decedent's full name Chas. Carrier Age 73 yrs.

Disease causing death Chronic nephritis.

Medical attendant Chas. S. Bransburg M. D.

Proposed date of burial Oct 7 1912

Proposed place of burial Co. Infirmary Cem.

Undertaker N. L. Jones Address So. Bend Ind

A Certificate of Death having been filed in my office in accordance with law, I hereby authorize the burial of the body of said deceased person as stated above. In the case of death from a dangerous communicable disease, the burial must be conducted according to the rules of the State Board of Health.

W. G. Wagner M.D

Name of Health Officer or Deputy

Dated Oct. 5 1912 So. Bend, Ind. R.F.D. 2

Address.

(Holder should Preserve this Permit.)

8

Figure 40. One of the earlist documented burial records (October 5, 1912) in Portage Cemetery

Ecological Assessment

Communities and Habitats

Portage Manor contains a mixture of definable communities and habitats. Due to its history as a county home and an operational farm, most of these distinct ecosystems are anthropogenic (heavily modified by human activity). However, the steep topography and hydrology of the southern portion of the property have kept portions of that area in a somewhat natural state. The following is a summation of Portage Manor's ecological communities and subcommunities.

Agricultural Fields

The Portage Manor property contains six recently farmed, former agricultural fields totaling approximately 67 acres. Last farmed in 2021, aside from the Southeast field, they are currently fallow and populated by a mixture of pioneer native and invasive exotic plant species.

Figure 41. The six former agricultural fields of Portage Manor

Although the plant communities vary from one field to another, there is some commonality to most fields. The noxious weeds Canada thistle (*Cirsium arvense*) and poison hemlock (*Conium maculatum*), as well as the invasive bull thistle (*Cirsium vulgare*) and Queen Anne's Lace (*Daucus carrota*), are present throughout the abandoned agricultural fields. Also present are several early successional (i.e., pioneer) native plants, including common milkweed (*Asclepias syriaca*), white avens (*Geum canadense*), black raspberry (*Rubus*

occidentalis), tall goldenrod (*Solidago altisima*), Canada goldenrod (*S. canadensis*) and white vervain (*Verbena urticifolia*). Additional problematic exotic plants include smooth brome (*Bromus inermis*) and common mullein (*Verbascum thapsus*).

Figure 42. Juxtaposition of pioneer native plants mixed with invasive exotic plants in one of the post-agricultural, early-successional field.

Figure 43. Some of the plants common to all of the fallow agricultural fields include (L–R), the desirable early successional native whorled milkweed (*Asclepias verticillata*), the "weedy" native marestail (*Erigeron canadensis*), the noxious weed Canada thistle (*Cirsium canadensis*), and the undesirable exotic common mullein (*Verbascum thapsus*).

Native wildlife currently utilize all five fallow fields. Both indigenous and exotic plants provide nectar and pollen for insects, which, in turn, attract insectivorous birds and dragonflies. White-tailed deer (*Odocoileus virginianus*) also frequent all fields for breeding and shelter.

Northwest Field

At 21.7 acres, the northwest agriculture field is the largest of the six. It is bounded on the west by the Indiana Toll Road, on the east by a tree line and old orchard, on the south by the manor residence, and on the west by Portage Avenue and the Council Oak Center (shopping plaza). An additional east-west tree line bisects its northeast corner.

Geologically, the Northwest Field resides entirely within the highest of the three glacial outwash plains within the campus. Through NRCS soil maps, we may conclude that the northwest field historically was an area where the eastern deciduous and mixed forests met a peninsula of the now-extinct Portage Prairie.

Figure 44. Looking southeast at the early successional habitat from the northwestern corner of the northwest agricultural field.

Historical aerial imagery and a research document published by the county provide clues to the recent past. Photographs from the 1930s through the late 1950s indicate the eastern portion of the area was a part of the Manor's orchard. Corroborating this is the document *Historical Timeline of the St. Joseph County Home*, which called the orchard during that period "extensive" (SJC 2019). However, by 1965, the orchard was gone from the northwest agricultural field aside from the northernmost row of trees, which still exists as the previously mentioned east-west tree line. Within this tree line, two remnant apple trees remain.

Figure 45. 1951 aerial photo of orchard overlayed atop current satellite imagery with locations of remanant apples trees represented by red circles

Figure 46. One of two remnant apples trees located in the east-west bisecting tree line as shown in Figure 23

For reasons unknown, of the six former agricultural fields, the Northwest Field contains the fewest woody plants and perhaps the highest concentration of herbaceous plants. Black cherry saplings (*Prunus serotina*) and black raspberry (*Rubus occidentalis*) are the most frequent woody species, but a mixture of exotic forbs and grasses and pioneer native species constitute most of the vegetation.

The post-agricultural flora of the Northwest Field currently supports a variety of fauna. The early-successional, herbaceous native plants, common milkweed (*Asclepias syriaca*), whorled milkweed (*Asclepias verticillata*), and annual fleabane (*Erigeron annuus*), along with the invasive thistles (*Cirsium* spp.) provide food and habitat for a variety of bees, butterflies, wasps, and other pollinating insects. Frequently seen feeding on these insects are dragonflies and several species of insectivorous birds such as Eastern Kingbirds, Chimney Swifts, Barn, Tree, and Northern Rough-winged Swallows. Groundhogs (*Marmota monax*) also currently utilize the field for food and burrows.

Figure 47. Native fauna of the Northwest Field. Top row (L–R): snowberry clearwing moth (*Hemaris diffinis*), wild indigo duskywing (*Erynnis baptisiae*), great black wasp (*Sphex pensylvanicus*). Middle row: noble scoliid wasp (*Scolia nobilitata nobilitata*), Tree Swallow (*Tachycineta bicolor*), eastern amberwing (*Perithemis tenera*). Bottom row: Halloween pennant (*Celithemis eponina*), furrow bee (*Halictis* sp.), sweat bee (*Agepostemon* sp.).

North Central Field

To the east of the tree line bordering the northwest former agricultural field is the 13-acre North Central field. This field is bordered on the north by the Indiana Toll Road, on the east by a tree line adjacent to the Northeast Field, and on the south by a tree line adjacent to the east-west road that connects the Manor residence to the Chet Waggoner Little League.

The North Central field lies within the middle of the three glacial outwash plains, lower than the Northwest Field, with the delineation point occurring along the tree line separating the two fields. Like the Northwest Field, the north central field contains a mixture of soil types, with prairie soils comprising 79% of the field and the remaining 21% deciduous and mixed forest soils.

The vegetation of this field is similar to but more starkly woody than the Northwest Field. Although black cherry (*Prunus serotina*) saplings are still present, the dominant woody species in the eastern half of the field is box elder (*Acer negundo*), another pioneer native tree. Fast-growing, in only three years, these trees have obtained a height of 4–8 feet. Among the herbaceous plants, the invasive thistles (*Cirsium* sp.) and the early successional natives tall goldenrod (*Solidago altissima*) and Canada goldenrod (*S. canadensis*) dominate. Historically, this area did not contain an orchard and was farmed at least as far back as 1938 and probably before.

Figure 48. Southern view from the northern edge of the North Central field in early August

The denser, woodier vegetation afforded by the North Central Field provides a habitat for native fauna different from that of the northwest field. In June 2024, we observed numerous Red-winged Blackbirds and Song Sparrows displaying breeding behavior. Almost certainly, both species nested in this early successional field, and on August 1, we observed an active American Goldfinch nest containing unfledged young. Pioneer native plants such as milkweeds (*Asclepias* spp.), goldenrods (*Solidago* spp.), and annual fleabane (*Erigeron annuus*) and invasive plants such as the two before-mentioned thistle species (*Cirsium* spp.) provide food for pollinating insects. However, those insects and granivorous birds, such as American Goldfinches (who relish thistle seed), help propagate and disperse them, including the ecologically damaging invasive plants.

Figure 49. Native fauna of the North Central agriculture field. Top row (L–R): common buckeye (*Junonia coenia*), red-spotted purple (*Limenitis arthemis*), a trilogy of native bees including, yellow bumble bee (*Bombus fervidus*). Bottom row: eastern tiger swallowtail (*Papilio glaucus*), Song Sparrow (*Melospiza melodia*), Carolina grasshopper (*Dissosteira carolina*).

Northeast Field

Virtually identical in size to the North Central field is the 13-acre Northeast Field. It's bordered on the west by a shared tree line with the North Central Field, which shares the same north and south boundaries. Its east boundary is the tree line adjacent to the Chet Waggoner baseball complex.

The Northeast Field contains two different geological landforms. The western half shares the mid-level outwash plain with the North Central Field, while the eastern half drops abruptly into the lowest of the three outwash plains, just above and adjacent to the St. Joseph River valley. Its soil types reflect this transition, with the western portion containing the well-drained Tyner complex soils while the eastern edge consists of the poorly-drained Gilford complex.

The vegetation of this field is consistent with its geology. Although artificially broken by the tree line separating them, the floral composition of the western half of the Northeast Field is a continuation of the North Central Field. As the topography transitions into more saturated soils, box elder (*Acer negundo*) ceases to be dominant and is replaced by cottonwood (*Populus deltoides*) and American sycamore (*Platanus occidentalis*) saplings. Although the invasive thistles (*Cirsium canadensis* and *C. vulgare*) and aggressive goldenrods (*Solidago altissima* and *S. canadensis*) remain dominant, the presence of American sycamore and cottongrass bulrush (*Scirpus cyperinus*), facultative and obligate wetland species, respectively, reflect the change in soils and drainage.

Figure 50. Cottongrass bulrush (*Scirpus cyperinus*) growing in the Northeast Field

Figure 51. Cottonwood dominant section of the Northeast Field

The continuation of the pioneer woody plants from the North Central Field provides habitat for similar fauna. Both Red-winged Blackbirds and Song Sparrows likely nested in this field in the Summer of 2024, and we recorded numerous species of pollinating and predatory insects, including one of the county's first known records of the common roadside skipper (*Amblyscirtes vialis*).

Figure 52. Native fauna of the Northeast Field. Top row (L–R): calico pennant (*Celithemis elisa*), communal gathering of Red-winged Blackbirds (*Agelaius phoeniceus*), lucerne moth (*Nomophila nearctica*). Bottom row: cloudless sulphur (*Phoebis sennae*), Colorado potato beetle (*Leptinotarsa decemlineata*), common roadside skipper (*Amblyscirtes vialis*).

Southwest Field

At 3.1 acres, the Southwest Field is the smallest of the six recently vacated agricultural fields. It is bordered on the north by a tree line adjacent to the east-west road that connects the Manor residence to the Chet Waggoner Little League, on the east by the tree line separating the South Central Field, on the south by the property's primary east-west road, and on the west by the wooded area east of and adjacent to the Manor Residence.

Geologically, the intersection of the property's highest and mid-level outwash plains longitudinally bisects this field, and two primary soil types are present. All but the extreme northeastern 0.4 acres are the Tyner complex, associated with deciduous woods, with the remainder being Coupee prairie soils.

Figure 53. Panoramic view of the Southwest Field (top).

Figure 54. Spotted Joe Pye weed (*Eutrochium maculatum*) in southeastern corner of same field (right).

The Southwest Field's vegetation is similar to the North Central and Northeast Fields, with a few exceptions. The tree species consist mainly of black cherry (*Prunus serotina*), American sycamore (*Platanus occidentalis*), honey locust (*Gleditsia triacanthos*), and eastern cottonwood (*Populus deltoides*), but the exotic black locust (*Robinia pseudoacacia*) is also present. In addition to the typical invasive and pioneer native herbaceous species typical of the previous fields, panicled-leaf tick-trefoil (*Desmodium paniculatum*), spotted Joe Pye weed (*Eutrochium maculatum*), and late figwort (*Scrophularia marilandica*), all non-pioneer native plants, are present.

The combination of early successional woody and herbaceous vegetation in the southwest field provides a habitat similar to the two previous fields. Red-winged Blackbirds, Song Sparrows, and

American Goldfinches are all common to this field, with large flocks of the latter observed eating the seed heads of Canada thistle (*Cirsium arvense*). Invertebrate species are also typical of the other fields.

Figure 55. Native fauna of the Southwest agriculture field. (L–R): pearl crescent (*Phyciodes tharos*), monarch (*Danaus plexippus*), eastern-tailed blue (*Everes comyntas*)

South Central Field

Consisting of approximately 5.4 acres, the southeast field is the second smallest of the fallow agricultural fields. This field is bordered on the west by a tree line separating the Southwest Field, which it shares parallel north and south borders, and on the east by the shared tree line with the South East Field.

The South Central Field contains a mixture of soil types. Approximately 3.6 acres of the northwestern portion of the field consists of the Coupee series prairie soils, while the Tracy and Tyner forested soils comprise the remaining 1.8 acres.

The field's vegetation is consistent with its soils. The western portion consists mainly of goldenrods (*Solidago* spp.) and other herbaceous species, while the eastern side (containing the woodland soils) includes a spattering of woody species, including eastern cottonwood (*Populus deltoides*) and American sycamore (*Platanus occidentalis*). Other native plants include spotted and purple Joe Pye weeds (*Eutrochium maculatum* and *E. purpureum*) and tall ironweed (*Vernonia gigantea*).

Figure 56. Southern view from the northern boundary of the South Central Field

Figure 57. Native vegetation in the South Central Field: tall ironwood (*Vernonia gigantea*) flanked by tall goldenrod (*Solidago altisima*) —left and purple Joe Pye weed (*Eutrochium purpureum*) —right

Southeast Field

Immediately east of the South Central Field lies a 10.2-acre former agricultural field where the St. Joseph County Highway Department recently begain storing broken asphalt and organic material, such as leaves. The field is bordered on the north by the Northeast Field and on the east and south by the Early Successional Woods.

Geologically, the Manor's middle and lowest outwash plains bisect the field. As a result, most of the South East Field consists of the well-drained Tyner complex mixed forest soils, but the eastern portion contains poorly drained Gilford complex, as evidenced by water frequently pooling along the east boundary.

Vegetatively, this field is populated primarily by exotic and early-successional native plants along the margins, in the northeastern corner, and on top of a large pile of earth in the southern portion. Invasive species present include Oriental bittersweet (*Celastrus orbiculatus*), Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), crown vetch (*Securigera varia*), and Johnson grass (*Sorghum halepense*). Ground asphalt covers much of the center of the field, which is also heavily disturbed by truck traffic.

Despite the high level of human activity, the Southeast Field contains notable avian activity. In June 2024, we observed several hatchling Killdeer in the field, and in August, the flooded area along the eastern boundary contained Wood Ducks and other bird species.

Figure 59. Southerly view of the Southeast field's asphalt operation

Figure 58. Flooded portion of the field containing Wood Ducks, Killdeer, and other birds

Tree Lines

Each of the five former agricultural fields contains at least one tree line boundary separating that field from an adjacent geographical feature. An additional tree line partially bisecting the northwest field is a remnant of the original northern edge of the former orchard. Collectively, these areas total approximately 11 acres. Most of these tree lines contain a fence row, and through historical imagery, we can deduce that the trees growing along these fence rows began growing from wild seed (aided by birds) shortly after the fence rows created no-till areas, which allowed woody species to thrive, probably in the 1950s.

Figure 60. The agricultural field's tree lines represented in green

Like all of the Manor's ecosystems and ecotones, the tree lines contain a combination of native, exotic, and exotic-invasive plants. The woody species vary by location, with the western fields containing more upland and facultative upland species and the eastern fields containing more facultative wetland species. Generally speaking, the dominant tree in most areas is the exotic-invasive white mulberry (*Morus albus*), which is fast-growing, soft-wooded, easily spread by birds, and present in all tree lines.

Despite the presence of invasive species, the tree lines are not without merit. Their structure provides habitat for several species of songbirds, most notably Indigo Buntings, which favor shrubby woodland edges for nesting. Red-tailed Hawks utilize the tree lines to observe prey in the open fields, and based on the number of observed juveniles, they are likely nesting in the tree lines as well.

Figure 61. Red-tailed Hawk hunting from one of the tree lines

Figure 62. The eastern tree line of the northeast field bordering the Chet Waggoner complex

Figure 63. Tree line invasive plants include common buckthorn (*Rhamnus cathartica*) — top left, tree of Heaven (*Ailanthus altissima*) — bottom left, and porcelain berry (*Ampelopsis brevipedunculata*) — right

Old Orchard

The area referred to as the "old orchard" refers to an approximately 4.4-acre square section of young woods located between the Northeast and North Central fields and just north of the Old Central Farm.

Geologically, the area lies on the far eastern edge of the property's highest outwash terrace. Aside from its extreme southwestern corner, its soil consists of the urban land Tracy complex, historically associated with mixed forests.

Figure 64. The wooded remains of the old orchard

Historically, this area was part of the Portage Manor's once extensive farm system. According to a document produced by the South Bend Historic Preservation Commission, Superintendent Thomas E. Clancy (appointed in 1932) planted 100 fruit trees (SBHPC 2023). The document also references inmates wrapping papers around Keifer pears (*Pyrus communis* 'Keifer'). Clancy's successor, Stephen A. Newrock, substantially increased the size of the orchard (and other farming operations) until his passing in 1962 (SJC 2019).

Following Newrock's death, farming operations appear to have steeply declined. Historical aerial imagery shows large sections of the orchard removed, and a document produced by St. Joseph County states that in 1963, "Farm profit plunged to just over $7,000, and never really recovered from this point on" (SJC 2019). Imagery from the 1960s and 70s illustrates the continued removal of orchard trees. Gradually, early successional woods replaced them, and for a short period, a small walking path may have bisected the woods.

Utilizing historical aerial imagery (SJC 2024), county and city documents (SJC 2019, SBHPC), remnant trees, and a personal interview, we can reasonably conclude that at least as far back as 1938 (the earliest available aerial imagery), it contained apple trees, potentially other fruit trees, and possibly vegetables or other non-grain crops.

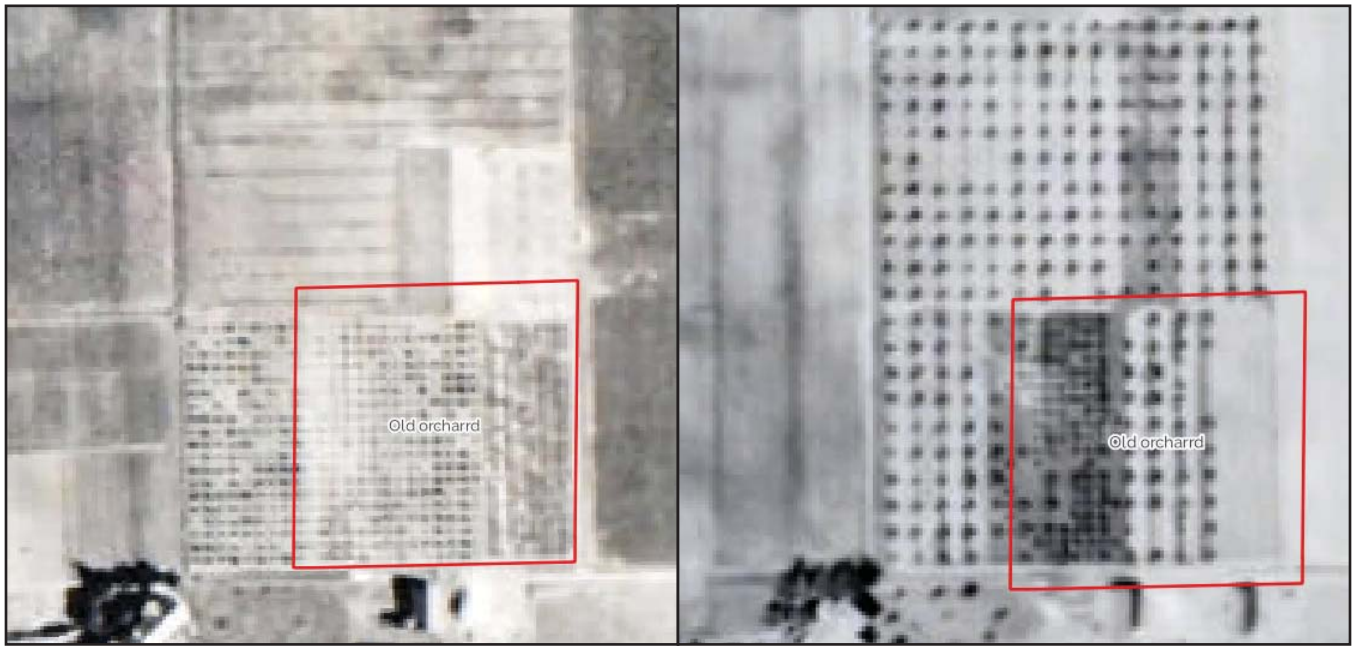


Figure 65. Comparison of size of orchard between 1938 (left) and 1951 (right) with current "old orchard" outlined in red

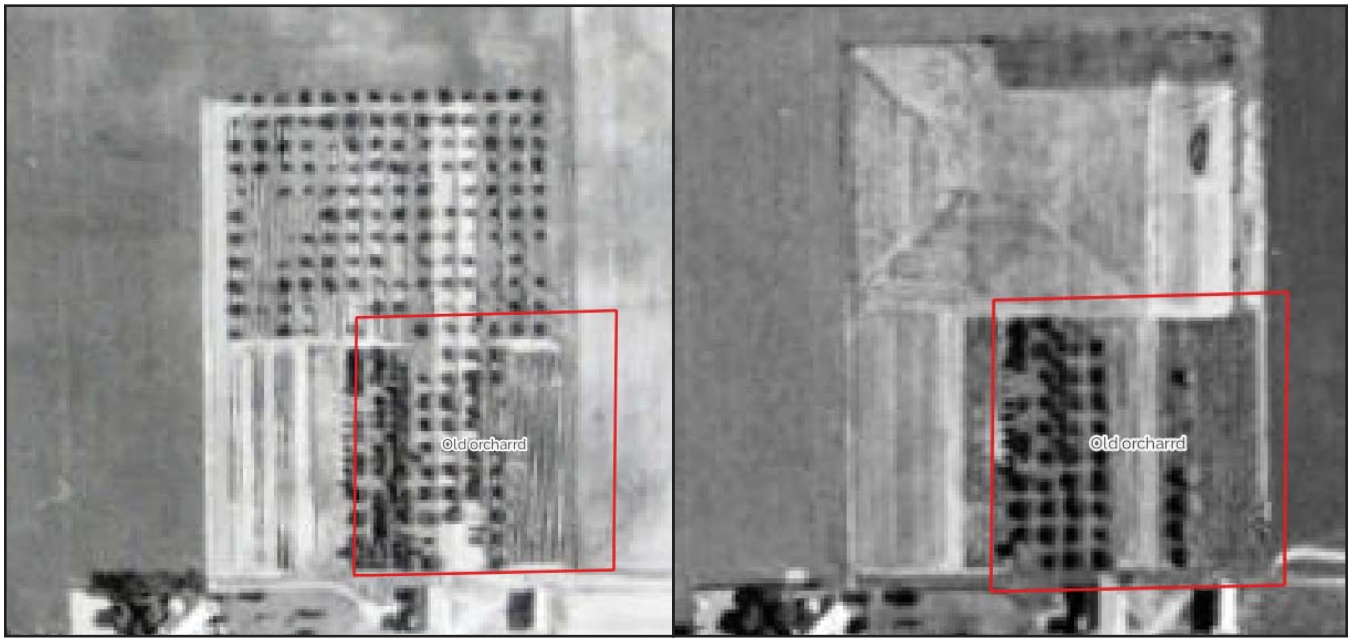


Figure 66. 1957 aerial imagery (left) shows some trees removed, and by 1965 (right), in the post Newrock era, the majority of the orchard trees were gone.

As it exists presently, the Old Orchard is an oddly vegetated area of the Portage Manor property. No trace of the orchard remains within the confines of the area defined in this document. In its place are primarily exotic invasive trees such as Norway maple (*Acer platanoides*) and white mulberry (*Morus albus*), but also noteworthy specimens of the native trees northern hackberry (*Celtis occidentalis*) and silver maple (*Acer saccharinum*). No doubt these trees (along with the other current vegetation) resulted from the former caretaker's ecological neglect by allowing the orchard to become fallow. Since the 1960s, they have formed a dense canopy where very little light reaches the ground. As a result, much of the old orchard contains little to no understory vegetation.

Figure 67. The "old orchard" in August of 2024

The invertebrate life observed in the Old Orchard was primarily in the clearings and margins where light is sufficient to support understory vegetation. In these areas, we observed various species of butterflies, moths, flies, wasps, and dragonflies.

Figure 68. Insects observed in the old orchard include (L–R) little wood satyr (*Megisto cymela*), robber fly (*Laphria* sp.) and immature male common whitetail (*Plathemis lydia*)

Old Central Farm

The area notated as the "Old Central Farm" refers to the three acres of land immediately east of the Manor facility. Bordering the other sides of the central farm are the Old Orchard and North Central Field on the north, the South Central field on the east, and the Southwest Field and Central Farm Woods on the south.

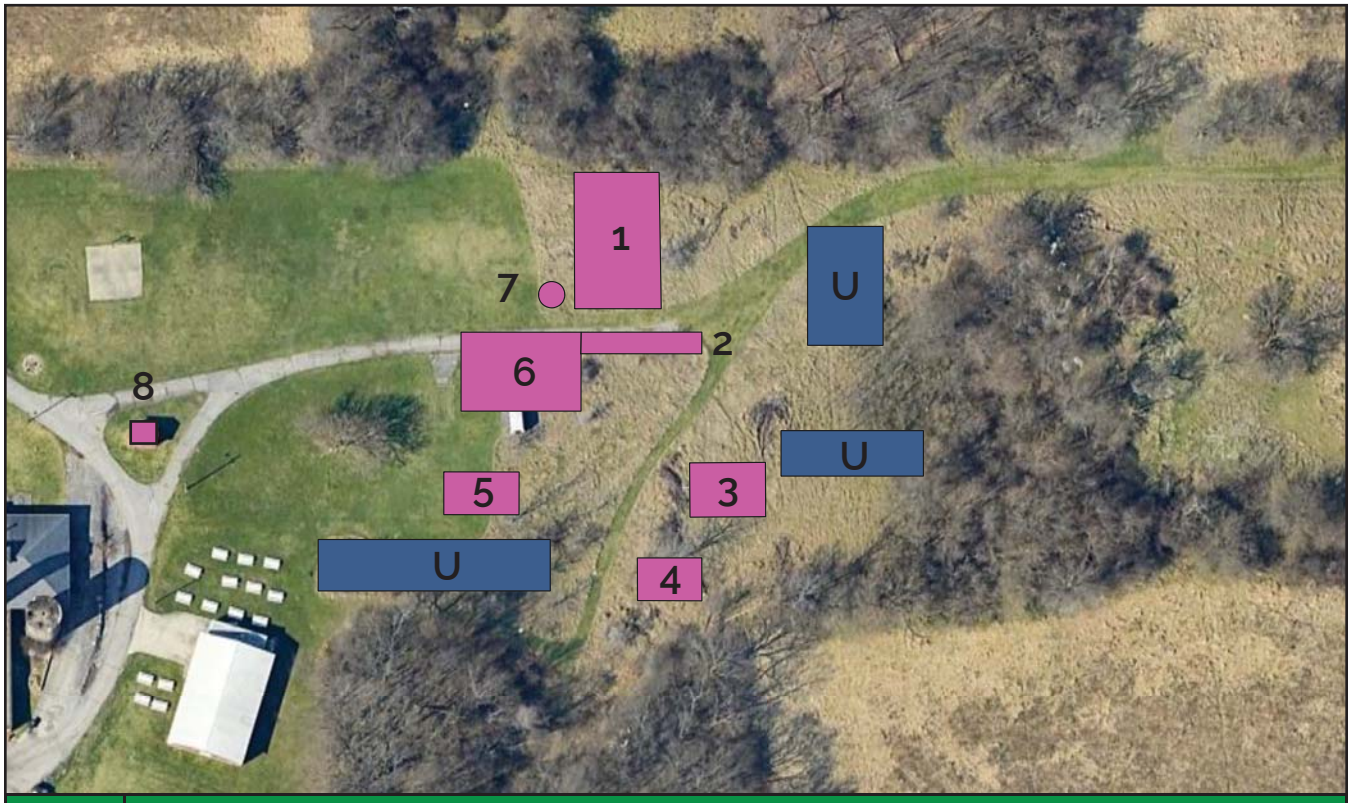
Geologically, the Old Central Farm is similar to the Old Orchard. Both lie primarily within the property's highest outwash plain and contain a majority of urban land Tracy complex soils, but the central farm differs by having its east and west margins within the property's peninsula of Coupee complex prairie soils.

Figure 69. The cessation of grazzing and tilling has allowed the Old Central Farm's original retangular shape to be altered by the intrusion of invasive and pioneer native woody vegetation along the southern border.

When the county purchased the property in 1905, the Old Central Farm area contained several agricultural buildings and was likely the epicenter of the farming operation of the Witter and Brown families. According to a 1917 Sanborn insurance map (Sanborn Map Company 1917), the county farm housed cattle, hogs, and chickens in this area, and the Old Central Farm also included buildings to house supporting necessities such as wagons and grain. Later aerial maps from the 1950s show additional structures, and according to the South Bend Historic Preservation Commission (and supported by historic aerial imagery), some of the buildings erected by Rezeau Brown survived until the county razed them in February 1999 (SBHPC 2023).

As expected, the Old Central Farm is one of the most anthropogenic areas of the property. As the principal location of agricultural operations, it was the site of decades of intensive animal food production, including housing, grazing, feeding, and likely slaughtering. For most of the 20th century, agricultural buildings covered much of this area, and since the cessation of farming, most of the Old Central Farm has gone

fallow, with Eurasian pasture grasses and pioneer tree species becoming the dominant vegetation. When the county purchased the property in 1905, the Old Central Farm area contained several agricultural buildings and was likely the epicenter of the farming operation of the Witter and Brown families. According to a 1917 Sanborn insurance map (citation), the county farm housed cattle, hogs, and chickens in this area, and the central farm also included buildings to house supporting necessities such as wagons and grain. Later aerial maps from the 1950s show additional structures, and according to the South Bend Historic Preservation Commission (and supported by historic aerial imagery), some of the buildings erected by Rezeau Brown survived until the county razed them in February 1999 (SBHPC 2023).



Point	Legend		
Buildings illustrated in 1917 Sanborn Insurance Map denoted in pink. Later structures in blue.			
1	"CB" (cattle barn?)	5	Wagons
2	Cribs	6	Straw and implments
3	Swine	7	Silo
4	Chicken house	8	Smoke house
U	Unknown later structures		

Figure 70. Contemporary satellite imagery of the Old Central Farm overlaid with historical agricultural buildings and structures

Figure 71. April 1998 satellite imagery of Residence and Old Central Farm shortly before razing the agricultural buildings

Figure 72. The Old Central Farm as it appeared in August 2024

Central Farm Woods

Immediately south of the Old Central Farm is an area notated as the Central Farm Woods. It is bordered on the east by the Southwest Field, on the south by the east-west road, and on the west by the Manor Residence.

Geologically, the Central Farm Woods lies entirely within the property's highest outwash plain, and its soils are a mixture of the Tracy mixed woods and Coupee prairie complexes.

Figure 73. The location of the Central Farm Woods

The current vegetation, historical maps, and aerial imagery provide clues into past land use. The area contains a relatively closed canopy with a blend of native and invasive trees, with the older native trees occurring principally along the southern margin. The shrub level contains primarily invasive honeysuckle (*Lonicera* spp.), and the ground level shows signs of heavy disturbances and an absence of conservative plants. The 19th-century maps denote a building at the northern edge of the woods, and aerial photography shows a much more open canopy from the 1930s through the 1960s.

Through these resources, we may reasonably conclude that most of this land was cleared, probably by the Witters or the Browns, and its historically sporadic trees, coupled with its proximity to the agricultural barns and the contemporary composition of ground-level vegetation, indicate that the operators of the farm likely used it as pasture land for many decades. Along with the Old Orchard and Old Central Farm, following the cessation of county farm-run agriculture in the 1960s, the overseers of the property probably abandoned the area and allowed the Central Farm Woods to become fallow.

Figure 74. The southern perimeter of the Central Farm Woods — October 2024

Figure 75. The heavily disturbed forest floor of the Central Farm Woods. Inset — 1938 aerial imagery of Central Farm Woods of what was likely pasture land.

Manor Residence

The Manor Residence refers to the 7.4-acre land in and around the former county home, including the landscaped areas between Portage Avenue and the building. In addition to Portage Avenue, the Manor Residence is bordered on the north by the Northwest Field, on the east by the Old Central Farm and Central Farm Woods, and on the south by the Mesic Wooded Slopes.

Geologically, the Manor Residence lies entirely in the property's highest outwash plain, and its soils consist of a combination of Coupee and Troxel complex prairie soils and Tracy complex mixed forest soils. Historically, the Portage Prairie probably transitioned into woodlands in this area, and the presence of two centuries-old bur oak (*Quercus macrocarpa*) trees near the driveway (a species strongly associated with prairies and savannas) supports this theory.

Figure 76. Outline and location of the Manor Residence

The vegetation of the Manor Residence is almost entirely a product of decades of human landscaping. Aside from a few remnant trees, the plants are almost entirely with exotic ornamentals such as Norway spruce (*Picea abies*), Japanese cherry (*Prunus serrulata*), common lilac (*Syringa vulgare*), Japanese spirea (*Spirea japonica*), wayfaring tree (*Viburnum lantana*), and acres of exotic turf grasses.

The Manor Residence is a habitat for several species of mammals and birds. Groundhogs (*Marmota monax*) have built burrows in the front lawn area. White-tailed deer (*Odocoileus virginianus*) frequently graze on

the grass and ornamental plants. Fox squirrels (*Sciurus niger*) and eastern chipmunks (*Tamias striatus*) are common. Native Chimney Swifts by the dozens fly in and out of the building's abandoned chimney, a probable nesting site, and several species of exotic birds, including Rock Pigeon, European Starlings, and House Sparrows, nest in the closed-down facility.

Figure 77. Front entrance of the Manor Residence with two centuries-old bur oak (*Quercus macrocarpa*) trees in the right foreground

Figure 78. Dozens of Chimney Swifts flying above residence at dusk in August 2024 (Derek Dieter photo)

County Highway Department

A field used by the St. Joseph County Highway Department lies on the property's northeast corner. This 11.8-acre property is bordered on the south and east by the South Bend Water Treatment Plant, on the west by the Early Successional Woods, and on the north by the Indiana Toll Road. For this document's purposes, this area also includes the north-south road, which connects it to the Manor's primary east-west road.

Most of this area sits in the property's lowest glacial outwash plain except for its north-south road, which lies within the St. Joseph River Valley. Its soils are primarily of the mixed forest Tyner complex except for the eastern edge, which are Psamments.

Figure 79. The County Highway Department East property and drive on the far eastern edge of the Portage Manor campus

Historically, this area likely contained a building, possibly a dwelling, during the Studebaker/Keltner/Garwood periods. The 1875, 1895, and 1911 maps all show a structure in or around the County Highway Department's East field, but it's unclear whether these are different structures or the same structure inaccurately mapped. In any case, the county and previous landowners farmed this area at least until 1938. 1951 aerial imagery is the first showing highway department buildings on the property.

Decades of heavy use have significantly degraded the botanical quality of the County Highway Department facility. Aside from the margins, most of the plants growing here are exotic, including several unchecked

invasives such as spotted knapweed (*Centaurea stoebe*), common reed (*Phragmites australis* ssp. *australis*), and common buckthorn (*Rhamnus cathartica*). The area flanking the southern entrance is less degraded and contains a few mildly conservative native plant species, such as American germander (*Teucrium canadense*), white ash (*Fraxinus americana*), and grass-leaved goldenrod (*Euthamia graminifolia*).

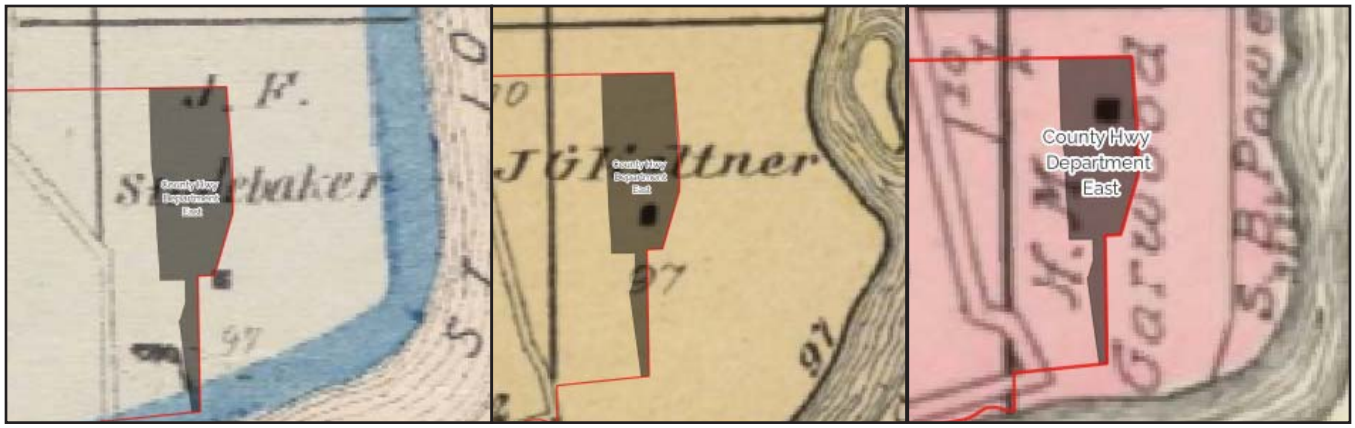


Figure 80. Left to right — 1875, 1895, and 1911 maps showing the location of a structure(s) in or around the County Highway Department East field.

Figure 81. Left to right — Current conditions of the County Highway Department facility showing botanically degraded field with western tree line on the left.

Chet Waggoner Baseball Complex

Sandwiched between the County Highway Department facility and the Northeast Field and just north of the Early Successional Woods is the 15.8-acre Chet Waggoner Baseball Complex. The complex sits atop land formerly part of the county farm's agricultural operation, which may have become disposable when they began downsizing in the mid-1960s.

The geology of the soil likely made it some of the least productive farmland. Due to its location in the property's lowest glacial outwash plain, Chet Waggoner's soils are the mixed-forest Tyner and the poorly-drained Gilford complexes. Evidence of the latter is apparent along the western boundary, where a north-south drainage ditch carries water away from the fields.

Figure 82. The Chet Waggoner Baseball Complex

Following the County Highway Department, the Chet Waggoner Baseball Complex was the second of the county farm's former agricultural fields to be repurposed. Historical aerial imagery shows that the construction of the first two diamonds took place in the mid-1970s, with the complex reaching its current size by the late 1990s.

Aside from the western margin and a few remnant trees along the southern border, the Chet Waggoner baseball complex is a low-biodiversity anthropogenic landscape.

Early Successional Woods

Immediately south of the Chet Waggoner Baseball Complex is the Early Successional Woods. Bordering the woods are the lane that is part of the County Highway Department, Portage Cemetery, the Southeast Field, the Boland Drive Slopes, and the Mesic Wooded Slopes. The woods contain an eastern and a western section, with the township section line dividing the two.

Located on the far eastern portion of the property, the Early Successional Woods lies within the property's lowest glacial outwash plain. Its soils consist entirely of the mixed forest Tyner complex and lack any presence of the prairie-dominated soils as its topography and proximity to the St. Joseph River would have provided a natural fire break.

Figure 83. The asymmetircal Early Successional Woods

With a north-south township section line running through it, The Early Successional Woods once had Lilac Road's predecessor running through it, which served as a boundary between the adjacent property owners. Before the completion of Riverside Drive in the 1930s, this road would have been a primary north-south corridor west of the river and the only terrestrial entrance to the eastern (i.e., Cripe/Studebaker/Keltner/Garwood property). From historical aerial imagery and the surviving foundation of an old barn, we may conclude that the county farm continued to utilize this entrance as part of its agricultural operation through the mid-20th century. As mentioned earlier in this document, unmarked graves could still exist along the Early Successional Woods' southeastern extent.

Figure 84. 1895 historical map showing location of township section line and old road (left) and 1938 aerial imagery with farming operations indicated by rows of likely fruit trees (right). The existing barn foundation is indicated by the red circle.

Figure 85. The remains of the foundation of a barn in the Early Successional Woods showing a combination of concrete and field stone construction.

As its name indicates, most of the Early Successional Woods is a young, second-growth forest. Woody plant species include a mixture of early natives such as cottonwoods (*Populus deltoides*), box elder (*Acer negundo*), hackberry (*Celtis occidentalis*), red oak (*Quercus rubra*), etc.) and exotic invasives such as Norway maple (*Acer platinoides*), bush honeysuckle (*Lonicera* spp.), white mulberry (*Morus alba*), Chinese spindle tree (*Euonymus bungeanus*), wintercreeper (*Euonymus fortunei*), etc. Of note, however, is the presence of several massive white oak trees (*Quercus alba*) along the northern edge, bordering the Chet Waggoner Baseball Complex. For reasons unknown, these oaks, which appear in early aerial imagery, were spared the axe despite over a century and a half of agriculture.

Ravine

The Ravine refers to the wetlands on the southern end of the property, including the ancient proglacial meltwater channel described in this document's Glaciation and Geology section, its terminal basin on the eastern end, and adjoining areas anthropogenically altered due to stormwater rerouting. Adjacent to the Ravine are the Mesic Wooded Slopes, the Boland Drive Slopes, and a portion of the Early Successional Woods.

The United States Fish and Wildlife Service (FWS) classifies most of the Ravine as a forested palustrine wetland, except for the terminal basin, which it calls a freshwater pond (see Figure 19). Following periods of heavy rains, stormwater enters the Ravine through two pipes on its western and southwestern edges. Additional water enters from the surrounding slopes, the agricultural field's drain tiles, and a small seep near the northwestern corner. When sufficient water reaches the terminal basin (i.e., freshwater pond), a connecting pipe carries it under Boland Drive and into the lagoon at Pinhook Park. During periods of drought, most of the Ravine and its terminal basin become dry.

Figure 86. Map of the Ravine showing stormwater entry points on the west and southwest and terminal basin on the east.

Historically, the Ravine was neither suitable for agriculture nor habitation, which is no doubt what preserved most of it, but it is not without human impact. The remnants of an old concrete dam are still apparent, and the channeling of stormwater has caused unnatural erosion to its margins, likely resulting

in the recent loss of several large trees. Because it still serves as an active stormwater channel, St. Joseph County presumably grants the City of South Bend a right of way through the property.

Figure 87. An area of the Ravine with undercut banks likely due to increased stormwater discharge

Figure 88. One of several agricultural drainage pipes in the Ravine

Vegetatively, the highest diversity lies in the terminal basin/ephemeral pond, which is probably more accurately described as an emergent marsh. Native plants present in this area include green arrow arum (*Peltandra virginica*), cottongrass bulrush (*Scirpus cyperinus*), dark green bulrush (*Scirpus atrovirens*), sweet wood reed (*Cinna arundinacea*), and rice cut grass (*Leersia oryzoides*).

Farther west, as the canopy fills in, woody species such as hackberry (*Celtis occidentalis*), green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), slippery elm (*Ulmus rubra*), and American sycamore (*Platanus occidentalis*) are frequent, and a small grove of pawpaw trees (*Asimina triloba*) grows along the edge.

Invasive plants present in the Ravine include Norway maple (*Acer platanoides*), burning bush (*Euonymus alatus*), multiflora rose (*Rosa multiflora*), Japanese hops (*Humulus japonicus*), and Japanese barberry (*Berberis thunbergii*).

Mesic Upland Woods and Slopes

Surrounding most of the Ravine are 16.4 acres of woods of varying slopes. Along most of the western portion of Boland Drive, the land is relatively flat until it drops off sharply near the Ravine. East of Portage Avenue and along the north side of the Ravine, the land is steeply sloped and lacks much of any flat ground. Geologically, the uplands lie within the property's highest outwash plain, and its soils are the mixed forest Urban land Tyner complex.

Figure 89. The Mesic Upland Forest and Slopes along the southwestern corner of the property

Historically, extreme disturbances impacted the flatter portions of this area. Aerial imagery from the 1930s through the 1970s shows the southcentral and northwest portions cleared, and personal accounts indicate the area contained grazing cattle, and remnants of a historic spring house remain on the northern edge near a natural seep. In the early 2020s, officials discovered a sizeable homeless encampment south of the Ravine, and the herbaceous species present and absent from the ground-level vegetation reflect the impact of these decades-long, continual disturbances. Even after substantial clean-up efforts, a significant amount of leftover trash from the homeless encampment remains in the area.

Despite the historical disturbances to its vegetation, the Mesic Upland Forest and Slopes contain ecologically salient components. For reasons unknown, many large trees escaped the forestry axe and have reached impressive sizes, especially white oak (*Quercus alba*), red oak (*Quercus rubra*), and American sycamore (*Platanus occidentalis*). Black cherry (*Prunus serotina*), black walnut (*Juglans nigra*), and bitternut hickory (*Carya cordiformis*) are also occasional to frequent in the area. On the forest floor, several conservative plant species are still extant, including ghost pipe (*Monotropa uniflora*), bloodroot (*Sanguinaria canadensis*), and the state-threatened herb Robert (*Geranium robertianum*).

Figure 91. 1973 aerial imagery of the area north of Boland Drive and east of Portage Avenue

As with all areas of the Portage Manor complex, invasive plants are problematic in the Mesic Upland Forest and Slopes. Norway maples (*Acer platanoides*), long planted by city forestry and common along the St. Joseph River, are frequent. In the shrub level, burning bush (*Euonymus alatus*), common privet (*Ligustrum vulgare*), Japanese barberry (*Berberis thunbergii*), multiflora rose (*Rosa multiflora*), and Asian bush honeysuckle (*Lonicera* spp.) are all present.

Figure 90. Mature red oak (*Quercus rubra*) and white oak (*Quercus alba*) on the top of a slope overlooking the Ravine

Boland Drive Slopes

The final ecosystem contained within the Portage Manor complex is the narrow slopes along Boland Drive. These are anthropogenically created areas resulting from the Boland Avenue trail project of 2018. On the western end, the land slopes downward towards the Ravine, and on the eastern end, the land slopes upward toward the Early Successional Forest.

Figure 92. The narrow, planted slopes along Boland Drive

The Boland Slopes currently contain a mixture of vegetation types. During the trail's construction, a contractor for South Bend presumably planted a mixture of native prairie grasses and forbs, including little bluestem grass (*Schizachyrium scoparium*), Canada wild rye (*Elymus canadensis*), wild bergamot (*Monarda fistulosa*), gray-headed coneflower (*Ratibida pinnata*), and other typical native meadow species. Although seemingly successful, now in its fifth or sixth growing season, invasive and early successional trees and shrubs are beginning to invade. Unchecked, woodland will eventually replace the existing prairie species. Unfortunately, this area and the southern margin of the Mesic Upland Forest face threats from nearby invasive and potentially invasive trees and shrubs planted by South Bend Forestry and neighbors to the south.

Vegetation Surveys

Overview

A comprehensive inventory of vascular plants is paramount to every terrestrial ecological assessment. It provides critical empirical data used to quantify the relative health of the property, supplies clues to past disturbances, warns of current and future threats, and serves as the cornerstone for land management plans.

Methodology

Vascular plant data collection began on June 8, 2024, ended on October 26, and consisted of 24 trips covering over 48 miles. Practitioners kept a master list of all plants observed and an inventory of species by habitat. This data then became the basis for quantifying the overall botanical composition of the entire county-owned property and as a means of juxtaposition of its 17 divisions as defined by this document.

This report quantifies botanical data in several ways:

- **Species richness** is the overall number of species within a given area. Richness is further divided into native and adventive (exotic) species.
- **Mean C** follows a methodology established by Floyd Swink and Gerould Wilhelm in the 1994 edition of *Plants of the Chicago Region* (Swink and Wilhelm 1994) and revised in 2017 (Wilhelm and Rericha 2017). This method assigns each species a coefficient of conservation or "c-value." The c-value is a 0-10 integer representing the plant's fidelity to occur in a pre-settlement natural remnant. For example, tall goldenrod (*Solidago altissima*), which occurs throughout the former agricultural fields, is a C0 because it will exist and even thrive in heavily disturbed areas. On the other end of the spectrum, pawpaw (*Asimina triloba*) is a tree whose natural presence is limited to remnant plant communities. At Portage Manor, it occurs naturally in and around the Ravine and is extremely unlikely to be found in any of the disturbed areas. Exotic plants are always C0. Mean C is obtained by dividing the sum of all C values by the number of species.
- **The Floristic Quality Index (FQI)** considers the number of species of a given site related to the Mean C (Swink and Wilhelm 1994). The formula for obtaining FQI is FQI = Mean C $\sqrt{N}$, whereas N represents the total number of species. Swink and Wilhelm proposed that areas with a Mean C ≥ 3.5 or an FQI ≥ 35 represent areas with at least marginal natural quality, and areas with a Mean C ≥ 4.5 or FQI ≥ 45 are almost certain to be natural remnants.

Results

The botanical surveys resulted in the identification of 263 vascular plants and an additional five ornamental plants identified only to genus. Of these plants, 135 (51.5%) are native, 127 (48.5%) are exotic, and of those exotic plants, 43 are legally "invasive" in Indiana. The Mean C of the entire property is 1.6, and the Floristic Quality Index (FQI) is 26. Appendix A contains a complete list of the survey's plant inventory, Appendix B lists the flora by habitat (defined areas), and Appendix C lists invasive plant species with additional details such as physiognomy, life span, and locations.

The survey turned up one state-listed plant: herb Robert (*Geranium robertianum*), which the State of Indiana recognizes as "state threatened. Herb Robert is an annual plant that is locally frequent in the Upland Mesic Forest.

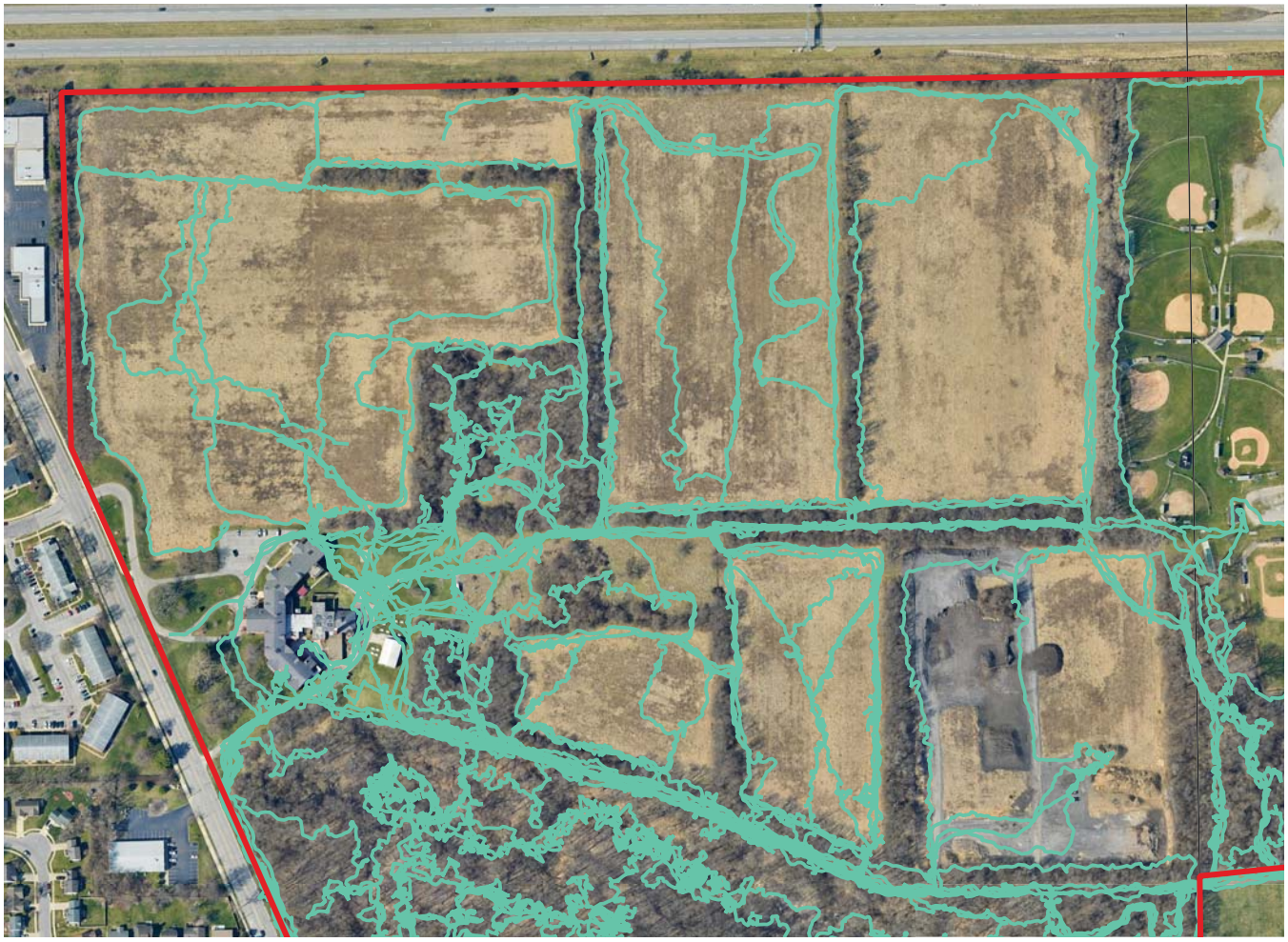


Figure 93. The meander routes used in the botanical survey

Figure 94. The Indiana State Threatened plant herb Robert (*Geranium robertianum*) in the Mesic Upland Forest

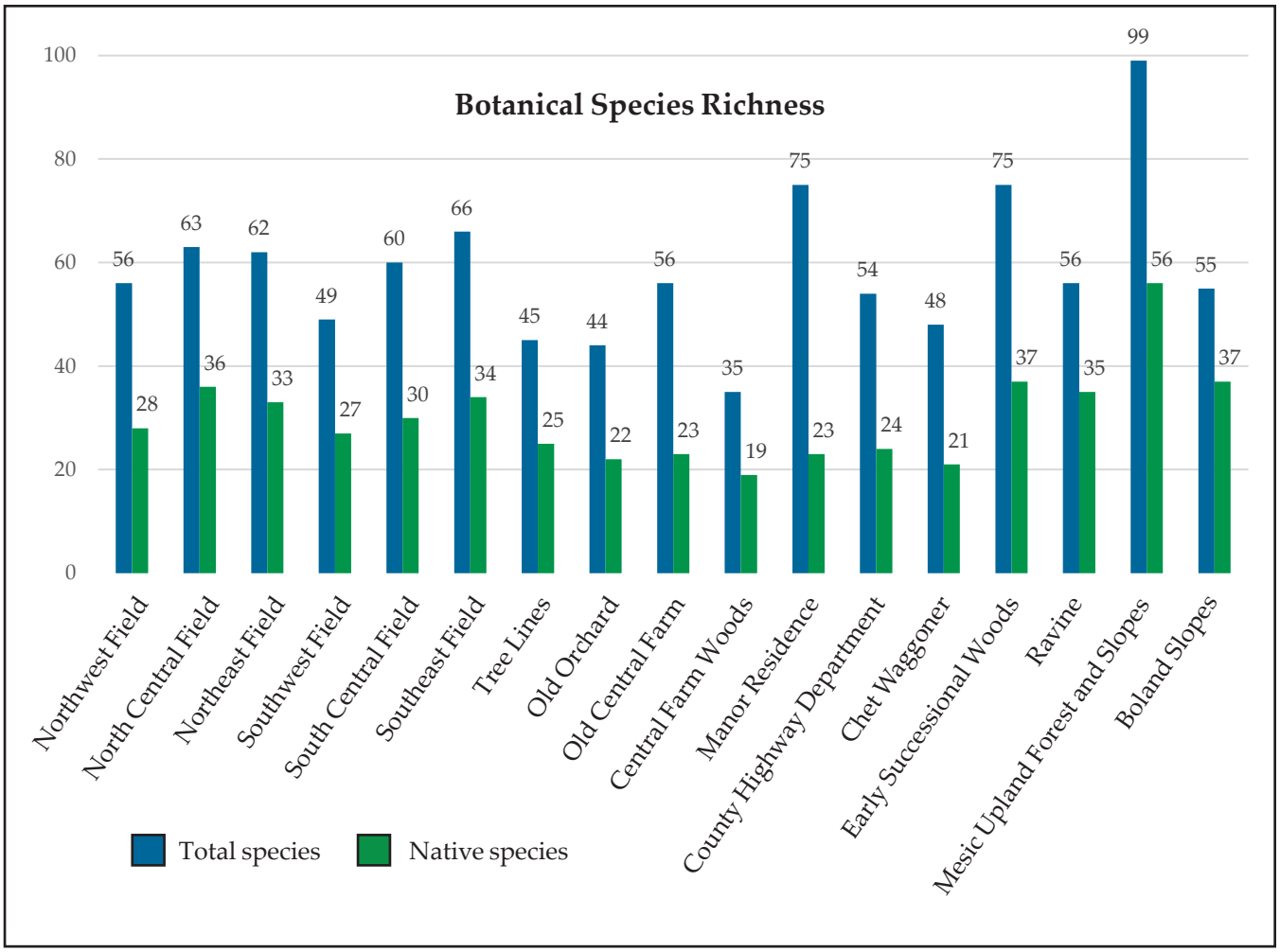


Figure 96. Vascular plant species richness and nativity by habitat

Figure 95. Giant yellow hyssop (*Agastache nepetoides*), a native plant in the mint (*Lamiaceae*) family in the Northeast Agricultural Field

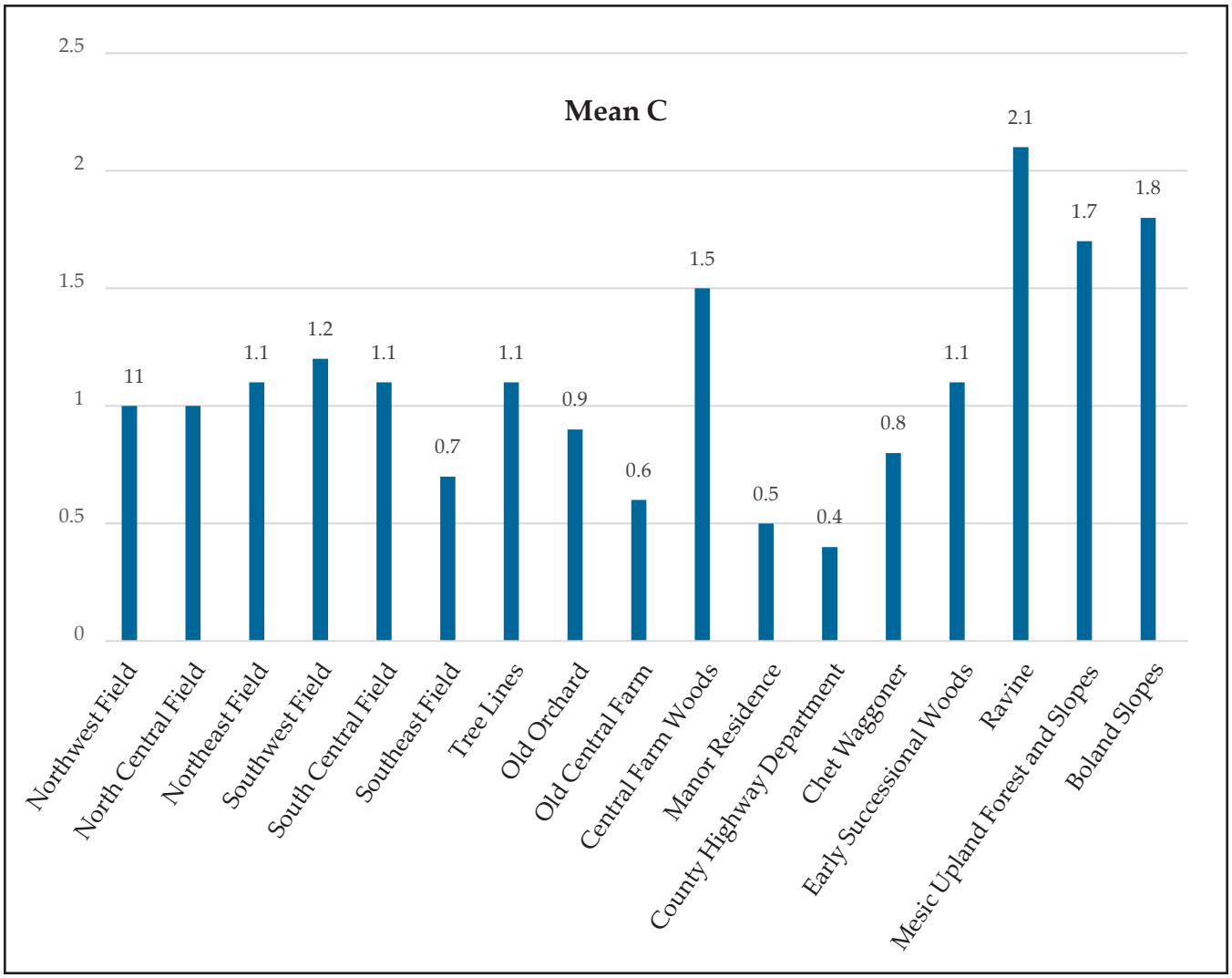


Figure 97. Vascular plant mean C values by habitat

Figure 98. Bloodroot (*Sanguinaria canadensis*), a native spring wildflower in the poppy (*Papaveraceae*) family in the mesic woods south of the Ravine.

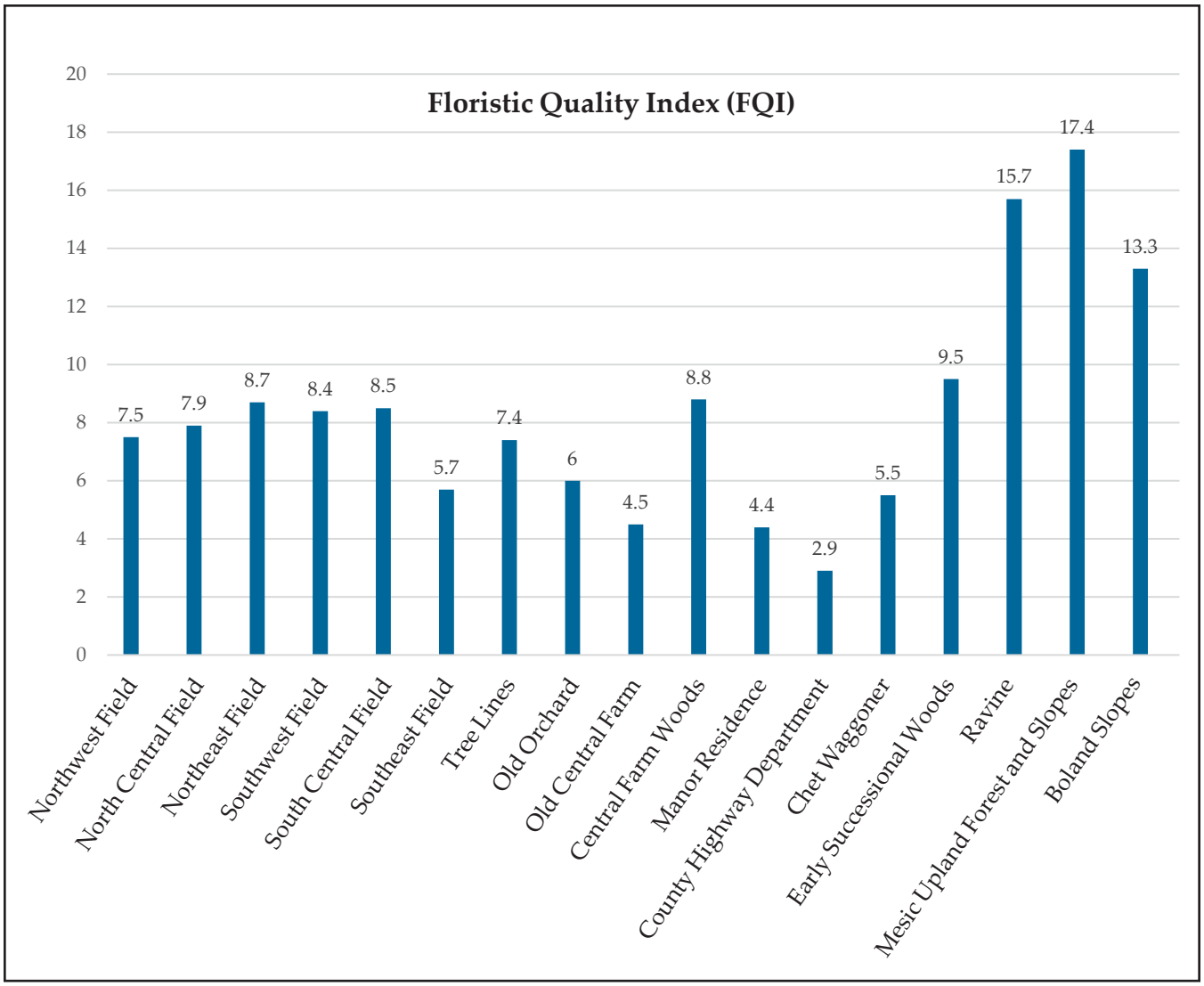
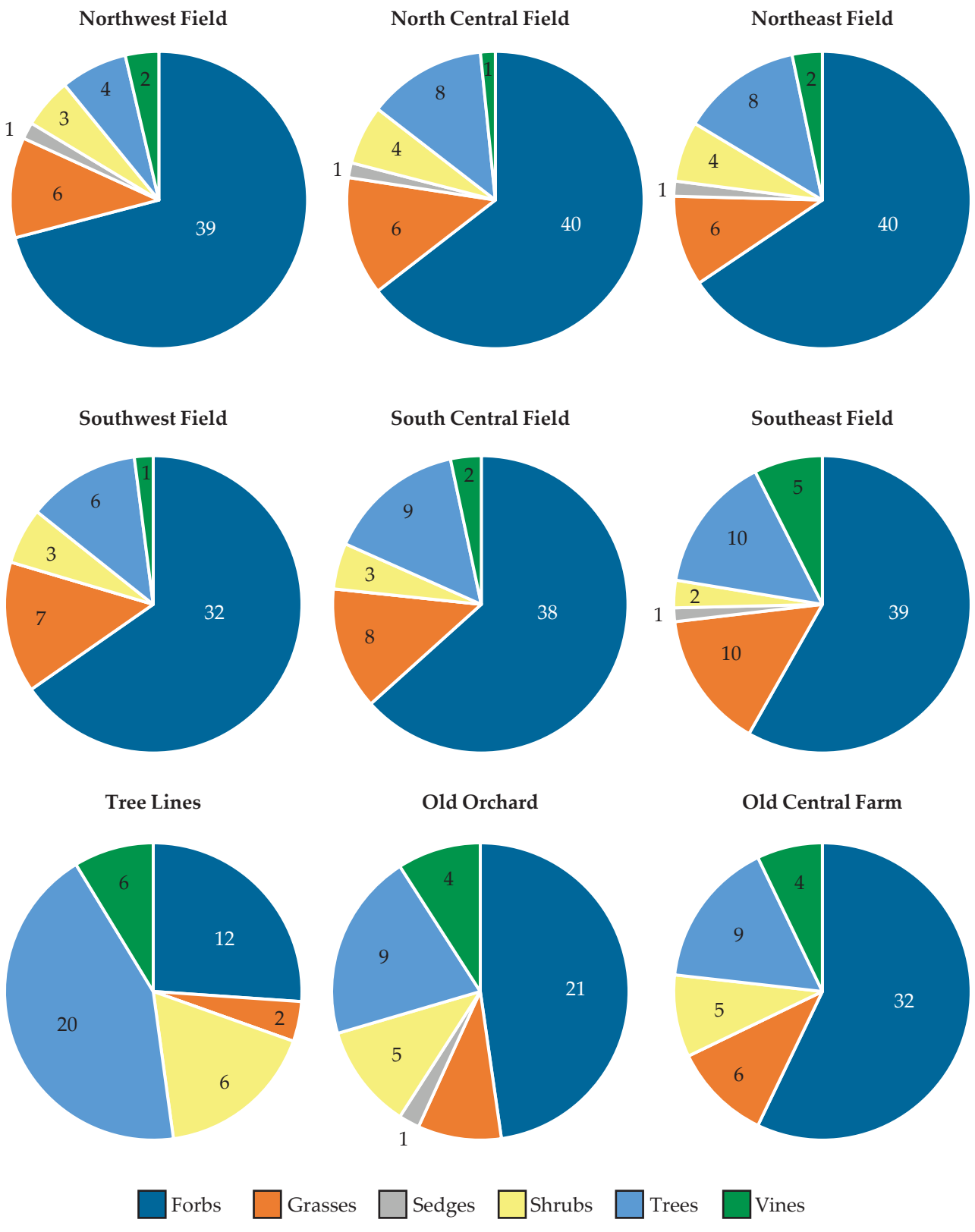


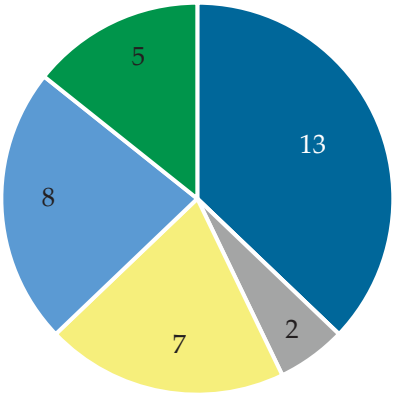
Figure 99. Vascular plant Floristic Quality Index (FQI) by habitat

Vascular Plant Physiognomy by Habitat

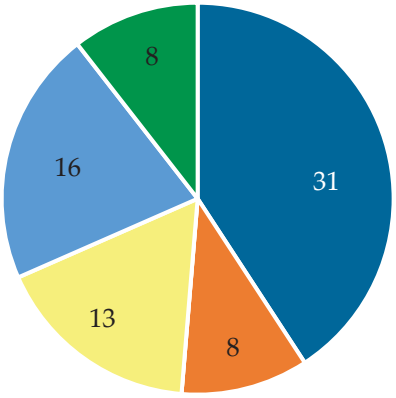


Vascular Plant Physiognomy by Habitat (continued)

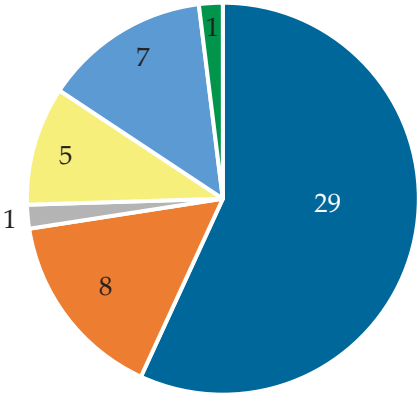
Central Farm Woods



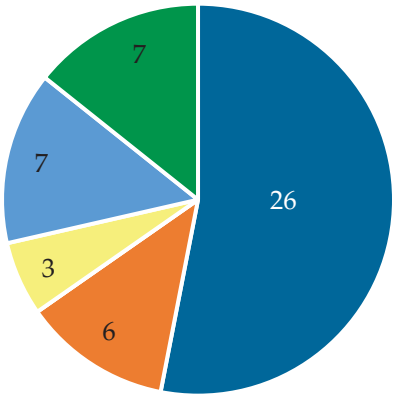
Manor Residence



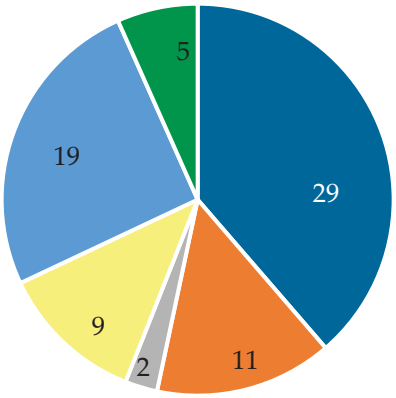
County Highway Dept.



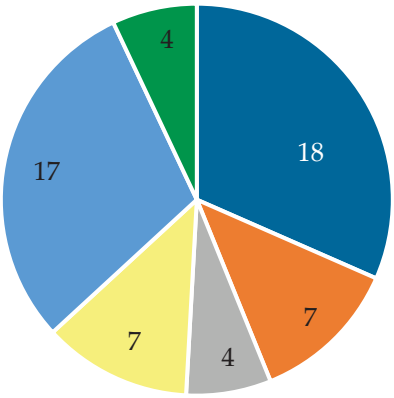
Chet Waggoner



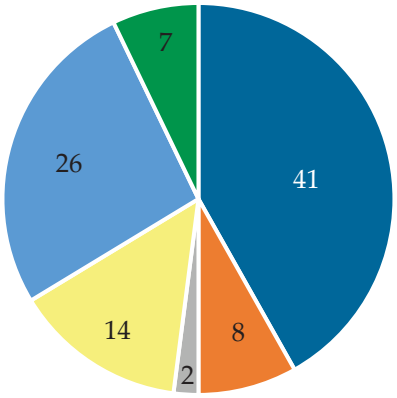
Early Successional Woods



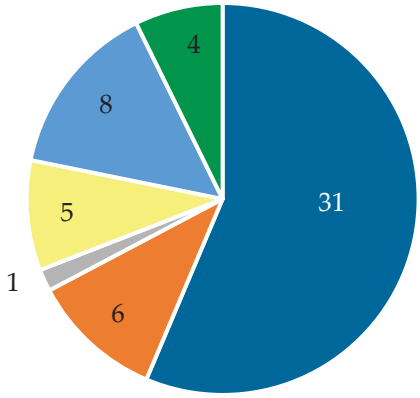
Ravine



Mesic Upland Woods & Slopes



Boland Slopes



Forbs Grasses Sedges Shrubs Trees Vines

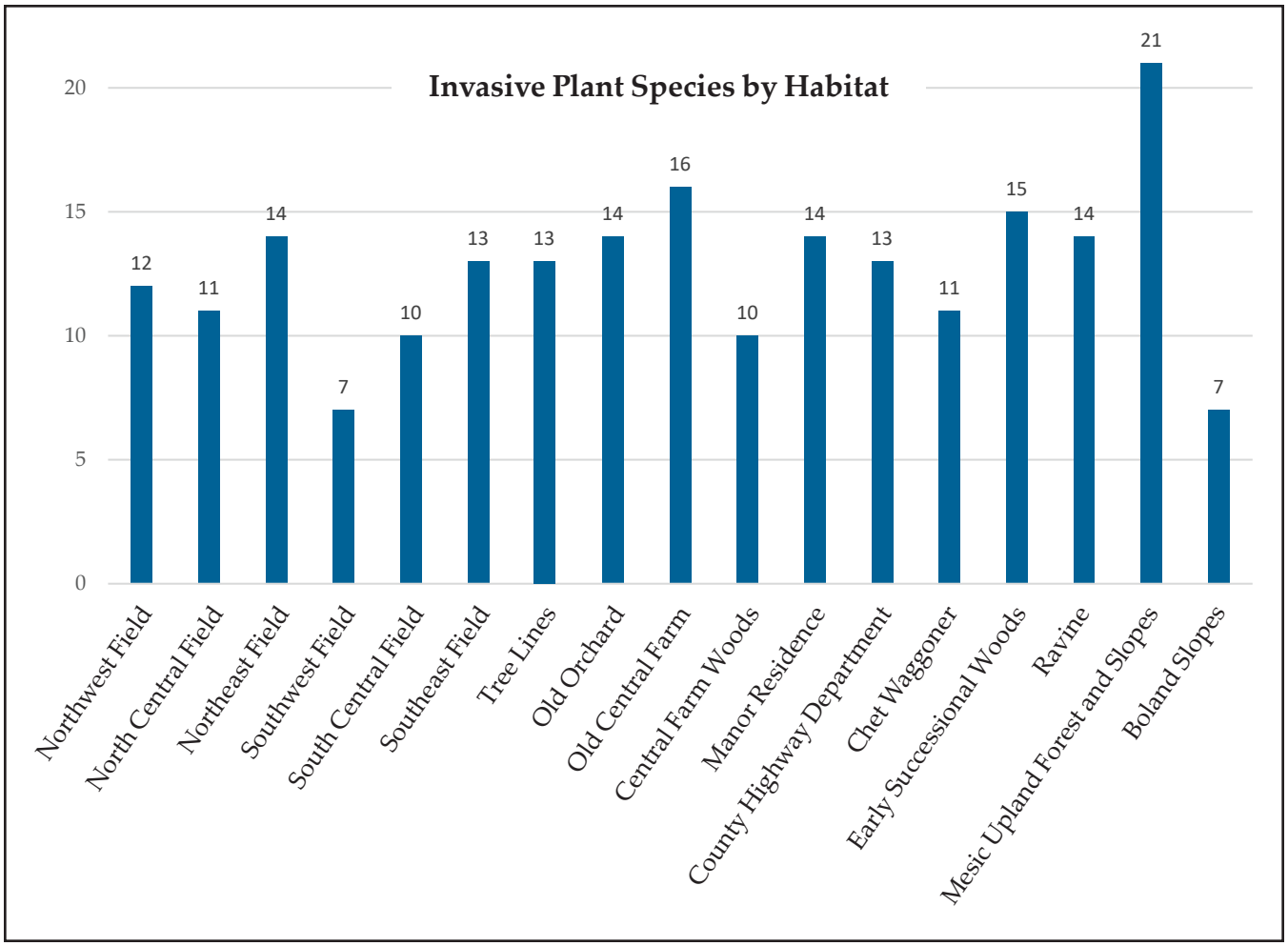


Figure 100. Number of invasive vascular plants by habitat

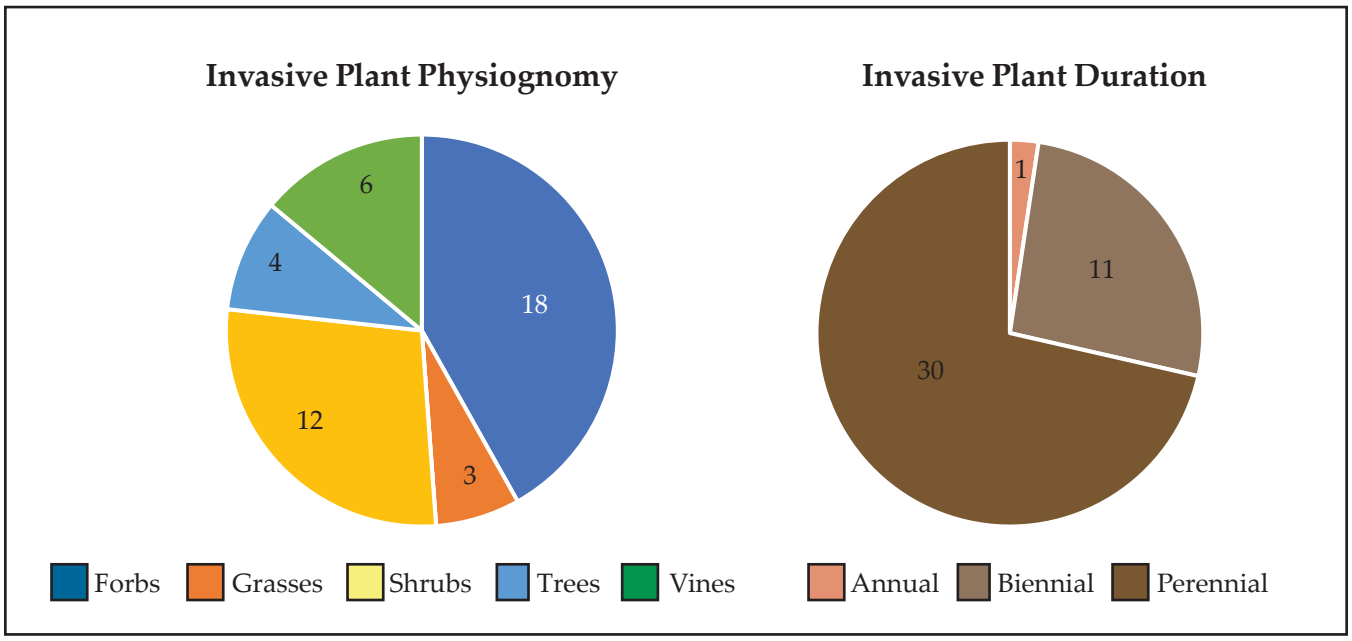


Figure 101. Physiognomy and duration of Portage Manor's invasive plants

Breeding Birds Surveys

Overview

The breeding bird surveys' purpose and objective is to assess the species and quantities of birds utilizing the Portage Manor property for reproduction. This information will provide land managers and decision-makers insight into which breeding bird species are currently using the property, impart a glimpse into the avian value of the land, and serve as baseline data for habitat management plans and future field surveys.

Methodology

Data collection followed two different methods. The primary method was fieldwork dedicated exclusively to observing breeding bird activity. From June 4 to June 29, we conducted five surveys covering 12.2 miles of accumulated tracks over 9.4 hours while covering as many habitats and ecotones as possible. The second method was recording incidental bird observations on trips when bird surveys were not our primary purpose (e.g., botanical inventories, habitat assessments, photography, etc.). Both methods observed and recorded bird behavior (e.g., singing, courtship behavior, active nests, etc.) to determine the likelihood of reproduction on the property. The primary bird surveys also recorded the number of individual birds from each species.

From this data, we compiled two different sets of results. The first, a "breeding bird atlas," utilizes a combination of protocols from the Indiana Department of Natural Resources (IDNR) and the Cornell University Lab of Ornithology to predict the likelihood of bird reproduction by species. From IDNR's most recent *Atlas of Breeding Birds of Indiana* (Castrale 2023), we obtained the breeding bird "safe dates" (i.e., the range of dates assigned to individual bird species when those respective species are conclusively within their breeding period). We also followed the Cornell Lab of Ornithology's most recent standards (i.e., codes) for reporting the likelihood of breeding bird activity based on behavioral observations (Cornell 2020). The second set of results, a compiled "meander count," ignores bird behavior and focuses strictly on the individual numbers of each bird species observed during the breeding season.

We augmented the data collection process with the latest technology for species identification. Following each meander, we compared our data with the results of an audio track from the survey analyzed by Cornell Lab of Ornithology's Merlin app to ensure the accuracy of audibly counted birds. Occasionally, the app suggested species and individuals undetected by the field observers. In these instances, we manually reviewed the recordings to determine the validity of the suggestions and adjusted the final results accordingly.

Results

The breeding bird surveys resulted in 259 individuals of 53 bird species observed on the Portage Manor property from June through August 2024. Following the Cornell Lab of Ornithology's guidelines, of the 53 species, 8 are "confirmed breeders," 20 qualify as "probably breeding," and an additional 20 species are "possibly breeding" on the property. The five remaining birds qualify as "observed," meaning their observations occurred on the property either as flyovers or outside their breeding safe dates. The five most abundant bird species observed were American Robin (56), Canada Goose (20), Song Sparrow (18), European Starling (17), and Red-winged Blackbird (15). In addition to the following tables, see Appendix D for the individual meander data and field notes.

Legend to Breeding Bird Atlas Evidence Codes (Cornell 2020)	
Observed	
F	Flyover — Birds flying high overhead or in direct flight
Possible	
H	Habitat — Adult in suitable nesting habitat during its breeding season
S	Singing —Birds that are singing, drumming, or utilizing other forms of mating calls
Probable	
S7	Singing bird present at same location on at least two occasions seven or more days apart
M	Multiple — Seven or more of a species singing or exhibiting territorial behavior within a block
P	Pair — Male and female observed in suitable nesting habitat
T	Territorial — Permanent territory presumed through defense by fighting or chasing
C	Courtship — Courtship behavior or copulation between a male and a female
N	Nest — Repeated visits to a probable nest site
A	Agitated — Agitated behavior or anxiety calls from adults indicating a nearby nest site or young
B	Building — Nest-building by wrens or excavation of cavities by woodpeckers
Confirmed	
PE	Physiological evidence of breeding based on a bird in the hand
CN	Carrying nest material
NB	Nest building (Other than woodpeckers or wrens)
DD	Distraction Display and injury feigning in attempt to draw intruder away from nests and young
UN	Used nest without adults present
ON	Occupied nest — Adult sitting in nest in incubating position, adult entering nest site, etc.
CF	Carrying food — Adult carrying food for young
FY	Feeding young — Adult feeding young who have left the nest
FS	Fecal sac — Adult carrying fecal sac or egg shell fragments
NE	Nest with eggs
NY	Nest with young

Portage Manor Breeding Bird Atlas — 2024						
SPECIES	EVIDENCE CODES				HIGH DATE COUNTS	SAFE DATES
	OB	PO	PR	CO		
Canada Goose		H			6/8/24	4/15–6/30
Wood Duck		H			6/29/24	5/1–6/30
Mallard		H			5/19/24	5/1–6/30
Rock Pigeon				ON	6/10/24	3/15–7/31
Mourning Dove		H			6/8/24	5/1–7/15
Chimney Swift			N		6/4/24	5/20–7/15

Portage Manor Breeding Bird Atlas — 2024						
SPECIES	EVIDENCE CODES				HIGH DATE COUNTS	SAFE DATES
	OB	PO	PR	CO		
Killdeer				FL	6/15/24	4/15–6/30
Great Blue Heron	F				6/29/24	5/15–7/15
Turkey Vulture		H			6/10/24	5/1–7/31
Red-tailed Hawk			P		7/15/24	4/15–7/31
Great Horned Owl	F				8/25/24	2/1–8/15
Belted Kingfisher	F				6/4/24	4/15–7/15
Red-bellied Woodpecker				FL	7/17/24	4/1–7/31
Downy Woodpecker			P		6/15/24	5/15–7/31
Hairy Woodpecker			P		6/8/24	5/15–7/31
Northern Flicker		H			6/15/24	5/15–7/31
Pileated Woodpecker		S			6/8/24	5/1–7/31
Great-crested Flycatcher		H			6/4/24	6/1–7/15
Eastern Kingbird		S			6/15/24	5/25–6/30
Eastern Wood-Pewee			S7		6/15/24	6/1–7/31
Willow Flycatcher		S			6/15/24	6/1–7/10
Eastern Phoebe		S			6/8/24	5/1–6/30
Warbling vireo		S			6/15/24	6/5–7/15
Red-eyed Vireo		S			6/15/24	5/25–6/30
Blue Jay			P		6/15/24	6/1–7/15
Black-capped Chickadee		S			6/21/24	5/1–7/15
Tufted Titmouse			S7		6/27/24	4/1–7/31
Tree Swallow			C		6/29/24	5/15–6/30
Northern Rough-winged Swallow		X			6/27/24	6/1–6/30
Barn Swallow		X			6/27/24	5/15–6/30
Cedar Waxwing	F				6/4/24	6/10–7/10
White-breasted Nuthatch			S7		6/15/24	5/10–7/31
Carolina Wren		S			6/4/24	5/1–7/31
House Wren			S7		6/15/24	5/20–6/30
Gray Catbird			S7		6/27/24	5/20–7/31
Northern Mockingbird		S			6/4/24	5/1–7/31
European Starling				ON	6/8/24	4/1–6/30
House Sparrow				ON	6/8/24	3/1–8/31
American Robin				FY	6/27/24	5/1–7/31

Portage Manor Breeding Bird Atlas — 2024						
SPECIES	EVIDENCE CODES				HIGH DATE COUNTS	SAFE DATES
	OB	PO	PR	CO		
House Finch	F				7/25/24	5/1–6/30
American Goldfinch				ON	8/1/24	6/15–8/31
Chipping Sparrow		S			6/28/24	5/10–7/31
Field Sparrow			S7		6/15/24	5/15–7/15
Song Sparrow			P		6/15/24	5/1–7/15
Orchard Oriole		S			6/15/24	5/25–7/5
Baltimore Oriole			P		6/29/24	5/25–7/5
Red-winged Blackbird			S7		6/15/24	5/1–6/30
Brown-headed Cowbird			S7		6/15/24	5/1–7/5
Common Grackle				CF	6/15/24	4/20–6/20
Northern Cardinal			S7		6/15/24	3/15–8/31
Rose-breasted Grosbeak			S7		6/21/24	6/5–7/15
Indigo Bunting			S7		6/15/24	6/1–7/31
TOTALS	**5**	**20**	**20**	**8**	**Species Observed: 53**	

Figure 102. American Goldfinch nest with young in the North Central Field on August 1, 2024

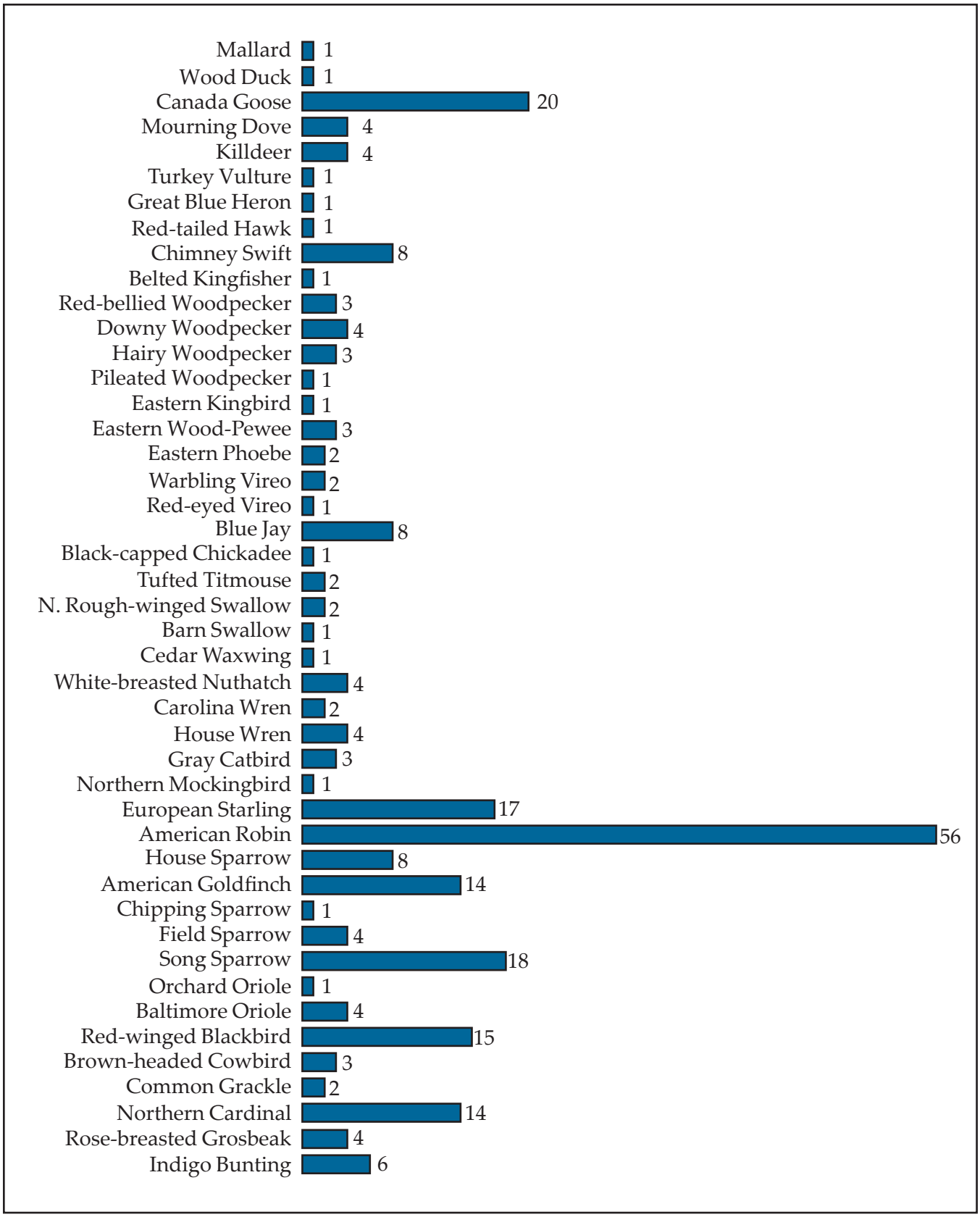


Figure 103. Species and quantities of birds observed on the meandering routes

Invertebrates

Overview

An inventory of invertebrates can provide additional insight into the health of the land. Invertebrates provide critical ecological functions as pollinators, predators, and prey, and they serve as a vital link between the property's primary producers (vegetation) and other species in the food web (i.e., consumers such as birds, reptiles, amphibians, and mammals). For the purposes of this study, invertebrates were secondary to plants and birds, and this report provides only an introductory glimpse into the property's invertebrate biodiversity.

Methodology

Invertebrate observations took on three forms. The first was incidental observations when invertebrate surveys were not the primary objective (such as while conducting bird or vegetation studies). The second was during invertebrate-specific meandering surveys, and due to time constraints, these surveys occurred only three or four times. The third method was a combination of white and black lights staged behind the manor's maintenance barn and left on all night to attract primarily moths. These surveys, which occurred approximately 12 times in July and August, relied upon revisiting the site each morning to photograph and identify the remaining invertebrates

Results

The invertebrate survey resulted in 72 taxa. The order *Lepidoptera* (butterflies and moths) accounted for the most species at 45, followed by *Hymenoptera* (bees, wasps, and ants) at 9, and *Odonata* (dragonflies and damselflies at 6). Most *Lepidoptera* observations came via the staged lights behind the maintenance garage.

Figure 104. (L–R) One-spotted variant (*Hypagyrtis unipunctata*), red-fringed emerald (*Nemoria bistriaria*), The Batman (*Coelostathma discopunctana*), Virginia tiger moth (*Spilosoma virginica*), two-banded petrophilia (*Petrophila bifascialis*), painted lichen moth (*Hypoprepia fucosa*)

Mammals

Over the course of the survey, we observed six species of mammals, all of which are presumed breeding on the Portage Manor property. White-tailed deer (*Odocoileus virginianus*) and groundhogs (*Marmota monax*) are frequent throughout, particularly in the old fields and Manor Residence, as are fox squirrels (*Sciurus niger*) and eastern chipmunks (*Tamias striatus*) in the wooded areas. Eastern cottontails (*Sylvilagus floridanus*) are occasional in the fields, and we recorded a solitary eastern gray squirrel (*Sciurus carolinensis*) in the wooded area adjacent to the Ravine.

Additional mammals likely to possibly occur on the property but not observed in this survey include Virginia opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), southern flying squirrel (*Glaucomys volans*), American red squirrel (*Tamiasciurus hudsonicus*), and various species of bats, mice, shrew, weasels and voles. North American beaver (*Castor canadensis*) and muskrat (*Ondatra zibethicus*) are notably extant at neighboring Pinhook Park.

Reptiles and Amphibians

Due to time constraints, we didn't specifically target reptiles or amphibians for this study, and the start date of June was too late for observing early-season breeding frogs, toads, and salamanders. The Ravine's terminal basin's ephemeral nature likely supports breeding amphibians, but further study is needed. As a result, we observed only one reptile, a DeKay's brown snake (*Storeria dekayi*), on August 25. Commissioner Derek Dieter also reported a common snapping turtle (*Chelydra serpentina*) in a flooded area of the Southeast Field.

Appendix E contains the entire list of non-bird faunal observations, including invertebrates, mammals, reptiles, and amphibians.

Fungi

Observers also recorded incidental fungi observations during the survey period. Appendix F contains the list of those taxa.

Figure 106. Pear-shaped puffballs (*Apioperdon pyriforme*) growing in the Ravine

Figure 105. DeKay's brown snake (*Storeia dekayi*) in the Old Orchard on August 25, 2024

Discussion

Following four months of research and field surveys at the Portage Manor property, we have obtained tremendous knowledge about past activities and empirical data on the present conditions. In this section, we will analyze the results and provide suggestions through an ecological lens for management strategies of how best to appreciate the property and steward its natural resources.

Location

Geographically, Portage Manor is well-situated for public access. Several nearby multi-use trails, including Riverside, Boland, and Portage Trails, connect the property to nearby parks, neighborhoods, and neighboring cities, and the South Bend Public Transportation Corporation's "Route 3B Portage" (TRANSPO) stops near the Manor's north and south entrances. According to data from the Global Human Settlement Layer population grid of 2025, just under 19,000 people live within a 3 km (1.86-mile radius) of Portage Manor (Maps.ie 2023).

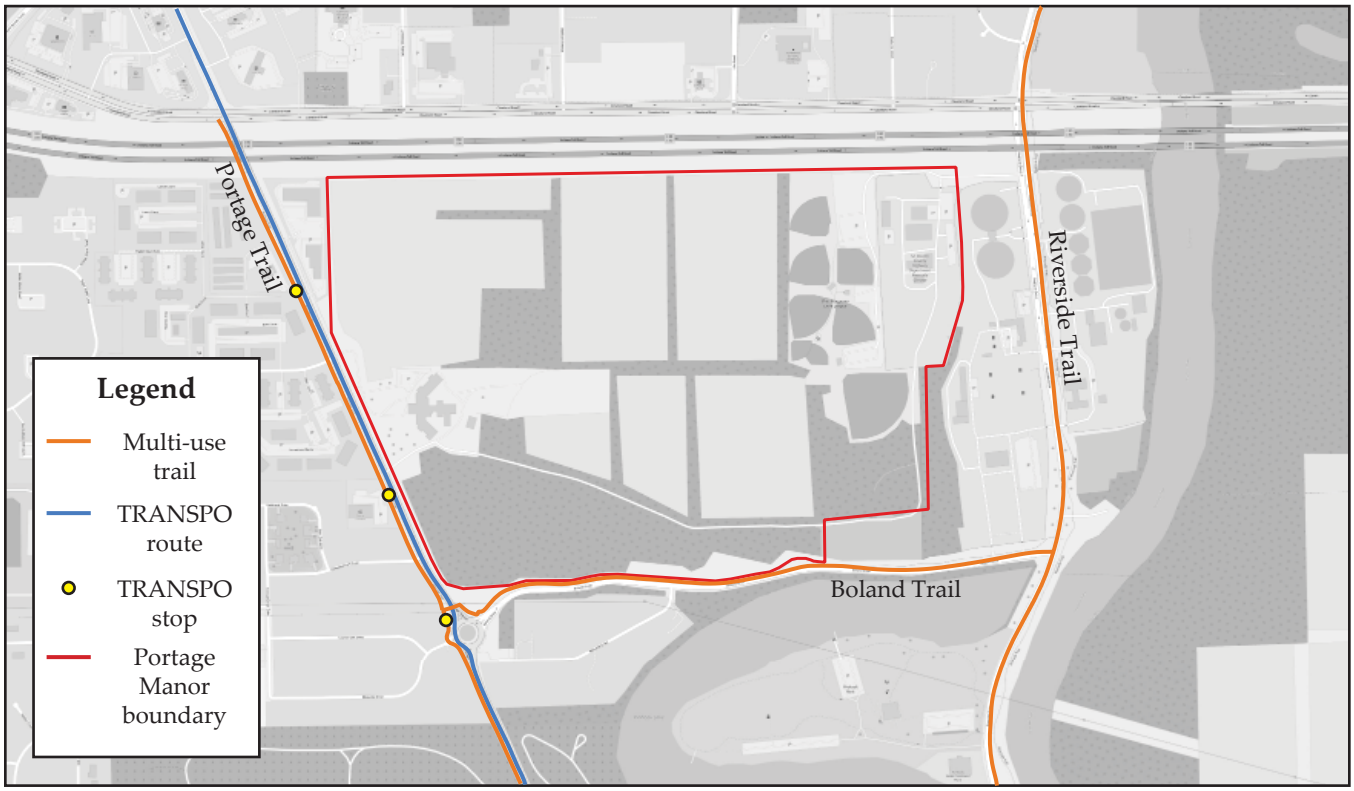


Figure 107. Public transportation and multi-use trails near Portage Manor

Geology and Natural History

Portage Manor is rich in geology and natural history. Situated on the edge of the Kalamazoo Moraine of the Lake Michigan Ice Lobe, its ravine, formed by an ancient proglacial meltwater channel running through the property, is a distinguishing feature along with its three levels of glacial outwash plains, which add visual interest to the property as it slopes towards the St. Joseph River Valley.

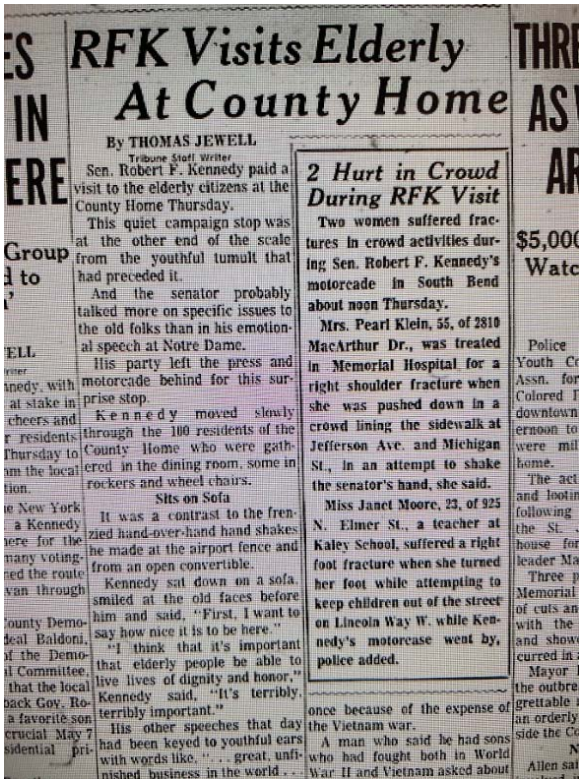
From the original township survey notes, soil maps, historical biographies, and early settlement maps, we know that just west of Portage Manor was the eastern extent of an extensive grassland called "The Portage Prairie." The Portage Prairie was one of several grasslands present in St. Joseph County at the time of European settlement, which included the massive Terre Coupee Prairie east of New Carlisle, Sumption Prairie near the intersection of Mayflower and Oak Roads, Harris Prairie near Granger, and Palmer Prairie near SR931 and Roosevelt Roads. Sadly, aside from a few remnant plants along railroad easements, these prairies are now extinct.

Figure 108. Fossilized remains of horn (rugose) coral (*Rugosa* sp.) dating to the Paleozoic Era from Portage Manor's ravine.

Prairie "restorations" and native pollinator landscapes are the current rage. In St. Joseph County, places such as Potato Creek State Park, Bendix Woods County Park, Lydick Bog Nature Preserve, the Harris Township Park at Elm Road, and South Bend's Fredericksen and Rum Village parks all contain native grassland plantings, but most of these areas were not historically grasslands. Given what we know about Portage Manor's soils and geography, we may conclude that a prairie recreation would be historically accurate for at least a portion of the property.

Cultural History

The areas in and around Portage Manor are culturally significant. For centuries, Native Americans used the historic portage as part of a substantial trade route. French explorers first set foot in Indiana nearby and allegedly held council with the Native American tribes here. Later, some of South Bend's founders settled here, and Jacob Studebaker, a member of one of the city's most famous families, owned a portion of the Portage Manor land. Later, the county home and farm represented a historic period in county and American history, including a 1968 visit by Robert Kennedy on the same day of the assassination of Dr. Martin Luther King Jr (Jewell 1968). The Portage Manor building is listed on the state and national registers of historic places (SBHPC 2023).



RFK Visits Elderly At County Home

By THOMAS JEWELL
Tribune Staff Writer

Sen. Robert F. Kennedy paid a visit to the elderly citizens at the County Home Thursday.

This quiet campaign stop was at the other end of the scale from the youthful tumult that had preceded it.

And the senator probably talked more on specific issues to the old folks than in his emotional speech at Notre Dame.

His party left the press and motorcade behind for this surprise stop.

Kennedy moved slowly through the 100 residents of the County Home who were gathered in the dining room, some in rockers and wheel chairs.

Sits on Sofa

It was a contrast to the frenzied hand-over-hand hand shakes he made at the airport fence and from an open convertible.

Kennedy sat down on a sofa, smiled at the old faces before him and said, "First, I want to say how nice it is to be here."

"I think that it's important that elderly people be able to live lives of dignity and honor," Kennedy said, "It's terribly, terribly important."

His other speeches that day had been keyed to youthful ears with words like, ". . . great, unfinished business in the world . . .

2 Hurt in Crowd During RFK Visit

Two women suffered fractures in crowd activities during Sen. Robert F. Kennedy's motorcade in South Bend about noon Thursday.

Mrs. Pearl Klein, 55, of 2810 MacArthur Dr., was treated in Memorial Hospital for a right shoulder fracture when she was pushed down in a crowd lining the sidewalk at Jefferson Ave. and Michigan St., in an attempt to shake the senator's hand, she said.

Miss Janet Moore, 23, of 925 N. Elmer St., a teacher at Kaley School, suffered a right foot fracture when she turned her foot while attempting to keep children out of the street on Lincoln Way W. while Kennedy's motorcade went by, police added.

once because of the expense of the Vietnam war.

A man who said he had sons who had fought both in World War II and Vietnam asked about

Figure 109. South Bend Tribune article mentioning Robert F. Kennedy's visit to Portage Manor on April 4, 1968.

Currently, there is very little commemoration of any of this history. Years ago, schoolchildren routinely took field trips to see the historic Council Oak in Highland Cemetery and learn about the portage while sitting in the bleachers at LaSalle Landing Park. Sadly, the old tree is no longer alive, and the infrastructure at LaSalle Landing Park has fallen into disrepair. None of the $56 million of the recent My South Bend Parks and Trails initiative went towards revitalizing LaSalle Landing or commemorating the portage at Pinhook Park.

Habitats

This study identified 17 distinct habitats and sub-habitats within the Portage Manor complex. Varying degrees of human activities have substantially impacted all of them. Since being allowed to go fallow, five of the six agriculture fields have turned into unchecked invasive plant nurseries. The cessation of agriculture without another plan for maintaining the land was ecologically reckless. The sixth field, currently used by the county highway department, was probably otherwise healthy and productive soil before being covered in road debris and lawn waste. The imported waste materials (e.g., leaves, etc.) also serve as a transportation vector for additional invasive plant and animal species. The Tree Lines provide habitat for nesting birds and conservation corridors but also harbor mature invasive trees, predominantly white mulberry (*Morus alba*). Like the agricultural fields, centuries of agriculture have heavily degraded the Old Central Farm, Central Farm Woods, Old Orchard, and Early Successional Woods, but years of intensive management could significantly improve their ecological health. The Ravine and the surrounding Mesic Woods and Slopes contain some remnant wetland plants and many large trees, but invasive vegetation threatens their well-being. As part of the Boland Trail project, the City of South Bend did a fine job of replanting the Boland Slopes with native grasses and forbs, but without management, the slopes will succeed back to forest. Aside from several remnant trees, the Manor Residence is a hodgepodge of cultivated, exotic landscape plants.

Vegetation Surveys

The vegetation surveys corroborate and quantify our habitat assessments. Of the 17 surveyed areas, only four (the Central Farm Woods, Ravine, Upland Mesic Woods and Slopes, and Boland Slopes) had a mean C of 1.5 or more, and only two (Ravine and Upland Mesic Woods and Slopes) had a Floristic Quality Index above 15. By comparison, the areas most impacted by human disturbance (Manor Residence, Old Central Farm, Chet Waggoner, and County Highway Department) scored the lowest in both mean C and FQI. Due to the cessation of row crops in 2021 and their subsequent fallowness, the former agricultural fields fell in the middle of the range, except for the Southeastern Field, which the county highway department began using as a dump.

Figure 110. The parastic plant ghost pipe (*Monotropa uniflora*) in the Upland Mesic Woods. (Derek Dieter photo)

The surveys also identified an alarming number of invasive plant species. According to an executive order signed by President Bill Clinton, an invasive species is "an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health" (Clinton 1999). Of the 126 aquatic and terrestrial plants identified by the Indiana Invasive Species Council as "invasive" in Indiana, over one-third are present on the Portage Manor campus (see Appendix C). These plants pose a threat not only to Portage Manor by displacing the native plants needed for ecosystem health and services but also to the neighboring communities where they readily spread.

Invasive plants aside, the surveys provide some reasons for optimism. The property contains many massive oaks (*Quercus* spp.), sycamores (*Platanus occidentalis*), black walnuts (*Juglans nigra*), and other native trees, primarily around the Ravine's edges and slopes, and where the Early Successional Woods meets the Chet Waggoner complex. The Ravine and surrounding areas also contain several plants of high

conservation value, including green arrow arum (*Peltandra virginica*), pawpaw (*Asimina triloba*), ghost pipe (*Monotropa uniflora*), bloodroot (*Sanguinaria canadensis*), and the state-threatened herb Robert (*Geranium robertianum*). After centuries of row crops, even the former agricultural fields show signs of hope as early and mid-successional native plants attempt to establish themselves amidst the pressure from invasive species.

Breeding Bird Surveys

The breeding bird surveys revealed a surprisingly large number of birds. With nearly 50 species either possibly, probably, or confirmed breeding on site, the surveys' numbers are more akin to those of a nature preserve than an old farm.

We may likely attribute the number of species to the diversity of the property's habitats. The forested areas of the Early Successional Woods and Upland Mesic Forest and Slopes provide habitat for woodland birds such as various species of woodpeckers, Eastern Wood-Pewees, Red-eyed Vireos, and others. The insect-filled former agriculture fields attract insectivores like swallows, Eastern Bluebirds, and Eastern Kingbirds while providing nesting habitat for Red-winged Blackbirds, Song Sparrows, and American Goldfinches. The woodland edges and Tree Lines support nesting Indigo Buntings, Red-tailed Hawks, Baltimore and Orchard Orioles, and Rose-breasted Grosbeaks. Even anthropogenic areas such as the Manor Residence and Southeast Field are home to breeding Chimney Swifts and Killdeer, respectively. Of additional note are two relatively uncommon and unexpected birds, a Northern Mockingbird in the Central Farm Woods and a recurring Great Horned Owl in and around the Ravine.

The property's location along the eastern edge of the former Portage Prairie may also be noteworthy. Historically, the Portage Prairie was likely home to many species of grassland-nesting birds, but as settlers converted it to farmland and later industry, populations of these birds declined. In the 1980s, before the construction of Blackthorn Golf Course and the development of the Nimtz Parkway industrial complex, the local chapter of the National Audubon Society began monitoring breeding bird populations. As the area became developed, the society noted a precipitous decline in the numbers of grassland birds such as Bobolinks, Dickcissels, Grasshopper Sparrows, Eastern Meadowlarks, and the Indiana State Endangered Upland Sandpipers, Sedge Wrens, and Henslow's Sparrows.

On the western edge of the South Bend International Airport lies an area known as Bendix Meadows. Bendix Meadows is a former landfill situated within the confines of the airport property. Its status as a capped landfill dictates the airport authority maintain the area as a grassland, allowing it to be the last remaining vestige of grassland in the former Portage Prairie. Unfortunately, the landscape is now almost entirely comprised of exotic Eurasian vegetation, but the size and structure of the plants (low-growth, non-dense grasses and forbs) provide suitable habitat for the declining grassland birds who continue to return each spring to breed. Because it serves as a critical bird habitat, the National Audubon Society and BirdLife International designated Bendix Meadows as an "Important Bird Area," a place with the "greatest significance for the conservation of the world's birds and the wildlife they need to thrive" (BLI 2021, NAS 2024, Sanchez 2015).

Figure 111. Male Dickcissel atop barbed wire fence at Bendix Meadows

Given its proximity to the Portage Prairie and Bendix Meadows, if the former agriculture fields at Portage Manor were maintained as grassland, the property could potentially attract and serve as an

additional breeding site for the declining grassland birds. Conversely, should the property become divided and the former agricultural fields developed into businesses or housing, it is reasonable to predict that bird species diversity would decline as the Eastern Bluebirds, Red-winged Blackbirds, Eastern Kingbirds, Field Sparrows, and the three swallow species would likely no longer have suitable habitat.

Additional Fauna

White-tailed Deer

Although counting their numbers was not part of the survey, white-tailed deer (*Odocoileus virginianus*) were impossible to overlook as they were virtually everywhere on the property. In the mornings and evenings, we frequently observed groups of them grazing on the grass of the Manor Residence. Surveys of the agricultural fields often revealed bedding areas, and while conducting vegetation and breeding bird surveys, we inadvertently but routinely flushed them from nearly all 17 identified habitats, and seeing up to seven at a time was not uncommon

Inevitably, the question becomes. "how many deer are too many?" The answer to that is not simple. In fact, according to a publication by Purdue University, there is no clear-cut answer because the number of deer a habitat can support varies tremendously and depends on factors such as forest composition, age, size, etc. (Brooke et al. 2024).

The website wildlifehelp.org, led by the Northeast Wildlife Damage Management Research and Outreach Cooperative, provides additional insight. They describe three distinct types of carrying capacity.

- Ecological carrying capacity is the maximum number of deer an area can withstand without inflicting damage to the ecosystem. For example, deer overbrowsing a plant relied upon by other wildlife can impact those species and others who depend upon them for survival. Deer overbrowse of sapling trees can also adversely affect forest regeneration.

- Cultural carrying capacity is the population limit people are willing to tolerate in their communities. Vehicular collisions and landscape damage are two of the contributing factors.

- Biological carrying capacity is the maximum number of deer a given ecosystem can supply enough food to sustain. Exceeding this level leads to starvation. However, the capacity may be augmented by artificial food sources.

Figure 112. White-tailed deer in the Northwest Field

The website provides additional insight into the relationship between deer populations and the three types of carrying capacity. As deer populations rise, the ecological capacity is

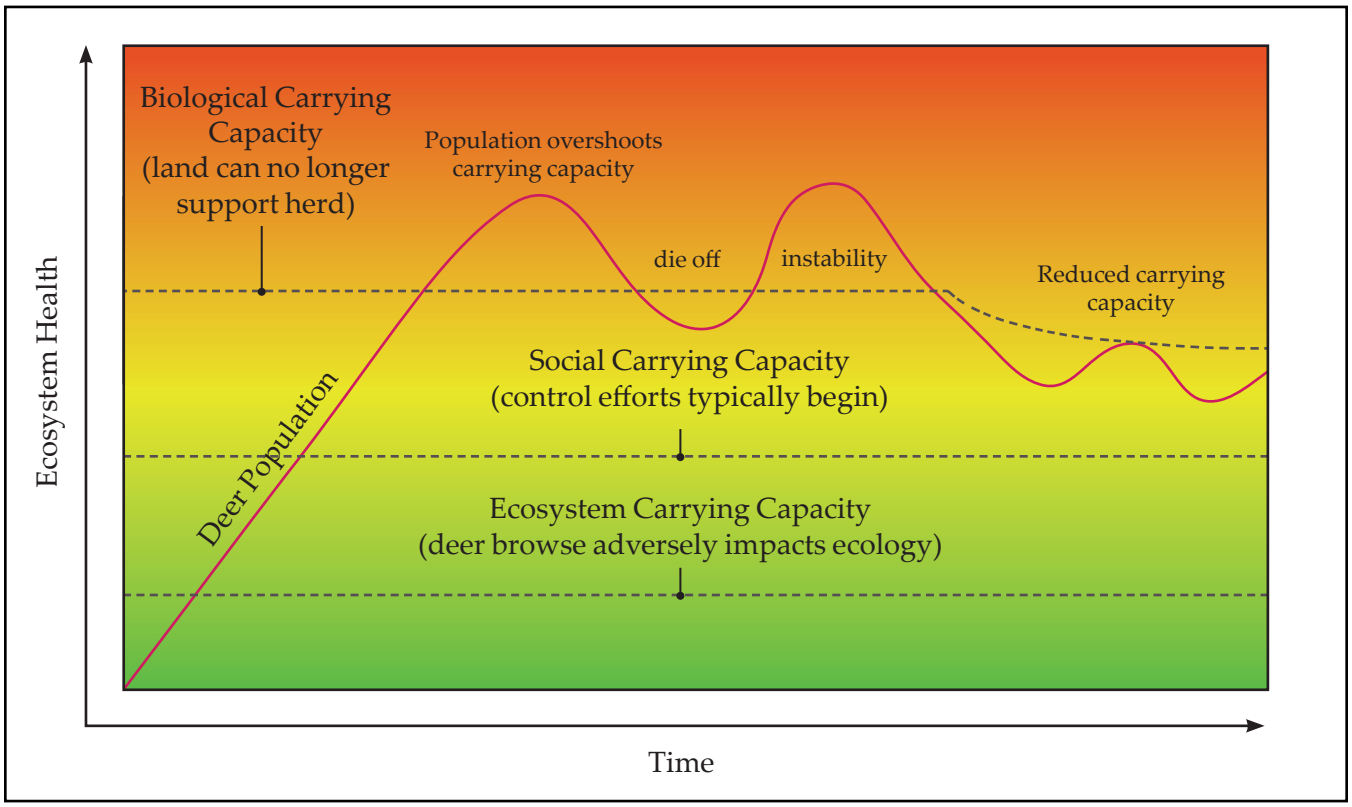


Figure 113. Carrying capacity of white-tailed deer with relation to time and herd size

the first to be compromised, but most deer management strategies do not commence until the population reaches the cultural carrying capacity, which is when people typically begin to take notice.

t is difficult to answer whether Portage Manor's deer population has exceeded some or all of the area's carrying capacities. Given that centuries of agriculture has disturbed so much of the property, the deer are arguably the least of concern, but to date, there are no known studies on the size or impact of the herd within Portage Manor. The cessation of farming likely benefitted the deer by providing additional habitat, likely resulting in a population increase. Anecdotally, we've observed deer in the surrounding neighborhoods, including regularly at nearby Woodlawn Park, and on August 29, 2024, a young male died in the front lawn of the Manor Residence, apparently as a result of a vehicular collision.

Developing some or all of the property would impact the deer herd. Due to the fencing along the property's northern and east sides, the natural barrier of the Pinhook Lagoon to the south, and the abundance of food and shelter, the Portage Manor's deer herd is essentially contained within the property's boundaries. The presence of industrial machinery and traffic will cause the deer to scatter into the protected areas and likely into the surrounding neighborhoods, increasing pressure on the social carrying capacity.

Groundhogs

Groundhogs (*Marmota monax*), also called woodchucks and whistle pigs, are another animal species currently thriving at Portage Manor, particularly in the former agricultural fields and Manor Residence. Considered a "keystone species," groundhogs play a critical role in the ecosystem by aerating the soil, influencing plant species composition, and providing burrows for secondary animals such as snakes, skunks, and foxes. In the fields and margins of Portage Manor, these environmentally significant animals are not pests but rather natural ecosystem engineers.

Invertebrates

Although our fieldwork didn't intensely target invertebrates, it still produced some noteworthy observations. Only three years fallow, the former agricultural fields already contain an abundance of pollinating and predatory insects, including 46 documented species of butterflies, bees, wasps, dragonflies, and other invertebrates, including an regionally uncommon skipper and a declining bumblebee. At a time when pollinator decline fueled by habitat loss and pesticide use is a global concern, these fields harbor increasing amounts of them.

Impact of Development

Should part or all of Portage Manor become open to commercial or residential development, we can expect substantial damages to the property's ecological health and well-being. In addition to the before-mentioned impacts on breeding bird habitat and displacement of white-tailed deer, 21st-century human development brings forth additional threats. Although agriculture has modified the property's soils, it has not obliterated their natural structure like heavy construction would. Human development almost assuredly also brings additional exotic plants, many of which become invasive and damaging to our cities, towns, and neighborhoods. Monocultures of ecologically barren turf grasses and their associated environmentally harmful fertilizers, herbicides, and pesticides are societal norms. Native wildlife such as groundhogs, moles, chipmunks, and mice become targetted as pests and are subsequently trapped or poisoned with rodenticides, thus impacting birds of prey and other natural predators. Mosquito abatement services typically use non-selective pesticides that poison fireflies, butterflies, bees, and other beneficial insects, many of whom are also impacted by light pollution associated with human habitation. Impervious surfaces such as rooftops, streets, and parking lots decrease the surface area for stormwater absorption, which also contains road salts, motor vehicle fluids, fertilizer runoff, and other contaminants, eventually draining into artificially constructed ponds. These and other matters are the environmental prices of "progress."

The Value of Public Open Spaces

Thus far, this study's focus has concentrated on evaluating the ecological and historical significance of the Portage Manor property, but what about its value to the human residents of St. Joseph County? Numerous studies support the importance of open lands to the health and well-being of growing communities such as St. Joseph County (Geoghegan 2002, IDNR 2019, McConnell and Walls 2005). The property's 119 acres of predominantly pervious surfaces and vegetated areas adjacent to the St. Joseph River provide opportunities for passive recreation activities, likely aid in stormwater absorption and filtration, sequester carbon, promote biodiversity, and help mitigate the impacts of climate change.

According to the St. Joseph County Park Department's most recent master plan, the residents of St. Joseph County desire more open lands. Chapter 3, "Current Needs," states that community input expressed a desire for "more natural spaces and natural-space programming" and "additional connections between neighborhood trails and parks." In the community survey section of the plan, 62% of respondents indicated they would like "more natural areas/preservation, 60% expressed a desire for more "natural/rustic trails," and 50% would like the park department to "acquire more property for parks" (Rundell Ernstberger Associates 2024: 49–61).

The State of Indiana's 2021-2025 Statewide Comprehensive Outdoor Recreation Plan (SCORP) provides metrics on the recommended amount of open public space per capita based on standards created in a national publication by the Urban Land Institute (Mertes and Hall 1996). The state plan recommends a ratio of 20 acres of locally owned land and 35 acres of state/federally owned land, totaling 55 acres of outdoor recreation land per 1000 residents (IDNR 2019). According to the report, St. Joseph County surpasses

the recommended total recreation land (no doubt due to Potato Creek State Park). However, at the time of printing, the locally owned (i.e., county, city, township, land trust) land was 1983.56 acres below the recommended guidelines, making the county the third worst in the state below Marion and Hamilton Counties (IDNR 2019).

The City of South Bend's Venues Parks & Arts 2021–2025 Master Plan Update uses a similar metric. Their standard, developed by the Park Board of Commissioners, calls for maintaining 12.5 acres of city parks per 1000 residents. With a population of 102,302 and 1296 acres of parkland, they report a ratio of 12.69 acres per 1000 residents, which yields a surplus of .19 acres/1000 residents (Rundell Ernstberger Associates 2024: 84). However, their reported 1296 acres also appears to include the city's three golf courses, which are closed to non-golfers for nine months of the year, and Wheelock Park, which is leased to the Izaak Walton League and closed to the public. Subtracting those approximately 575 acres leaves a difference of 721 acres, or 7.05 acres per 1000 residents of non-golfing/non-Izaak Walton League members, or a deficit of 5.45 acres per 1000 residents.

Figure 114. Sign posted at Elbel Park declaring it off-limits to non-golfers

The Prospect of Parkland

Frequently asked questions during this study included, "Is this property suitable for parkland?" and "Who would operate it?" This section will discuss the ecological feasibility of converting the Portage Manor property into a managed, semi-natural space.

From the perspective of a nature preserve, this property falls short of some of the standard benchmarks. The botanical quality of the various habitats is well below the threshold of being an undisturbed natural remnant. This study found no endangered species and only one Indiana State Rare plant, and every one of the 17 identified habitats faces challenges from invasive plants.

From a county or city park perspective, Portage Manor would require a significant investment to meet the current standards. For example, it lacks rental shelters, restrooms, playgrounds, sports courts, and other amenities typically associated with city or county parks. In addition, the dozens of acres of former agricultural fields need immediate attention, and getting the invasive plants under control will take years of focused work and dedication. This type of work is rarely a priority and typically outside of the capacity or expertise of most county and municipal park departments.

Negatives aside, advocates can make valid arguments for preserving and renaturalizing the land. At approximately 82 acres, the property's undeveloped areas represent some of the largest remaining unprotected and undeveloped land in South Bend. Portage Manor's location within an urban area and its proximity to trails make it accessible to thousands of people by foot or bicycle. It is rich in natural and cultural history, and its variety of habitats makes it an oasis for wildlife and a potential haven for passive recreation, including hiking, nature studies, bird watching, and dog walking. As evidenced by the county park system's current master plan (Rundell Ernstberger Associates 2024) and the Indiana State

Comprehensive Outdoor Recreation Plan (IDNR 2019), residents desire and support more natural areas and rustic trails.

The answer to the question of who would manage and operate the land lies outside of this study's scope. Perhaps it is most congenial to state that the local parks and land trusts are aware of the potential opportunity, and further questions regarding their levels of interest should be directed to those entities and organizations, respectively.

Earth's Biodiversity Crisis

On September 15, 2024, The South Bend Chapter of the Wild Ones native plant advocacy organization, in collaboration with other area partners, hosted Dr. Douglas Tallamy at the University of Notre Dame. Dr. Tallamy is a professor of entomology and wildlife ecology at the University of Delaware and the author of several well-known books, including *Bringing Nature Home: How You Can Sustain Wildlife with Native Plants*, T*he Nature of Oaks: The Rich Ecology of Our Most Essential Native Trees*, and *Nature's Best Hope: A New Approach to Conservation That Starts in Your Yard*.

Dr. Tallamy's talk was titled "Start a New Habitat: Homegrown National Park." In this presentation, Doug described the Earth's current biodiversity crisis and blamed human landscape choices for some of it. He referenced the late biologist Edward O. Wilson's 1996 book *Half Earth: Our Planet's Fight for Life*, in which Wilson boldly predicted that if humans are to stave off extinction, including our own, we must set aside one-half of Earth for nature.

Thanks to advocates such as Tallamy and Wilson, there is greater awareness of the need for ecologically responsible landscaping and the urgency to preserve natural remnants and convert degraded properties into wildlife habitat. In his book *Nature's Best Hope: A New Approach to Conservation That Starts in Your Yard*, Tallamy wrote, "Although we must continue to protect good habitat wherever it still exists, we can no longer afford to ignore the ecological value of the land outside of our preserves — that is, the areas between isolated habitat fragments," and "Restoring habitat where we live and work, and to a lesser extent where we farm, and graze, will go a long a way toward building biological corridors that connect preserved habitat fragments with one another" (Tallamy 2019).

With 82 acres of undeveloped public land, given proper stewardship, Portage's Manor could be well-positioned to help combat biodiversity loss and improve the health and well-being of St. Joseph County and its residents..

Figure 115. Doug Tallamy speaking on the importance of preserving nature at Univerity of Notre Dame on September 15, 2024.

Conclusion

Ecologically speaking, Portage Manor is a property with both considerable challenges and promising opportunities. After nearly two centuries of agriculture, with little to no ecological stewardship, invasive plants are a substantial problem that will not be quick, easy, or inexpensive to mitigate. Allowing the fields to go fallow exasperated the problem exponentially. On the other hand, the property contains some centuries-old remnant trees, has geology unique to the area, and supports a diverse variety of breeding birds and other wildlife, including a recovering population of invertebrates.

The property's size and range of habitats are responsible for its bird diversity. Consisting of open fields, tree lines, woods, and wetlands, Portage Manor supports a surprising number of breeding birds from various families. Decreasing the property's size and types of habitats will almost certainly adversely affect bird populations and diversity.

The Portage Manor property is also rich in natural and cultural history. Situated near the St. Joseph River on the edge of the Kalamazoo Moraine of the Lake Michigan Lobe of the Laurentide Ice Sheet, the property offers compelling geology, including a remnant ancient proglacial meltwater stream. Culturally, the nearby portage trail is of extreme historical significance, but in recent decades, its notoriety has seemingly diminished as it's lacked community investment. Several of South Bend's founders, including one of the five famous Studebaker brothers, owned portions of the Portage Manor land, and the story of the St. Joseph County home and farm bears commemoration for posterity.

The property's size is perhaps its greatest ecological asset. At nearly 120 combined acres, it represents an oasis for wildlife in a county rapidly losing open spaces to industrial development. If that trend continues, places like Portage Manor will become increasingly rare and valuable. Its unfragmented habitat provides terrestrial wildlife the opportunity to travel throughout the property without the danger of collisions with cars and other potentially lethal human interactions such as trapping and poisoning.

Portage Manor will never be an untarnished natural remnant, but with dedicated stewardship and proper management, it could become an ecologically healthy urban oasis and a community asset for future generations.

Mangement Recommendations

To improve the ecological health of the Portage Manor property, we recommend the following actions:

Fall/Winter 2024–2025

- Begin removing the invasive shrubs bush honeysuckle (*Lonicera* spp.), burning bush (*Euonymus alatus*), wintercreeper (*Euonymus fortunei*), privet (*Ligustrum* spp.), Japanese barberry (*Berberis thunbergii*), common buckthorn (*Rhamnus cathartica*), autumn olive (*Elaeagnus umbellata*), and Chinese spindle tree (*Euonymus bungeanus*) from the Ravine, Mesic Upland Woods and Slopes, Central Farm Woods, Early Successional Woods, and other areas as resources allow.
- Begin removing manageable-sized invasive trees from the areas listed above, including white mulberry (*Morus alba*), Siberian elm (*Ulmus pumilla*), tree-of-Heaven (*Ailanthus altissima*), and Norway maple (*Acer platanoides*) as resources allow.

- Begin drafting a long-term management plan for the property, including an integrated vegetation pest management plan documenting the worst infestations, and create strategies for removal. Procure funding for 2025 mitigation efforts.

Spring/Summer 2025

- Aggressively target the most egregious invasive plants in former agricultural fields, including but not limited to Canada thistle (*Cirsium canadense*), bull thistle (*Cirsium vulgare*), and poison hemlock (*Conium maculatum*).
- Monitor and treat infestations of garlic mustard (*Alliaria petiolata*) and dames rocket (*Hesperis matronalis*) in wooded and semi-wooded areas. Treat resprouts of woody plants cut over the winter.

Areas of Additional Study

Due to time and budgetary constraints, this study focused primarily on habitat assessment, plant inventory/floristic quality assessment, and breeding bird activity. Additional areas of study for the Portage Manor property could include:

- **Continuation of breeding bird surveys** — The surveys performed by this study are typically repeated annually for at least five years (breeding bird atlas) and ongoing (meander counts).
- **Non-breeding bird surveys** — Spring and fall migrant counts and overwintering bird counts would be additional datasets useful for habitat management.
- **Expanded invertebrate inventories** — The 2024 studies contained primarily incidental observations and semi-targeted nocturnal insect activity. More targeted surveys would provide a more accurate assessment of the property's invertebrates.
- **Spring plant surveys** — Although some of this study's data came from 2021, most data collecting didn't commence until June 2024. Undoubtedly, there are additional spring-growing plants yet to be discovered, particularly in the wooded areas.
- **Amphibian and reptile studies** — As mentioned in this report, we didn't target amphibians and reptiles in this study as the start date of June was too late to monitor spring breeding frogs.
- **Water quality monitoring** — A significant amount of stormwater flows through the Portage Manor Ravine, and some of it seasonally remains in the terminal basin. To our knowledge, there is no monitoring of the contaminants in the stormwater, which could impact the property's plant and animal life, particularly amphibians.
- **Archeological studies** — Areas of Portage Manor such as the Early Successional Woods, Ravine, Mesic Upland Woods and Slopes, and Central are rich in cultural history and potentially contain artifacts and mysteries left by human habitation. Partnering with a university archeology program or archeology professional would reveal details about these areas beyond the scope of this report.
- **Geological studies** — The ravine contains a variety of rocks, fossils, and human-made materials such as brick and drain pipes. A professional geologist or university geology program could clarify the identification and origin of the materials.
- **Bat surveys** — Comprehensive bat surveys were outside of this report's scope. Specialized biologists typically perform these surveys, which can be cost-prohibitive.

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Appendix A — Master Plant Inventory

Legend to Master Plant Inventory Table						
Form	The plant's physiological form					
F = forb	G = grass	R = rush	S = sedge	SH = shrub	T = tree	V= Vine
Dur	Duration: the plant's life cycle					
A = annual		B = biennial		P = perennial		
Freq	Frequency: The plants relative abundance on the property					
R = rare	O = occasional	F = frequent	C = common	A = abundant		
Additionally, the "L" designation stands for "locally." When used, indicates a species' presence may be concentrated or restricted to certain areas of the property						
Ori	Origin: the nativity of the species					
N = native to northern Indiana	E = exotic, non-native to northern Indiana, adventive	EI = Exotic and designated as invasive by the State of Indiana				
C	Coefficient of conservatism (0–10). See Vegetation Surveys section for more information.					
W	Coffefficent of wetness (-2–2). Indicates a plants tolerance for wetness.					

Master Plant Inventory								
Taxonomic Name	**Common Name**	**Family**	**Form**	**Dur**	**Freq**	**Ori**	**C**	**W**
Abutilon theophrasti	velvetleaf	*Malvaceae*	F	A	R	E	0	1
Acalypha rhomboidea	three-seeded mercury	*Eurphobiaceae*	F	A	R	N	0	1
Acer negundo	box elder	*Sapindaceae*	T	P	F	N	0	0
Acer platanoides	Norway maple	*Sapindaceae*	T	P	LF	EI	0	0
Acer sacchqrum	sugar maple	*Sapindaceae*	T	P	R	N	5	1
Acer saccharinum	silver maple	*Sapindaceae*	T	P	LO	N	1	-1
Achillea millefolium	yarrow	*Asteraceae*	F	P	O	E	0	1
Agastache nepetoides	giant yellow hyssop	*Lamiaceae*	F	P	O	N	5	1
Agertina altisima	white snakeroot	*Asteraceae*	F	P	O	N	3	1
Agrimonia gryposepala	tall agrimony	*Rosaceae*	F	P	R	N	2	1
Ailanthus altissima	tree-of-heaven	*Simaroubaceae*	T	P	O	EI	0	1
Alliaria petiolata	garlic mustard	*Brassicaceae*	F	B	O	EI	0	0
Allium canadense	meadow garlic	*Liliaceae*	F	P	R	N	3	1
Alliumn vineale	field garlic	*Liliaceae*	F	P	R	E	0	1
Ambrosia artemisiifolia	annual ragweed	*Asteraceae*	F	A	O	N	0	1
Ambrosia trifida	giant ragweed	*Asteraceae*	F	A	R	N	0	0
Ampelopsis brevipedunculata	porcelain berry	*Vitaceae*	V	P	R	EI	0	2

Master Plant Inventory								
Taxonomic Name	**Common Name**	**Family**	**Form**	**Dur**	**Freq**	**Ori**	**C**	**W**
Andropogon virginicus	broom sedge	*Poaceae*	G	P	R	N	1	1
Apocynum cannabinum	Indian hemp	*Apocynaceae*	F	P	O	N	2	0
Arctium minus	lesser burdock	*Asteraceae*	F	B	O	E	0	1
Artemisia vulgare	mugwort	*Asteraceae*	F	P	O	EI	0	2
Asclepias syriaca	common milkweed	*Asclepiadaceae*	F	P	O	N	0	1
Asclepia tuberosa	butterfly milkweed	*Asclepiadaceae*	F	P	O	N	8	2
Asclepias verticillata	whorled milkweed	*Asclepiadaceae*	F	P	LO	N	1	1
Asimina triloba	pawpaw	*Annonaceae*	T	P	LF	N	10	0
Barbarea vulgaris	yellow rocket	*Brassicaceae*	F	B	O	E	0	0
Berberis thunbergii	Japanese barberry	*Berberdiaceae*	F	P	LF	EI	0	1
Berteroa incana	hoary alyssum	*Brassicaceae*	F	A	R	E	0	2
Bidens frondosa	common beggar's ticks	*Asteraceae*	F	A	LO	N	1	-1
Bromus inermis	smooth brome	*Poaceae*	G	P	F	E	0	1
Bromus tectorum	cheatgrass	*Poaceae*	G	P	O	E	0	2
Calystegia sepium	hedge bindweed	*Convovulaceae*	F	P	O	N	1	0
Cardamine concatenata	cutleaf toothwort	*Brassicaceae*	F	P	LO	N	5	1
Cardamine hirsuita	hairy bittercress	*Brassicaceae*	F	P	F	E	0	0
Carex blanda	eastern woodland sedge	*Cyperaceae*	S	P	LO	N	1	0
Carex cephalaphora	oval-leaf sedge	*Cyperaceae*	S	P	R	N	5	1
Carex frankii	bristly cattail sedge	*Cyperaceae*	S	P	R	N	4	-2
Carex pensylvanica	Pennsylvania sedge	*Cyperaceae*	S	P	LO	N	5	2
Carex radiata	eastern star sedge	*Cyperaceae*	S	P	R	N	5	2
Carex stipata	awl-fruited sedge	*Cyperaceae*	S	P	LO	N	4	-2
Carex vulpinoidea	fox sedge	*Cyperaceae*	S	P	LO	N	2	-1
Carya cordiformis	bitternut hickory	*Juglandaceae*	T	P	O	N	5	1
Carya ovalis	red hickory	*Juglandaceae*	T	P	R	N	6	1
Carya ovata	shagbark hickory	*Juglandaceae*	T	P	R	N	5	1
Catalpa speciosa	northern catalpa	*Bignoniaceae*	T	P	O	E	0	1
Celastrus orbiculatus	Oriental bittersweet	*Celastraceae*	V	P	O	EI	0	2
Celtis occidentalis	northern hackberry	*Ulmaceae*	T	P	LF	N	2	0
Centaurea stoebe	spotted knapweed	*Asteraceae*	F	P	O	EI	0	2
Cercis canadensis	eastern redbud	*Fabaceae*	T	P	O	N	5	1
Cichorium intybus	chicory	*Asteraceae*	F	P	O	E	0	1
Cinna arundinacea	sweet wood reed	*Poaceae*	G	P	LO	N	5	-1
Cirsium arvense	Canada thistle	*Asteraceae*	F	B	C	EI	0	1
Cirsium discolor	field thistle	*Asteraceae*	F	B	R	N	3	1
Cirsium vulgare	bull thistle	*Asteraceae*	F	B	C	EI	0	1
Commelina communis	Asiatic dayflower	*Commelinaceae*	F	A	R	E	0	1

Master Plant Inventory								
Taxonomic Name	**Common Name**	**Family**	**Form**	**Dur**	**Freq**	**Ori**	**C**	**W**
Conium maculatum	poison hemlock	*Apiaceae*	F	B	F	EI	0	-1
Convallaria majalis	lily-of-the-valley	*Liliaceae*	F	P	R	E	0	2
Convolvulus arvensis	field bindweed	*Convovulaceae*	F	P	O	EI	0	2
Crepis capillaris	smooth hawksbeard	*Asteraceae*	F	A	LF	E	0	1
Cyperus strigosus	straw-colored flatsedge	*Cyperaceae*	S	P	LO	N	1	-1
Dactylis glomerata	orchard grass	*Poaceae*	G	P	C	E	0	1
Datura stramonium	jimsonweed	*Solanaceae*	F	A	R	E	0	2
Daucus carota	Queen Anne's lace	*Apiaceae*	F	P	F	EI	0	2
Desmodium paniculatum	panicled-leaf tree tickfoil	*Fabaceae*	F	P	O	N	6	1
Dianthus armeria	Depford pink	*Caropyllaceae*	F	P	O	E	0	2
Dichanthelium clandestinum	deer tongue grass	*Poaceae*	G	P	R	N	4	1
Digitaria sanguinalis	hairy crab grass	*Poaceae*	G	A	LF	E	0	1
Dipsacus fullonum	common teasel	*Dipsacaceae*	F	B	O	EI	0	1
Dipsacus laciniatus	cutleaf teasel	*Dipsacaceae*	F	B	O	EI	0	2
Echinacea purpurea	purple coneflower	*Asteraceae*	F	P	LO	N	10	2
Echinoloa crus-galli	barnyard grass	*Poaceae*	G	P	O	N	0	-1
Elaeagnus umbellata	autumn olive	*Elaeagnaceae*	SH	P	R	EI	0	2
Eleusine indica	goosegrass	*Poaceae*	G	A	LF	E	0	1
Elymus canadensis	Canada wild rye	*Poaceae*	G	P	O	N	4	1
Elymus virginicus	Viginia wild rye	*Poaceae*	G	P	R	N	5	1
Eragrostis cilianensis	stink grass	*Poaceae*	G	A	R	E	0	1
Erigeron annuus	daisy fleabane	*Asteraceae*	F	A	F	N	0	1
Erigeron philadelphicus	Philadelphia fleabane	*Asteraceae*	F	P	R	N	4	-1
Erigeron canadensis	marestail	*Asteraceae*	F	A	F	N	0	1
Euonymus alatus	burning bush	*Celastraceae*	SH	P	LF	EI	0	2
Euonymus bungeanus	Chinese spindle tree	*Celastraceae*	SH	P	R	E	0	2
Euonymus fortunei	wintercreeper	*Celastraceae*	SH	P	LO	EI	0	2
Eupatorium altissimum	tall boneset	*Asteraceae*	F	P	O	N	0	2
Eupatorim pefoliatum	common boneset	*Asteraceae*	F	P	R	N	4	-2
Eupatorium serotinum	late boneset	*Asteraceae*	F	P	F	N	0	0
Euphorbia dentata	toothed spurge	*Eurphobiaceae*	F	A	R	E	0	2
Euthamia graminifolia	grass-leaved goldenrod	*Asteraceae*	F	P	LO	N	4	`1
Eutrochium maculatum	spotted Joe Pye weed	*Asteraceae*	F	P	R	N	5	-2
Eutrochium purpureum	purple Joe Pye weed	*Asteraceae*	F	P	R	N	6	0
Fallopia scandens	climbing false buckwheat	*Polygonaceae*	V	P	O	N	3	0
Festuca rubra	red fescue	*Poaceae*	G	P	LF	E	0	1

Master Plant Inventory								
Taxonomic Name	**Common Name**	**Family**	**Form**	**Dur**	**Freq**	**Ori**	**C**	**W**
Fraxinus americana	white ash	*Oleaceae*	T	P	O	N	5	1
Fraxinus pennslyvanica	green ash	*Oleaceae*	T	P	O	N	4	1
Galium aparine	cleavers	*Rubiaceae*	F	A	F	N	0	1
Geranium robertianum	herb Robert	*Geraniaceae*	F	P	R	N	5	2
Geum canadense	white avens	*Rosaceae*	F	P	F	N	1	0
Glechoma hederacea	creeping Charlie	*Lamiaceae*	F	P	LF	EI	0	1
Gleditsia triacanthos	honey locust	*Fabaceae*	T	P	O	N	1	1
Hackelia virginiana	stickseed	*Boraginaceae*	F	P	O	N	1	1
Helianthus tuberosus	Jerusalem-artichoke	*Asteraceae*	F	P	LF	N	3	1
Hesperis matronalis	dame's rocket	*Brassicaceae*	F	B	O	EI	0	1
Hordeum jubatum	fox-tail barley	*Poaceae*	G	P	LO	N	0	0
Humulus japonicus	Japanese hops	*Cannabaceae*	V	A	LF	EI	0	1
Hieracium caespitosum	meadow hawkweed	*Asteraceae*	F	P	LO	E	0	2
Hypericum perforatum	common St. John's wort	*Clusiaceae*	F	P	O	EI	0	1
Ilex opaca	American holly	*Aquifoleaceae*	SH	P	R	E	0	1
Juglans nigra	black walnut	*Juglandaceae*	T	P	O	N	3	1
Juncus tenuis	path rush	*Juncaceae*	R	P	F	N	0	0
Juniperus virginiana	eastern red cedar	*Cupressaceae*	T	P	R	N	0	1
Lactuca serriola	prickly lettuce	*Asteraceae*	F	B	R	E	0	1
Lamium purpureum	purple dead nettle	*Lamiaceae*	F	A	O	E	0	2
Lathyrus latifolius	everlasting pea	*Fabaceae*	F	P	R	E	0	2
Leersia oryzoides	rice cut grass	*Poaceae*	G	P	LC	N	3	-2
Leontodon saxatilis	lesser hawkbit	*Asteraceae*	F	P	LO	E	0	2
Leonurus cardiaca	motherwort	*Lamiaceae*	F	P	O	E	0	2
Lepidium virginicum	common peppergrass	*Brassicaceae*	F	A	F	N	0	1
Leucanthemum vulgare	ox-eye daisy	*Asteraceae*	F	P	O	E	0	2
Ligustrum obtusifolium	border privet	*Oleaceae*	SH	P	R	EI	0	2
Ligustrum ovalifolium	California privet	*Oleaceae*	SH	P	R	EI	0	N
Ligustrum vulgare	common privet	*Oleaceae*	SH	P	O	EI	0	1
Linaria vulgaris	yellow toadflax	*Scrophulariaceae*	F	P	R	E	0	2
Lobelia siphilitica	great blue lobelia	*Campanulaceae*	F	P	R	N	4	-2
Lolium perenne	perennial rye grass	*Poaceae*	G	P	LF	E	0	1
Lonicera maackii	Amur honeysuckle	*Caprifoliaceae*	SH	P	F	EI	0	2
Lonicera morrowii	Morrow's honeysuckle	*Caprifoliaceae*	SH	P	O	EI	0	1
Lonicera tatarica	Tatarian honeysuckle	*Caprifoliaceae*	SH	P	O	EI	0	1
Lythrum salicaria	purple loosestrife	*Lythraceae*	F	P	R	EI	0	-2
Maclura pomifera	Osage orange	*Moraceae*	T	P	R	E	0	1
Magnolia lilifora	lily magnolia	*Magnoliaceae*	T	P	R	E	0	N

Master Plant Inventory								
Taxonomic Name	**Common Name**	**Family**	**Form**	**Dur**	**Freq**	**Ori**	**C**	**W**
Malus pumila	apple	*Rosaceae*	T	P	R	E	0	2
Malva neglecta	common mallow	*Malvaceae*	F	B	R	E	0	2
Medicago lupulina	black medic	*Fabaceae*	F	A	LF	E	0	1
Melilotus albus	white sweet clover	*Fabaceae*	F	B	F	EI	0	2
Melilotus officinalis	yellow sweet clover	*Fabaceae*	F	B	F	EI	0	2
Menispermum canadense	Canadian moonseed	*Menispermaceae*	V	P	R	N	5	0
Monarda fistulosa	bee balm	*Lamiaceae*	F	P	LO	N	4	1
Monotropa uniflora	ghost pipe	*Monotropaceae*	F	P	R	N	7	1
Morus albus	white mulberry	*Moraceae*	T	P	F	EI	0	0
Muhlenbergia schreberi	nimblewill	*Poaceae*	G	P	LF	N	0	0
Myosoton aquaticum	giant chickweed	*Caropyllaceae*	F	P	F	E	0	-1
Narcissus pseudo-narcissus	daffodill	*Amaryllidaceae*	F	P	R	E	0	2
Nepeta cataria	catnip	*Lamiaceae*	F	P	R	E	0	2
Oenothera biennis	evening primrose	*Onagraceae*	F	B	O	N	0	1
Ostrya virginiana	hop hornbearm	*Betulaceae*	T	P	LO	N	5	1
Oxalis dillenii	slender wood sorrel	*Fabaceae*	F	P	O	N	0	1
Packera glabella	butterweed	*Asteraceae*	F	A	O	E	0	-1
Panicum dichotomiflorum	fall panic grass	*Poaceae*	G	A	LO	N	0	-1
Panicum virgatum	switch grass	*Poaceae*	G	P	LO	N	3	0
Parthenocissus quinquefolia	Virginia creeper	*Vitaceae*	V	P	O	N	4	1
Parthenocissus tricuspidata	Boston ivy	*Vitaceae*	V	P	LF	E	0	2
Peltandra virginica	green arrow-arum	*Araceae*	F	P	LO	N	10	-2
Persecaria hydropiper	waterpepper	*Polygonaceae*	F	A	LO	N	2	-2
Persicaria maculosa	lady's thumb	*Polygonaceae*	F	A	LF	E	0	-1
Persicaria virginiana	jumpseed	*Polygonaceae*	F	P	F	N	4	0
Phalaris arundinacea	reed canary grass	*Poaceae*	G	P	LF	EI	0	-1
Phleum pratense	Timothy	*Poaceae*	G	P	O	E	0	1
Phragmites australis ssp. australis	common reed	*Poaceae*	G	P	LF	EI	0	-1
Phytolacca americana	pokeweed	*Phytolaccaeae*	F	P	O	N	0	1
Picea abies	Norway spruce	*Pinaceae*	T	P	R	E	0	2
Pilea pumila	Canadian clearweed	*Urticaceae*	F	A	O	N	2	-1
Plantago lanceolata	English plantain	*Plantaginaceae*	F	P	F	E	0	1
Plantago major	great plantain	*Plantaginaceae*	F	P	O	E	0	0
Platanus occidentalis	American sycamore	*Platanaceae*	T	P	LO	N	5	-1

Master Plant Inventory								
Taxonomic Name	**Common Name**	**Family**	**Form**	**Dur**	**Freq**	**Ori**	**C**	**W**
Poa pratensis	Kentucky bluegrass	*Poaceae*	G	P	C	E	0	0
Podophyllum peltatum	mayapple	*Berberidaceae*	F	P	LO	N	4	1
Polanisia dodecandra	clammyweed	*Cleomaceae*	F	A	R	N	0	2
Populus deltoides	cottonwood	*Salicaceae*	T	P	O	N	0	0
Portulaca oleracea	common purslane	*Portulaceae*	F	A	R	E	0	1
Potentilla indica	Indian strawberry	*Rosaceae*	F	P	C	E	0	1
Prunella vulgaris ssp. vulgaris	self heal	*Lamiaceae*	F	P	O	E	0	0
Prunus serotina	black cherry	*Rosaceae*	T	P	F	N	0	1
Prunus serrulata	Japanese cherry	*Rosaceae*	T	P	R	E	0	N
Pseudognaphalium obtusifolium	rabbit tobbaco	*Asteraceae*	F	A	LO	N	2	2
Pseudotsuga menziesii	Douglas fir	*Pinaceae*	T	P	R	E	0	N
Pyrus calleryana	Callery pear	*Rosaceae*	T	P	R	EI	0	2
Quercus alba	white oak	*Fagaceae*	T	P	O	N	5	1
Quercus macrocarpa	bur oak	*Fagaceae*	T	P	R	N	5	0
Quercus muhlenbergii	chinkapin oak	*Fagaceae*	T	P	R	N	8	1
Quercus rubra	northern red oak	*Fagaceae*	T	P	O	N	5	1
Quercus velotina	black oak	*Fagaceae*	T	P	R	N	5	2
Ranunculus hispidus var. nitidus	bristly buttercup	*Ranunculaceae*	F	P	O	N	5	0
Ratibida pinnata	grey-headed coneflower	*Asteraceae*	F	P	LO	N	5	0
Rhamnus cathartica	common buckthorn	*Rhamnaceae*	SH	P	LF	EI	0	0
Rhus aromatica	fragrant sumac	*Anacardiaceae*	SH	P	R	N	9	2
Rhus glabra	smooth sumac	*Anacardiaceae*	SH	P	O	N	1	2
Rhus hirta	staghorn sumac	*Anacardiaceae*	T	P	LF	N	1	2
Robinia pseudoacacia	black locust	*Fabaceae*	T	P	R	E	0	1
Rosa multiflora	multiflora rose	*Rosaceae*	SH	P	O	EI	0	1
Rubus allegheniensis	Alleghany blackberry	*Rosaceae*	SH	P	O	N	3	1
Rubus flagellaris	common dewberry	*Rosaceae*	SH	P	R	N	5	1
Rubus occidentalis	black raspberry	*Rosaceae*	SH	P	F	N	0	2
Rudbeckia hirta	black-eyed Susan	*Asteraceae*	F	P	LO	N	1	1
Rumex crispus	curly dock	*Polygonaceae*	F	P	O	E	0	0
Rumex obtusifolius	bitter dock	*Polygonaceae*	F	P	F	E	0	-1
Salix nigra	black willow	*Salicaceae*	T	P	O	N	5	-2
Sanguinaria canadensis	bloodroot	*Papaveraceae*	F	P	R	N	5	1
Saponaria officinalis	bouncing bet	*Caryophyllaceae*	F	P	O	EI	0	1
Sassafra albidum	sassafras	*Lauraceae*	T	P	O	N	3	1

Master Plant Inventory								
Taxonomic Name	**Common Name**	**Family**	**Form**	**Dur**	**Freq**	**Ori**	**C**	**W**
Schedonorus arundinaceus	tall fescue	*Poaceae*	G	P	LF	EI	0	2
Schizachyrium scoparium	little bluestem	*Poaceae*	G	P	LO	N	5	1
Schoenoplectus tabernaemontani	soft-stemmed bulrush	*Cyperaceae*	S	P	LO	N	3	-2
Scirpus atrovirens	dark green bulrush	*Cyperaceae*	S	P	LO	N	4	-2
Scirpus cyperinus	cottongrass bulrush	*Cyperaceae*	S	P	LO	N	6	-2
Scrophularia marilandica	late figwort	*Scrophulariaceae*	F	P	LO	N	4	1
Securigera varia	crown vetch	*Fabaceae*	F	P	O	EI	0	2
Senecio hieraciifolius	American burnweed	*Asteraceae*	F	A	O	N	0	0
Seteria faberi	Japanese bristle grass	*Poaceae*	G	A	LF	E	0	1
Setaria pumila	yellow foxtail	*Poaceae*	G	A	LF	E	0	0
Seteria viridis	green foxtail	*Poaceae*	G	A	LO	E	0	2
Sisymbrium altissimum	tall hedge mustard	*Brassicaceae*	F	P	O	E	0	1
Smilax herbacea	smooth carrion flower	*Smilacaceae*	F	P	R	N	1	0
Smilax rotundifolia	greenbrier	*Smilacaceae*	V	P	R	N	5	0
Solanum carolinense	Carolina horsenettle	*Solanaceae*	F	P	O	E	0	1
Solanum dulcamara	bittersweet nightshade	*Solanaceae*	F	P	O	E	0	0
Solidago altissima	tall goldenrod	*Asteraceae*	F	P	LF	N	1	1
Solidago canadensis	Canada goldenrod	*Asteraceae*	F	P	LF	N	1	1
Solidago juncea	early goldenrod	*Asteraceae*	F	P	R	N	3	2
Solidago rigida	stiff goldenrod	*Asteraceae*	F	P	LO	N	3	1
Solidago rugosa	rough-leaved goldenrod	*Asteraceae*	F	P	LO	N	6	0
Sonchus asper	spiny sowthistle	*Asteraceae*	F	A	O	E	0	1
Sorghastrum nutans	Indian grass	*Poaceae*	G	P	LO	N	5	1
Sorghum halepense	Johnson grass	*Poaceae*	G	P	R	EI	0	1
Spiraea japonica	Japanese spirea	*Rosaceae*	SH	P	R	E	0	2
Stellaria media	common chickweed	*Caryophyllaceae*	F	A	O	E	0	1
Symphyotrichum pilosum	frost aster	*Asteraceae*	F	P	O	N	0	1
Syringa vulgaris	common lilac	*Oleaceae*	SH	P	R	E	0	2
Taraxacum officinale	dandelion	*Asteraceae*	F	P	F	E	0	1
Taxus cuspidata	Japanese yew	*Taxaceae*	S	P	R	N	0	2
Teucrium canadense	American germander	*Lamiaceae*	F	P	LO	N	3	-1
Thuja occidentalis	eastern white cedar	*Cupressaceae*	T	P	R	N	0	-1
Tilia americana	basswood	*Tiliaceae*	T	P	LO	N	5	1
Torilis japonica	Japanese hedge parsley	*Apiaceae*	F	P	R	EI	0	2
Toxicodendron radicans	poison ivy	*Anacardiaceae*	V	P	O	N	2	0

Master Plant Inventory								
Taxonomic Name	**Common Name**	**Family**	**Form**	**Dur**	**Freq**	**Ori**	**C**	**W**
Tradescantia ohioensis	Ohio spiderwort	*Commelinaceae*	F	P	LO	N	3	1
Tragopogon dubius	yellow goat's beard	*Asteraceae*	F	B	LO	E	0	2
Tragopogon pratensis	common goat's beard	*Asteraceae*	F	B	LO	E	0	2
Tridens flavus	purple top	*Poaceae*	G	P	O	E	0	2
Trifolium pratense	red clover	*Fabaceae*	F	P	O	E	0	1
Trifolium repens	white clover	*Fabaceae*	F	P	O	E	0	1
Typa x glauca	hybrid cattail	*Typhaceae*	F	P	LO	EI	0	-2
Ulmus americana	American elm	*Ulmaceae*	T	P	O	N	3	-1
Ulmus pumila	Siberian elm	*Ulmaceae*	T	P	O	EI	0	2
Ulmus rubra	slippery elm	*Ulmaceae*	T	P	R	N	4	0
Urtica dioica ssp. gracilis	stinging nettle	*Urticaceae*	F	P	O	N	1	-1
Verbascum blattaria	moth mullein	*Scrophulariaceae*	F	P	LO	E	0	1
Verbascum thapsus	common mullein	*Scrophulariaceae*	F	B	LF	E	0	2
Verbena bracteata	creeping vervain	*Verbenaceae*	F	A	R	E	0	1
Verbena urticifolia	white vervain	*Verbenaceae*	F	P	LF	N	2	0
Verbesina alternifolia	wingstem	*Asteraceae*	F	P	LF	N	5	-1
Vernonia gigantea	smooth tall ironweed	*Asteraceae*	F	P	LO	N	4	0
Viburnum dentatum	southern arrowwood	*Caprifoliaceae*	S	P	R	E	0	0
Viburnum lantana	wayfaring tree	*Caprifoliaceae*	SH	P	R	E	0	2
Viburnum prunifolium	blackhaw viburnum	*Caprifoliaceae*	SH	P	R	N	5	1
Vicia sativa	common vetch	*Fabaceae*	F	A	O	E	0	1
Vicia villosa	winter vetch	*Fabaceae*	F	A	R	E	0	2
Vinca minor	periwinkle	*Apocynaceae*	SH	P	LF	EI	0	2
Viola odorata	sweet violet	*Violaceae*	F	P	LO	E	0	2
Viola sororia	common blue violet	*Violaceae*	F	P	LO	N	3	0
Vitis riparia	riverbank grape	*Vitaceae*	V	P	F	N	1	-1
Vitis vulpina	frost grape	*Vitaceae*	V	P	O	N	5	0
Xanthium spinosum	cocklebur	*Asteraceae*	F	A	LO	E	0	1

Four additional ornamental plants at Manor Residence identified only to genus:

- *Chaenomeles* sp.
- *Crataegus* sp. (hawthorn)
- *Iris* sp. (ornamental iris)
- *Malus* sp. (ornamental crab)

Appendix B — Plant Inventory by Habitat

Northwest Field	
Taxonomic Name	**Common Name**
Ailanthus altissima	tree-of-heaven
Ambrosia artemisiifolia	annual ragweed
Andropogon virginicus	broom sedge
Apocynum cannabinum	Indian hemp
Asclepias syriaca	common milkweed
Asclepias tuberosa	butterfly milkweed
Asclepias verticillata	whorled milkweed
Carex frankii	bristly cattail sedge
Cirsium arvense	Canada thistle
Cirsium discolor	field thistle
Cirsium vulgare	bull thistle
Crepis capillaris	smooth hawksbeard
Conium maculatum	poison hemlock
Dactylis glomerata	orchard grass
Daucus carota	Queen Anne's lace
Desmodium paniculatum	panicled-leaf tree tickfoil
Erigeron annuus	daisy fleabane
Erigeron canadensis	marestail
Eupatorium serotinum	late boneset
Euthamia graminifolia	grass-leaved goldenrod
Geum canadense	white avens
Hypericum perforatum	common St. John's wort
Juncus tenuis	path rush
Lonicera morrowii	Morrow's honeysuckle
Melilotus officinalis	yellow sweet clover
Persicaria virginiana	jumpseed
Phragmites australis ssp. australis	common reed
Phytolacca americana	pokeweed
Plantago lanceolata	English plantain
Plantago major	great plantain
Potentilla indica	Indian strawberry
Prunus serotina	black cherry
Pseudognaphalium obtusifolium	rabbit tobbaco
Rosa multiflora	multiflora rose
Rubus occidentalis	black raspberry

Northwest Field	
Taxonomic Name	**Common Name**
Senecio hieraciifolius	American burnweed
Saponaria officinalis	bouncing bet
Seteria faberi	Japanese bristle grass
Seteria viridis	green foxtail
Solanum carolinense	Carolina horsenettle
Solidago altissima/canadensis	tall/Canada goldenrod
Solidago juncea	early goldenrod
Solidago rugosa	rough-leaved goldenrod
Sonchus asper	spiny sowthistle
Taraxacum officinale	dandelion
Toxicodendron radicans	poison ivy
Tragopogon pratensis	common goat's beard
Tridens flavus	purple top
Trifolium pratense	red clover
Trifolium repens	white clover
Ulmus americana	American elm
Ulmus pumila	Siberian elm
Verbascum blattaria	moth mullein
Verbascum thapsus	common mullein
Verbena urticifolia	white vervain
Vitis riparia	riverbank grape

North Central Field	
Taxonomic Name	**Common Name**
Acer negundo	boxelder
Agrimonia gryposepala	tall agrimony
Ailanthus altissima	tree-of-heaven
Ambrosia artemisiifolia	annual ragweed
Arctium minus	lesser burdock
Apocynum cannabinum	Indian hemp
Asclepias syriaca	common milkweed
Asclepias verticillata	whorled milkweed
Bromus inermis	smooth brome
Cichorium intybus	chicory
Cirsium arvense	Canada thistle
Cirsium discolor	field thistle
Cirsium vulgare	bull thistle
Crepis capillaris	smooth hawksbeard

North Central Field	
Taxonomic Name	**Common Name**
Conium maculatum	poison hemlock
Dactylis glomerata	orchard grass
Daucus carota	Queen Anne's lace
Desmodium paniculatum	panicled-leaf tree tickfoil
Elymus canadensis	Canada wild rye
Erigeron annuus	daisy fleabane
Erigeron canadensis	marestail
Eupatorium altissimum	tall boneset
Eupatorium serotinum	late boneset
Euthamia graminifolia	grass-leaved goldenrod
Galium aparine	cleavers
Geum canadense	white avens
Gleditsia triacanthos	honey locust
Hordeum jubatum	fox-tail grass
Juncus tenuis	path rush
Lepidium virginicum	common peppercress
Lonicera morrowii	Morrow's honeysuckle
Melilotus albus	white sweet clover
Morus alba	white mulberry
Muhlenbergia schreberi	nimblewill
Parthenocissus quinquefolia	Virginia creeper
Persicaria virginiana	jumpseed
Plantago lanceolata	English plantain
Plantago major	great plantain
Platanus occidentalis	American sycamore
Populus deltoides	cottonwood
Potentilla indica	Indian strawberry
Prunus serotina	black cherry
Pseudognaphalium obtusifolium	rabbit tobbaco
Rosa multiflora	multiflora rose
Rubus allegheniensis	Alleghany blackberry
Rubus occidentalis	black raspberry
Scirpus cyperinus	cottongrass bulrush
Securigera varia	crown vetch
Setaria pumila	yellow foxtail
Seteria viridis	green foxtail
Solanum carolinense	Carolina horsenettle
Solidago altissima	tall goldenrod

North Central Field	
Taxonomic Name	**Common Name**
Solidago canadensis	Canada goldenrod
Solidago rugosa	rough-leaved goldenrod
Symphyotrichum pilosum	frost aster
Taraxacum officinale	dandelion
Tragopogon pratensis	common goat's beard
Tridens flavus	purple top
Trifolium repens	white clover
Ulmus americana	American elm
Ulmus pumila	Siberian elm
Verbascum thapsus	common mullein
Verbena urticifolia	white vervain

Northeast Field	
Taxonomic Name	**Common Name**
Acer negundo	boxelder
Agastache nepetoides	giant yellow hyssop
Agertina altisima	white snakeroot
Agrimonia gryposepala	tall agrimony
Ailanthus altissima	tree-of-heaven
Ambrosia artemisiifolia	annual ragweed
Arctium minus	lesser burdock
Apocynum cannabinum	Indian hemp
Arctium minus	lesser burdock
Artemisia vulgaris	mugwort
Asclepias syriaca	common milkweed
Asclepias verticillata	whorled milkweed
Bromus inermis	smooth brome
Cichorium intybus	chicory
Cirsium arvense	Canada thistle
Cirsium discolor	field thistle
Cirsium vulgare	bull thistle
Conium maculatum	poison hemlock
Dactylis glomerata	orchard grass
Daucus carota	Queen Anne's lace
Elaeagnus umbellata	autumn olive
Erigeron annuus	daisy fleabane
Erigeron canadensis	marestail
Eupatorim pefoliatum	common boneset

Northeast Field	
Taxonomic Name	**Common Name**
Eupatorium serotinum	late boneset
Euthamia graminifolia	grass-leaved goldenrod
Fallopia scandens	climbing false buckwheat
Galium aparine	cleavers
Geum canadense	white avens
Gleditsia triacanthos	honey locust
Juncus effusus	common rush
Lonicera maackii	Amur honeysuckle
Morus alba	white mulberry
Oxalis dillenii	slender wood sorrel
Parthenocissus quinquefolia	Virginia creeper
Persicaria virginiana	jumpseed
Phalaris arundinacea	reed canary grass
Phragmites australis ssp. australis	common reed
Phytolacca americana	pokeweed
Plantago lanceolata	English plantain
Plantago major	great plantain
Platanus occidentalis	American sycamore
Populus deltoides	cottonwood
Potentilla indica	Indian strawberry
Prunus serotina	black cherry
Rosa multiflora	multiflora rose
Rubus occidentalis	black raspberry
Rumex obtusifolius	bitter dock
Salix nigra	black willow
Scirpus cyperinus	cottongrass bulrush
Securigera varia	crown vetch
Setaria pumila	yellow foxtail
Seteria viridis	green foxtail
Solanum carolinense	Carolina horsenettle
Solidago altissima/canadensis	tall/Canada goldenrod
Solidago rugosa	rough-leaved goldenrod
Symphyotrichum pilosum	frost aster
Taraxacum officinale	dandelion
Trifolium repens	white clover
Urtica dioica ssp. gracilis	stinging nettle
Verbascum thapsus	common mullein
Verbena urticifolia	white vervain

Southwest Field	
Taxonomic Name	**Common Name**
Agertina altisima	white snakeroot
Ambrosia artemisiifolia	annual ragweed
Apocynum cannabinum	Indian hemp
Arctium minus	lesser burdock
Artemisia vulgaris	mugwort
Asclepias syriaca	common milkweed
Bromus inermis	smooth brome
Cirsium arvense	Canada thistle
Cirsium vulgare	bull thistle
Conium maculatum	poison hemlock
Dactylis glomerata	orchard grass
Daucus carota	Queen Anne's lace
Desmodium paniculatum	panicled-leaf tree tickfoil
Elymus canadensis	Canada wild rye
Erigeron annuus	daisy fleabane
Erigeron canadensis	marestail
Eupatorium altissimum	tall boneset
Eupatorium serotinum	late boneset
Eutrochium maculatum	spotted Joe Pye weed
Geum canadense	white avens
Gleditsia triacanthos	honey locust
Muhlenbergia schreberi	nimblewill
Parthenocissus quinquefolia	Virginia creeper
Persicaria virginiana	jumpseed
Phytolacca americana	pokeweed
Plantago lanceolata	English plantain
Plantago major	great plantain
Platanus occidentalis	American sycamore
Populus deltoides	cottonwood
Potentilla indica	Indiana strawberry
Prunus serotina	black cherry
Pseudognaphalium obtusifolium	rabbit tobbaco
Robinia pseudoacacia	black locust
Quercus rubra	northern red oak
Rosa multiflora	multiflora rose
Rubus allegheniensis	Alleghany blackberry
Rubus occidentalis	black raspberry
Rumex obtusifolius	bitter dock

Southwest Field	
Taxonomic Name	**Common Name**
Scrophularia marilandica	late figwort
Seteria faberi	Japanese bristle grass
Setaria pumila	yellow foxtail
Seteria viridis	green foxtail
Solanum carolinense	Carolina horsenettle
Solidago altissima/canadensis	tall/Canada goldenrod
Solidago rugosa	rough-leaved goldenrod
Sonchus asper	spiny sowthistle
Taraxacum officinale	dandelion
Trifolium repens	white clover
Verbena urticifolia	white vervain

South Central Field	
Taxonomic Name	**Common Name**
Acer negundo	boxelder
Agertina altisima	white snakeroot
Ailanthus altissima	tree-of-heaven
Apocynum cannabinum	Indian hemp
Arctium minus	lesser burdock
Asclepias syriaca	common milkweed
Bromus inermis	smooth brome
Cirsium arvense	Canada thistle
Cirsium vulgare	bull thistle
Conium maculatum	poison hemlock
Dactylis glomerata	orchard grass
Daucus carota	Queen Anne's lace
Desmodium paniculatum	panicled-leaf tree tickfoil
Elaeagnus umbellata	autumn olive
Elymus canadensis	Canada wild rye
Erigeron annuus	daisy fleabane
Erigeron canadensis	marestail
Eupatorium altissimum	tall boneset
Eupatorium serotinum	late boneset
Euthamia graminifolia	grass-leaved goldenrod
Eutrochium maculatum	spotted Joe Pye weed
Eutrochium purpureum	purple Joe Pye weed
Galium aparine	cleavers
Geum canadense	white avens

South Central Field	
Taxonomic Name	**Common Name**
Gleditsia triacanthos	honey locust
Hieracium caespitosum	meadow hawkweed
Hypericum perforatum	common St. John's wort
Lactuca serriola	prickly lettuce
Leontodon saxatilis	lesser hawkbit
Muhlenbergia schreberi	nimblewill
Parthenocissus quinquefolia	Virginia creeper
Persicaria virginiana	jumpseed
Phytolacca americana	pokeweed
Plantago lanceolata	English plantain
Plantago major	great plantain
Platanus occidentalis	American sycamore
Populus deltoides	cottonwood
Potentilla indica	Indian strawberry
Prunus serotina	black cherry
Pseudognaphalium obtusifolium	rabbit tobbaco
Robinia pseudoacacia	black locust
Rosa multiflora	multiflora rose
Rubus occidentalis	black raspberry
Rumex obtusifolius	bitter dock
Seteria faberi	Japanese bristle grass
Setaria pumila	yellow foxtail
Seteria viridis	green foxtail
Solanum carolinense	Carolina horsenettle
Solidago altissima/canadensis	tall/Canada goldenrod
Solidago rugosa	rough-leaved goldenrod
Sonchus asper	spiny sowthistle
Taraxacum officinale	dandelion
Toxicodendron radicans	poison ivy
Tridens flavus	purple top
Trifolium repens	white clover
Ulmus pumila	Siberian elm
Urtica dioica ssp. gracilis	stinging nettle
Verbascum thapsus	common mullein
Verbena urticifolia	white vervain
Vernonia gigantea	smooth tall ironweed

Southeast Field	
Taxonomic Name	**Common Name**
Acer negundo	boxelder
Agertina altisima	white snakeroot
Ailanthus altissima	tree-of-heaven
Ambrosia artemisiifolia	annual ragweed
Arctium minus	lesser burdock
Bidens frondosa	common beggar's ticks
Bromus inermis	smooth brome
Catalpa speciosa	northern catalpa
Celastrus orbiculatus	Oriental bittersweet
Centaurea stoebe	spotted knapweed
Cirsium arvense	Canada thistle
Cirsium vulgare	bull thistle
Cyperus strigosus	straw-colored flatsedge
Dactylis glomerata	orchard grass
Datura stramonium	jimsonweed
Daucus carota	Queen Anne's lace
Dianthus armeria	Depford pink
Echinoloa crus-galli	barnyard grass
Eleusine indica	goosegrass
Erigeron canadensis	marestail
Eupatorium serotinum	late boneset
Euthamia graminifolia	grass-leaved goldenrod
Fallopia scandens	climbing false buckwheat
Fraxinus pennslyvanica	green ash
Gleditsia triacanthos	honey locust
Hackelia virginiana	stickseed
Lythrum salicaria	purple loosestrife
Melilotus albus	white sweet clover
Muhlenbergia schreberi	nimblewill
Nepeta cataria	catnip
Oenothera biennis	evening primrose
Panicum dichotomiflorum	fall panic grass
Parthenocissus quinquefolia	Virginia creeper
Persicaria virginiana	jumpseed
Phytolacca americana	pokeweed
Pilea pumila	Canadian clearweed
Plantago lanceolata	English plantain
Polanisia dodecandra	clammyweed

Southeast Field	
Taxonomic Name	**Common Name**
Populus deltoides	cottonwood
Potentilla indica	Indian strawberry
Prunus serotina	black cherry
Pseudognaphalium obtusifolium	rabbit tobbaco
Rhus hirta	staghorn sumac
Rubus allegheniensis	Alleghany blackberry
Rubus occidentalis	black raspberry
Rumex obtusifolius	bitter dock
Saponaria officinalis	bouncing bet
Securigera varia	crown vetch
Senecio hieraciifolius	American burnweed
Seteria faberi	Japanese bristle grass
Setaria pumila	yellow foxtail
Seteria viridis	green foxtail
Sisymbrium altissimum	tall hedge mustard
Solanum carolinense	Carolina horsenettle
Solidago altissima/canadensis	tall/Canada goldenrod
Solidago rugosa	rough-leaved goldenrod
Sorghum halepense	Johnson grass
Symphyotrichum pilosum	frost aster
Taraxacum officinale	dandelion
Toxicodendron radicans	poison ivy
Trifolium pratense	red clover
Ulmus pumila	Siberian elm
Urtica dioica ssp. gracilis	stinging nettle
Verbascum thapsus	common mullein
Verbena urticifolia	white vervain
Vitis riparia	riverbank grape
Xanthium spinosum	cocklebur

Tree Lines	
Taxonomic Name	**Common Name**
Acer negundo	boxelder
Acer platanoides	Norway maple
Acer saccharinum	silver maple
Ampelopsis brevipedunculata	porcelain berry
Bromus inermis	smooth brome
Carya ovata	shagbark hickory

Tree Lines	
Taxonomic Name	**Common Name**
Catalpa speciosa	northern catalpa
Celastrus orbiculatus	Oriental bittersweet
Celtis occidentalis	northern hackberry
Dactylis glomerata	orchard grass
Daucus carota	Queen Anne's lace
Eupatorium serotinum	late boneset
Euonymus bungeanus	Chinese spindle tree
Euthamia graminifolia	grass-leaved goldenrod
Fraxinus americana	white ash
Fraxinus pennslyvanica	green ash
Geum canadense	white avens
Gleditsia triacanthos	honey locust
Hackelia virginiana	stickseed
Juglans nigra	black walnut
Juniperus virginiana	eastern red cedar
Leonurus cardiaca	motherwort
Ligustrum vulgare	common privet
Lonicera maackii	Amur honeysuckle
Lonicera tatarica	Tatarian honeysuckle
Malus pumila	apple
Morus albus	white mulberry
Packera glabella	butterweed
Persicaria virginiana	jumpseed
Phytolacca americana	pokeweed
Platanus occidentalis	American sycamore
Populus deltoides	cottonwood
Prunus serotina	black cherry
Quercus rubra	northern red oak
Rhamnus cathartica	common buckthorn
Rhus glabra	smooth sumac
Rhus hirta	staghorn sumac
Robinia pseudoacacia	black locust
Rosa multiflora	multiflora rose
Rubus occidentalis	black raspberry
Solanum carolinense	Carolina horsenettle
Solidago altissimaa	tall goldenrod
Toxicodendron radicans	poison ivy
Ulmus americana	American elm

Tree Lines	
Taxonomic Name	**Common Name**
Ulmus pumila	Siberian elm
Vitis riparia	riverbank grape

Old Orchard	
Taxonomic Name	**Common Name**
Acer platanoides	Norway maple
Acer saccharinum	silver maple
Agertina altisima	white snakeroot
Agrimonia gryposepala	tall agrimony
Alliaria petiolata	garlic mustard
Ambrosia artemisiifolia	annual ragweed
Arctium minus	lesser burdock
Bromus inermis	smooth brome
Carex blanda	eastern woodland sedge
Celastrus orbiculatus	Oriental bittersweet
Celtis occidentalis	northern hackberry
Cirsium arvense	Canada thistle
Cirsium vulgare	bull thistle
Convolvulus arvensis	field bindweed
Dactylis glomerata	orchard grass
Daucus carota	Queen Anne's lace
Erigeron annuus	daisy fleabane
Erigeron canadensis	marestail
Fraxinus pennslyvanica	green ash
Geum canadense	white avens
Gleditsia triacanthos	honey locust
Hesperis matronalis	dame's rocket
Ligustrum vulgare	common privet
Lonicera maackii	Amur honeysuckle
Morus albus	white mulberry
Parthenocissus quinquefolia	Virginia creeper
Persicaria virginiana	jumpseed
Phytolacca americana	pokeweed
Pilea pumila	Canadian clearweed
Poa pratensis	Kentucky bluegrass
Potentilla indica	Indian strawberry
Prunus serotina	black cherry
Rhamnus cathartica	common buckthorn

Old Orchard	
Taxonomic Name	**Common Name**
Rosa multiflora	multiflora rose
Rubus occidentalis	black raspberry
Sassafras albidum	sassafras
Seteria faberi	Japanese bristle grass
Solanum carolinense	Carolina horsenettle
Toxicodendron radicans	poison ivy
Ulmus americana	American elm
Urtica dioica ssp. gracilis	stinging nettle
Verbena urticifolia	white vervain
Viola sororia	common blue violet
Vitis riparia	riverbank grape

Old Central Farm	
Taxonomic Name	**Common Name**
Acer negundo	boxelder
Agertina altisima	white snakeroot
Alliaria petiolata	garlic mustard
Ambrosia artemisiifolia	annual ragweed
Arctium minus	lesser burdock
Asclepias syriaca	common milkweed
Bromus inermis	smooth brome
Celastrus orbiculatus	Oriental bittersweet
Celtis occidentalis	northern hackberry
Centaurea stoebe	spotted knapweed
Cichorium intybus	chicory
Cirsium arvense	Canada thistle
Cirsium vulgare	bull thistle
Conium maculatum	poison hemlock
Dactylis glomerata	orchard grass
Datura stramonium	jimsonweed
Daucus carota	Queen Anne's lace
Desmodium paniculatum	panicled-leaf tree tickfoil
Erigeron annuus	daisy fleabane
Erigeron canadensis	marestail
Euonymus fortunei	wintercreeper
Fallopia scandens	climbing false buckwheat
Fraxinus pennslyvanica	green ash
Geum canadense	white avens

Old Central Farm	
Taxonomic Name	**Common Name**
Gleditsia triacanthos	honey locust
Hypericum perforatum	common St. John's wort
Juglans nigra	black walnut
Lepidium virginicum	common peppergrass
Leonurus cardiaca	motherwort
Ligustrum vulgare	common privet
Lonicera maackii	Amur honeysuckle
Melilotus albus	white sweet clover
Nepeta cataria	catnip
Persicaria virginiana	jumpseed
Phleum pratense	Timothy
Phytolacca americana	pokeweed
Plantago lanceolata	English plantain
Prunus serotina	black cherry
Rhus hirta	staghorn sumac
Rosa multiflora	multiflora rose
Rubus occidentalis	black raspberry
Rumex obtusifolius	bitter dock
Securigera varia	crown vetch
Seteria faberi	Japanese bristle grass
Setaria pumila	yellow foxtail
Solanum carolinense	Carolina horsenettle
Solidago altissima	tall goldenrod
Solidago canadensis	Canada goldenrod
Toxicodendron radicans	poison ivy
Tridens flavus	purple top
Trifolium repens	white clover
Ulmus pumila	Siberian elm
Urtica dioica ssp. gracilis	stinging nettle
Verbascum thapsus	common mullein
Verbena urticifolia	white vervain
Vitis riparia	riverbank grape

Central Farm Woods	
Taxonomic Name	**Common Name**
Acer platanoides	Norway maple
Agertina altisima	white snakeroot
Alliaria petiolata	garlic mustard

Central Farm Woods	
Taxonomic Name	**Common Name**
Carex blanda	eastern woodland sedge
Carex stipata	awl-fruited sedge
Celastrus orbiculatus	Oriental bittersweet
Celtis occidentalis	northern hackberry
Conium maculatum	poison hemlock
Euonymus fortunei	wintercreeper
Geum canadense	white avens
Glechoma hederacea	creeping Charlie
Gleditsia triacanthos	honey locust
Juglans nigra	black walnut
Lactuca serriola	prickly lettuce
Ligustrum vulgare	common privet
Lonicera maackii	Amur honeysuckle
Lonicera morrowii	Morrow's honeysuckle
Morus alba	white mulberry
Parthenocissus quinquefolia	Virginia creeper
Persicaria virginiana	jumpseed
Potentilla indica	Indian strawberry
Prunus serotina	black cherry
Quercus rubra	northern red oak
Rhus glabra	smooth sumac
Rosa multiflora	multiflora rose
Rubus occidentalis	black raspberry
Senecio hieraciifolius	American burnweed
Solanum carolinense	Carolina horsenettle
Toxicodendron radicans	poison ivy
Ulmus americana	American elm
Verbesina alternifolia	wingstem
Viola sororia	common blue violet
Vitis riparia	riverbank grape
Vitis vulpina	frost grape

Manor Residence	
Taxonomic Name	**Common Name**
Acer negundo	boxelder
Acer platanoides	Norway maple
Acer saccharinum	silver maple
Arctium minus	lesser burdock

Manor Residence	
Taxonomic Name	**Common Name**
Artemisia vulgaris	mugwort
Berberis thunbergii	Japanese barberry
Chaenomeles sp.	quince
Celastrus orbiculatus	Oriental bittersweet
Cichorium intybus	chicory
Cirsium arvense	Canada thistle
Cirsium vulgare	bull thistle
Conium maculatum	poison hemlock
Convolvulus arvensis	field bindweed
Dactylis glomerata	orchard grass
Digitaria sanguinalis	hairy crab grass
Eleusine indica	goosegrass
Erigeron annuus	daisy fleabane
Euonymus alatus	burning bush
Fallopia scandens	climbing false buckwheat
Festuca rubra	red fescue
Geum canadense	white avens
Glechoma hederacea	creeping Charlie
Hackelia virginiana	stickseed
Ilex opaca	American holly
Iris sp.	Iris
Juniperus sp.	juniper
Leonurus cardiaca	motherwort
Lepidium virginicum	common peppergrass
Ligustrum ovalifolium	California privet
Lonicera maackii	Amur honeysuckle
Magnolia liliflora	lily magnolia
Malva neglecta	common mallow
Malus sp.	crabapple
Morus alba	white mulberry
Muhlenbergia schreberi	nimblewill
Oxalis dillenii	slender wood sorrel
Parthenocissus quinquefolia	Virginia creeper
Parthenocissus tricuspidata	Boston ivy
Persicaria maculosa	lady's thumb
Persicaria virginiana	jumpseed
Phytolacca americana	pokeweed
Picea abies	Norway sprunce

Manor Residence	
Taxonomic Name	**Common Name**
Plantago lanceolata	English plantain
Plantago major	great plantain
Platanus occidentalis	American sycamore
Poa pratensis	Kentucky bluegrass
Portulaca oleracea	common purslane
Potentilla indica	Indian strawberry
Prunus serotina	black cherry
Prunus serrulata	Japanese cherry
Pseudotsuga menziesii	Douglas fir
Quercus macrocarpa	bur oak
Quercus rubra	northern red oak
Rhamnus cathartica	common buckthorn
Rhus hirta	staghorn sumac
Rubus occidentalis	black raspberry
Rumex obtusifolius	bitter dock
Securigera varia	crown vetch
Senecio hieraciifolius	American burnweed
Seteria faberi	Japanese bristle grass
Setaria pumila	yellow foxtail
Solanum dulcamara	bittersweet nightshade
Solidago altissimaa	tall goldenrod
Spirea japonica	Japanese spirea
Syringa vulgaris	common lilac
Taraxacum officinale	dandelion
Taxus cuspidata	Japanese yew
Thuja occidentalis	northern white cedar
Toxicodendron radicans	poison ivy
Trifolium repens	white clover
Ulmus americana	American elm
Verbascum thapsus	common mullein
Verbena bracteata	creeping vervain
Viburnum dentatum	arrowood viburnum
Viburnum lantana	wayfaring tree
Vitis riparia	riverbank grape

County Highway Department	
Taxonomic Name	**Common Name**
Acer negundo	boxelder
Agertina altisima	white snakeroot
Ambrosia artemisiifolia	annual ragweed
Arctium minus	lesser burdock
Artemisia vulgaris	mugwort
Berteroa incana	hoary alyssum
Bromus inermis	smooth brome
Catalpa speciosa	northern catalpa
Celtis occidentalis	northern hackberry
Centaurea stoebe	spotted knapweed
Cichorium intybus	chicory
Cyperus strigosus	straw-colored flatsedge
Datura stramonium	jimsonweed
Daucus carota	Queen Anne's lace
Echinoloa crus-galli	barnyard grass
Dipsacus fullonum	common teasel
Elaeagnus umbellata	autumn olive
Erigeron annuus	daisy fleabane
Erigeron canadensis	marestail
Eupatorium serotinum	late boneset
Euthamia graminifolia	grass-leaved goldenrod
Fraxinus americana	white ash
Glechoma hederacea	creeping Charlie
Hordeum jubatum	fox-tail grass
Lythrum salicaria	purple loosestrife
Muhlenbergia schreberi	nimblewill
Oenothera biennis	evening primrose
Panicum dichotomiflorum	fall panic grass
Phragmites australis ssp. australis	common reed
Plantago lanceolata	English plantain
Poa pratensis	Kentucky bluegrass
Populus deltoides	cottonwood
Potentilla indica	Indian strawberry
Rhamnus cathartica	common buckthorn
Rhus glabra	smooth sumac
Rhus hirta	staghorn sumac
Rosa multiflora	multiflora rose
Rubus occidentalis	black raspberry

County Highway Department	
Taxonomic Name	**Common Name**
Rumex obtusifolius	bitter dock
Securigera varia	crown vetch
Senecio hieraciifolius	American burnweed
Seteria faberi	Japanese bristle grass
Setaria pumila	yellow foxtail
Seteria viridis	green foxtail
Solanum carolinense	Carolina horsenettle
Solidago altissima/canadensis	tall/Canada goldenrod
Symphyotrichum pilosum	frost aster
Teucrium canadense	American germander
Toxicodendron radicans	poison ivy
Tridens flavus	purple top
Ulmus pumila	Siberian elm
Verbascum blattaria	moth mullein
Verbascum thapsus	common mullein
Xanthium spinosum	cocklebur

Chet Waggoner Baseball Complex	
Taxonomic Name	**Common Name**
Acalypha rhomboidea	three-seeded mercury
Acer negundo	boxelder
Ailanthus altissima	tree-of-heaven
Ambrosia artemisiifolia	annual ragweed
Ambrosia trifida	giant ragweed
Arctium minus	lesser burdock
Artemisia vulgaris	mugwort
Bromus inermis	smooth brome
Celastrus orbiculatus	Oriental bittersweet
Celtis occidentalis	northern hackberry
Cichorium intybus	chicory
Cirsium arvense	Canada thistle
Convolvulus arvensis	field bindweed
Dactylis glomerata	orchard grass
Daucus carota	Queen Anne's lace
Euonymus alatus	burning bush
Eupatorium serotinum	late boneset
Euthamia graminifolia	grass-leaved goldenrod
Geum canadense	white avens

Chet Waggoner Baseball Complex	
Taxonomic Name	**Common Name**
Glechoma hederacea	creeping Charlie
Melilotus albus	white sweet clover
Morus alba	white mulberry
Oxalis dillenii	slender wood sorrel
Parthenocissus quinquefolia	Virginia creeper
Phleum pratense	Timothy
Phragmites australis ssp. australis	common reed
Phytolacca americana	pokeweed
Plantago lanceolata	English plantain
Plantago major	great plantain
Populus deltoides	cottonwood
Prunus serotina	black cherry
Quercus alba	white oak
Rhus glabra	smooth sumac
Rubus allegheniensis	Alleghany blackberry
Rumex obtusifolius	bitter dock
Salix nigra	black willow
Scrophularia marilandica	late figwort
Seteria faberi	Japanese bristle grass
Setaria pumila	yellow foxtail
Solanum carolinense	Carolina horsenettle
Solanum dulcamara	bittersweet nightshade
Solidago altissima/canadensis	tall/Canada goldenrod
Symphyotrichum pilosum	frost aster
Taraxacum officinale	dandelion
Toxicodendron radicans	poison ivy
Trifolium repens	white clover
Verbena urticifolia	white vervain
Vitis riparia	riverbank grape
Vitis vulpina	frost grape

Early Successional Woods	
Taxonomic Name	**Common Name**
Acer negundo	boxelder
Acer platanoides	Norway maple
Acer saccharinum	silver maple
Agertina altisima	white snakeroot
Ailanthus altissima	tree-of-heaven

Early Successional Woods	
Taxonomic Name	**Common Name**
Alliaria petiolata	garlic mustard
Ambrosia artemisiifolia	annual ragweed
Berteroa incana	hoary alyssum
Bromus inermis	smooth brome
Carex blanda	eastern woodland sedge
Carex pensylvanica	Pennsylvania sedge
Catalpa speciosa	northern catalpa
Celastrus orbiculatus	Oriental bittersweet
Celtis occidentalis	northern hackberry
Cirsium arvense	Canada thistle
Convallaria majalis	lily-of-the-valley
Cyperus strigosus	straw-colored flatsedge
Dactylis glomerata	orchard grass
Datura stramonium	jimsonweed
Daucus carota	Queen Anne's lace
Desmodium paniculatum	panicled-leaf tree tickfoil
Echinoloa crus-galli	barnyard grass
Eleusine indica	goosegrass
Erigeron annuus	daisy fleabane
Erigeron canadensis	marestail
Euonymus bungeanus	Chinese spindle tree
Euonymus fortunei	wintercreeper
Fraxinus americana	white ash
Fraxinus pennslyvanica	green ash
Geum canadense	white avens
Glechoma hederacea	creeping Charlie
Hackelia virginiana	stickseed
Hypericum perforatum	common St. John's wort
Juglans nigra	black walnut
Juncus tenuis	path rush
Leonurus cardiaca	motherwort
Lepidium virginicum	common peppergrass
Ligustrum vulgare	common privet
Lonicera maackii	Amur honeysuckle
Melilotus albus	white sweet clover
Morus alba	white mulberry
Muhlenbergia schreberi	nimblewill
Myosoton aquaticum	giant chickweed

Early Successional Woods	
Taxonomic Name	**Common Name**
Ostrya virginiana	hop hornbearm
Parthenocissus quinquefolia	Virginia creeper
Persicaria maculosa	lady's thumb
Persicaria virginiana	jumpseed
Phytolacca americana	pokeweed
Plantago lanceolata	English plantain
Poa pratensis	Kentucky bluegrass
Populus deltoides	cottonwood
Prunus serotina	black cherry
Quercus alba	white oak
Quercus rubra	northern red oak
Rhamnus cathartica	common buckthorn
Rosa multiflora	multiflora rose
Rubus allegheniensis	Alleghany blackberry
Rubus occidentalis	black raspberry
Rumex obtusifolius	bitter dock
Seteria faberi	Japanese bristle grass
Setaria pumila	yellow foxtail
Seteria viridis	green foxtail
Solanum carolinense	Carolina horsenettle
Sassafras albidum	Ssassafras
Solidago altissima/canadensis	tall/Canada goldenrod
Tilia americana	basswood
Toxicodendron radicans	poison ivy
Tridens flavus	purple top
Ulmus americana	American elm
Ulmus pumila	Siberian elm
Urtica dioica ssp. gracilis	stinging nettle
Verbesina alternifolia	wingstem
Vinca minor	periwinkle
Viola sororia	common blue violet
Vitis riparia	riverbank grape

Ravine	
Taxonomic Name	**Common Name**
Acer negundo	boxelder
Acer platanoides	Norway maple
Ailanthus altissima	tree-of-heaven

Ravine	
Taxonomic Name	**Common Name**
Asimina triloba	pawpaw
Berberis thunbergii	Japanese barberry
Bidens frondosa	common beggar's ticks
Bromus inermis	smooth brome
Carex blanda	eastern woodland sedge
Carex vulpinoidea	fox sedge
Catalpa speciosa	northern catalpa
Celastrus orbiculatus	Oriental bittersweet
Celtis occidentalis	northern hackberry
Cinna arundinacea	sweet wood reed
Commelina communis	Asiatic dayflower
Dichanthelium clandestinum	deer tongue grass
Elaeagnus umbellata	autumn olive
Echinoloa crus-galli	barnyard grass
Elymus virginicus	Viginia wild rye
Euonymus alatus	burning bush
Euonymus fortunei	wintercreeper
Eupatorium serotinum	late boneset
Fraxinus pennslyvanica	green ash
Galium aparine	cleavers
Glechoma hederacea	creeping Charlie
Gleditsia triacanthos	honey locust
Humulus japonicus	Japanese hops
Leersia oryzoides	rice cut grass
Ligustrum vulgare	common privet
Lobelia siphilitica	great blue lobelia
Lonicera maackii	Amur honeysuckle
Peltandra virginica	green arrow-arum
Persicaria virginiana	jumpseed
Pilea pumila	Canadian clearweed
Platanus occidentalis	American sycamore
Populus deltoides	cottonwood
Quercus muhlenbergii	chinkapin oak
Quercus rubra	northern red oak
Rosa multiflora	multiflora rose
Rumex obtusifolius	bitter dock
Salix nigra	black willow
Scirpus atrovirens	dark green bulrush

Ravine	
Taxonomic Name	**Common Name**
Scirpus cyperinus	cottongrass bulrush
Scrophularia marilandica	late figwort
Setaria pumila	yellow foxtail
Solidago altissima	tall goldenrod
Symphyotrichum pilosum	frost aster
Toxicodendron radicans	poison ivy
Typha x glauca	hybrid cattail
Ulmus americana	American elm
Ulmus rubra	slippery elm
Ulmus pumila	Siberian elm
Urtica dioica ssp. gracilis	stinging nettle
Verbena urticifolia	white vervain
Verbesina alternifolia	wingstem
Viola sororia	common blue violet
Vitis riparia	riverbank grape
Xanthium spinosum	cocklebur

Upland Mesic Woods and Slopes	
Taxonomic Name	**Common Name**
Acer negundo	boxelder
Acer platanoides	Norway maple
Acer saccharum	sugar maple
Achillea millefolium	yarrow
Agastache nepetoides	giant yellow hyssop
Agertina altisima	white snakeroot
Ailanthus altissima	tree-of-heaven
Alliaria petiolata	garlic mustard
Alliumn vineale	field garlic
Ambrosia artemisiifolia	annual ragweed
Ambrosia trifida	giant ragweed
Andropogon virginicus	broom sedge
Arctium minus	lesser burdock
Asclepias tuberosa	butterfly milkweed
Asimina triloba	pawpaw
Berberis thunbergii	Japanese barberry
Bromus inermis	smooth brome
Carex blanda	eastern woodland sedge
Carex pensylvanica	Pennsylvania sedge

Upland Mesic Woods and Slopes	
Taxonomic Name	**Common Name**
Carya cordiformis	bitternut hickory
Carya ovalis	red hickory
Carya ovata	shagbark hickory
Catalpa speciosa	northern catalpa
Celastrus orbiculatus	Oriental bittersweet
Celtis occidentalis	northern hackberry
Cercis canadensis	eastern redbud
Cirsium vulgare	bull thistle
Conium maculatum	poison hemlock
Dactylis glomerata	orchard grass
Erigeron canadensis	marestail
Euonymus alatus	burning bush
Euonymus fortunei	wintercreeper
Eupatorium altissimum	tall boneset
Eupatorium serotinum	late boneset
Fallopia scandens	climbing false buckwheat
Fraxinus americana	white ash
Fraxinus pennslyvanica	green ash
Geranium robertianum	herb Robert
Geum canadense	white avens
Glechoma hederacea	creeping Charlie
Gleditsia triacanthos	honey locust
Hackelia virginiana	stickseed
Hesperis matronalis	dame's rocket
Juglans nigra	black walnut
Juncus tenuis	path rush
Juniperus virginiana	eastern red cedar
Leonurus cardiaca	motherwort
Ligustrum obtusifolium	border privet
Ligustrum vulgare	common privet
Lolium perenne	perennial rye grass
Lonicera maackii	Amur honeysuckle
Lonicera morrowii	Morrow's honeysuckle
Lonicera tatarica	Tatarian honeysuckle
Melilotus officinalis	yellow sweet clover
Monotropa uniflora	ghost pipe
Morus alba	white mulberry
Muhlenbergia schreberi	nimblewill
Ostrya virginiana	hop hornbearm

Upland Mesic Woods and Slopes	
Taxonomic Name	**Common Name**
Parthenocissus quinquefolia	Virginia creeper
Persicaria virginiana	jumpseed
Phytolacca americana	pokeweed
Pilea pumila	Canadian clearweed
Platanus occidentalis	American sycamore
Populus deltoides	cottonwood
Potentilla indica	Indian strawberry
Prunus serotina	black cherry
Quercus alba	white oak
Quercus macrocarpa	bur oak
Quercus rubra	northern red oak
Rhamnus cathartica	common buckthorn
Rhus glabra	smooth sumac
Ribes cynosbati	eastern prickly gooseberry
Robinia pseudoacacia	black locust
Rubus occidentalis	black raspberry
Rumex obtusifolius	bitter dock
Sanguinaria canadensis	bloodroot
Saponaria officinalis	bouncing bet
Schizachyrium scoparium	little bluestem
Scrophularia marilandica	late figwort
Setaria pumila	yellow foxtail
Sisymbrium altissimum	tall hedge mustard
Smilax rotundifolia	greenbrier
Solanum carolinense	Carolina horsenettle
Symphyotrichum pilosum	frost aster
Toxicodendron radicans	poison ivy
Tridens flavus	purple top
Ulmus americana	American elm
Urtica dioica ssp. gracilis	stinging nettle
Verbascum blattaria	moth mullein
Verbascum thapsus	common mullein
Verbena urticifolia	white vervain
Verbesina alternifolia	wingstem
Viburnum dentatum	southern arrowwood
Viburnum lantana	wayfaring tree
Vitis riparia	riverbank grape
Vitis vulpina	frost grape

Boland Slopes	
Taxonomic Name	**Common Name**
Achillea millefolium	yarrow
Agertina altisima	white snakeroot
Ailanthus altissima	tree-of-heaven
Ambrosia artemisiifolia	annual ragweed
Ambrosia trifida	giant ragweed
Apocynum cannabinum	Indian hemp
Asclepias syriaca	common milkweed
Carex vulpinoidea	fox sedge
Cichorium intybus	chicory
Cirsium arvense	Canada thistle
Cirsium discolor	field thistle
Convolvulus arvensis	field bindweed
Daucus carota	Queen Anne's lace
Dichanthelium clandestinum	deer tongue grass
Elymus canadensis	Canada wild rye
Eupatorium serotinum	late boneset
Euthamia graminifolia	grass-leaved goldenrod
Helianthus tuberosus	Jerusalem-artichoke
Lonicera maackii	Amur honeysuckle
Medicago lupulina	black medic
Melilotus albus	white sweet clover
Monarda fistulosa	bee balm
Oenothera biennis	evening primrose
Oxalis dillenii	slender wood sorrel
Panicum virgatum	switch grass
Parthenocissus quinquefolia	Virginia creeper
Phytolacca americana	pokeweed
Platanus occidentalis	American sycamore
Populus deltoides	cottonwood
Ratibida pinnata	grey-headed coneflower
Rhus aromatica	fragrant sumac
Rhus hirta	staghorn sumac
Robinia pseudoacacia	black locust
Rubus flagellaris	common dewberry
Rubus occidentalis	black raspberry
Rudbeckia hirta	black-eyed Susan
Rubus occidentalis	black raspberry
Rumex crispus	curly dock

Boland Slopes	
Taxonomic Name	**Common Name**
Rumex obtusifolius	bitter dock
Salix nigra	black willow
Schizachyrium scoparium	little bluestem
Setaria pumila	yellow foxtail
Solanum carolinense	Carolina horsenettle
Solidago altissima/canadensis	tall/Canada goldenrod
Solidago rigida	stiff goldenrod
Sorghastrum nutans	Indian grass
Symphyotrichum pilosum	frost aster
Toxicodendron radicans	poison ivy
Ulmus americana	American elm
Ulmus pumila	Siberian elm
Verbascum thapsus	common mullein
Verbesina alternifolia	wingstem
Vernonia gigantea	smooth tall ironweed
Vitis riparia	riverbank grape
Vitis vulpina	frost grape

Appendix C — Invasive Plants

Portage Manor plants designated as "invasive" by the Indiana Invasive Species Council			
Taxonomic Name	**Common Name**	**Threat Level**	**Locations**
Acer platanoides	Norway maple	high	7,8,10,11,14,15,16
Alliaria petiolata	garlic mustard	high	8,9,10,14,16
Ailanthus altissima	tree-of-heaven	high	1,2,3,5,6,13,14,15,16,17
Ampelopsis brevipedunculata	porcelain berry	caution	7
Artemisia vulgaris	mugwort	high	3,4,11,12,13,
Berberis thunbergii	Japanese barberry	high	11,15,16
Celastrus orbiculatus	Oriental bittersweet	high	4,7,8,9,10,11,13,14,15,16
Centaurea stoebe	spotted knapweed	low	6,9,12,
Cirsium arvense	Canada thistle	high	1,2,3,4,5,6,8,9,11,13,14,17
Cirsium vulgare	bull thistle	high	1,2,3,4,5,6,8,9,11,16,
Conium maculatum	poison hemlock	high	1,2,3,4,5,9,10,11,16,
Convolvulus arvensis	field bindweed	high	8,11,13,17
Daucus carota	Queen Anne's lace	medium	1,2,3,4,5,6,7,8,9,12,13,14,15
Dipsacus fullonum	common teasel	high	12
Dipsacus laciniatus	cutleaf teasel	high	5
Elaeagnus umbellata	autumn olive	medium	3,5,12,15
Euonymus alatus	burning bush	high	11,13,15,16
Euonymus fortunei	wintercreeper	high	9,10,14,15,16
Glechoma hederacea	creeping Charlie	medium	10,11,12,13,14,15,16
Hesperis matronalis	dame's rocket	high	8,16
Humulus japonicus	Japanese hops	high	15
Hypericum perforatum	common St. John's wort	low	1,5,9,14
Ligustrum obtusifolium	border privet	high	16
Ligustrum ovalifolium	California privet	caution	11
Ligustrum vulgare	common privet	caution	7,8,9,10,14,15
Lonicera maackii	Amur honeysuckle	high	3,7,8,9,10,11,14,15,16,
Lonicera morrowii	Morrow's honeysuckle	high	1,2,10,16
Lonicera tatarica	Tatarian honeysuckle	high	7,16
Lythrum salicaria	purple loosestrife	high	6,12
Melilotus albus	white sweet clover	medium	2,6,9,13,14.17
Melilotus officinalis	yellow sweet clover	medium	1,16
Morus albus	white mulberry	high	2,3,7,8,10,11,13,14,16
Phalaris arundinacea	reed canary grass	high	3
Phragmites australis ssp. australis	common reed	high	3,12,13

Portage Manor plants designated as "invasive" by the Indiana Invasive Species Council			
Taxonomic Name	**Common Name**	**Threat Level**	**Locations**
Rhamnus cathartica	common buckthorn	high	7,8,11,12,14,16
Rosa multiflora	multiflora rose	high	1,2,3,4,5,7,8,9,10,12,14,15,
Saponaria officinalis	bouncing bet	low	1.6,16
Securigera varia	crown vetch	medium	2,3,6,9,11,12
Sorghum halepense	Johnson grass	high	6
Torilis japonica	Japanese hedge parsley	high	7
Typa x glauca	hybrid cattail	caution	15
Ulmus pumila	Siberian elm	medium	1,2,5,6,7,9,12,14,15,17
Vinca minor	periwinkle	medium	14

Key to Locations			
1	Northwest Field	10	Central Farm Woods
2	North Central Field	11	Manor Residence
3	Northeast Field	12	County Highway Department
4	Southwest Field	13	Chet Waggoner Complex
5	South Central Field	14	Early Successional Woods
6	South East Field	15	Ravine
7	Tree Lines	16	Upland Mesic Upland and Slopes
8	Old Orchard	17	Boland Slopes
9	Old Central Farm		

Appendix D — Breeding Bird Survey Tracks

Legend to Environmental Conditions			
Wind (Beaufort Scale)		**Sky**	
0	Calm: smoke rises vertically	0	Clear or few clouds
1	Light air: Direction shown by smoke drift but not by wind vanes	1	Partly cloudy (scattered)
2	Light breeze: Wind felt on face; leaves rustle; wind vane moved by wind	2	Cloudy (broken) or overcast
3	Gentle breeze: Leaves and small twigs in constant motion; light flags extended	3	Fog or smoke
4	Moderate breeze: Raises dust and loose paper; small branches moved	4	Drizzle
5	Fresh breeze: Small trees in leaf begin to sway; crested wavelets form on inland waters	5	Snow
6	Strong breeze: Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty	6	Showers

Transect #1 — 6/4 Old Orchard			
Survey Time: 1:43–3:00 pm	Start Temp: 83° F	Beaufort Wind Code: 5	Sky Code: 2
Distance Travelled: 1.1 miles	Avg Speed: 0.85 mph	Practictioner(s): Steve Sass	

Species	Quan.	Notes
Mourning Dove	1	Heard
Chimney Swift	7	Flying in vicinity of Manor chimney
Belted Kingfisher	1	Rattling in distance
Warbling Vireo	1	Singing but outside of safe date
Blue Jay	1	
Black-capped Chickadee	1	Warning calls
Tufted Titmouse	1	Singing
Cedar Waxwing	1	Calling (almost certainly more than one present)
White-breasted Nuthatch	1	Singing
Carolina Wren	1	Singing
Northern Mockingbird	1	Singing from tree line to the east of the Manor building
European Starling	1	Singing
American Robin	3	Singing and calling
House Sparrow	3	Likely nesting in Manor
American Goldfinch	1	Outside of safe date
Song Sparrow	2	Singing

Transect #1 — 6/4 Old Orchard		
Brown-headed Cowbird	1	Singing male
Northern Cardinal	3	Singing
Indigo Bunting	1	Singing

Transect #2 6/8 — Manor to Ravine and Back			
Survey Time: 8:15–10:00 am	Start Temp: 63° F	Beaufort Wind Code: 0	Sky Code: 1
Distance Travelled: 1.81 miles	Avg Speed: 0.97 mph	Practictioner(s): Steve Sass	
Species	**Quan.**	**Notes**	
Canada Goose	20	Adults with young crossing from Pinhook	
Mourning Dove	1	Heard calling	
Chimney Swift	1	Flying near Manor chimney	
Red-bellied Woodpecker	3	Seen and heard	
Downy Woodpecker	1	Observed	
Hairy Woodpecker	2	Pair feeding together	
Pileated Woodpecker	1	Drumming	
Eastern Wood-Pewee	3	Singing	
Eastern Phoebe	1	Singing	
Blue Jay	4	Observed and heard vocalizing	
White-breasted Nuthatch	1	Singing	
Carolina Wren	1	Singing	
House Wren	2	Singing and observed sitting on post near manor	
Gray Catbird	1	Singing	
European Starling	2	Nesting in eaves of Manor	
American Robin	25	Singing everywhere. Observed agressive behavior	
House Sparrow	4	Nesting in eaves of Manor	
American Goldfinch	1	Singing	
Song Sparrow	1	Ag field north of Orchard	
Baltimore Oriole	1	Singing and observed flying	
Red-winged Blackbird	1	Singing	
Brown-headed Cowbird	1	Singing	
Common Grackle	1	Flyover	
Northern Cardinal	4	Singing	
Rose-breasted Grosbeak	3	Singing males	
Indigo Bunting	1	Singing	

Transect #3 6/15 — Meander from Chet Waggoner on Open House Day			
Survey Time: 8:40–12:15 pm	Start Temp: 66° F	Beaufort Wind Code: 2	Sky Code: 2
Distance Travelled: 3.86 miles	Avg Speed: 0.93 mph	Practictioner(s): Steve Sass	

Species	Quan.	Notes
Mallard	1	Male in floodplain
Mourning Dove	1	
Killdeer	3	Parent with two babies in highway dept. area
Downy Woodpecker	2	Pair
Hairy Woodpecker	1	
Eastern Kingbird	1	Singing
Eastern Phoebe	1	Singing
Warbling Vireo	1	Singing
Red-eyed Vireo	1	Singing
Blue Jay	2	Pair
White-breasted Nuthatch	2	Siging
House Wren	1	Singing
European Starling	10	Flying over old fields
American Robin	13	Seemingly everywhere. Calling, singing, chasing.
American Goldfinch	10	Territorial behavior. Most seen in the old fields
Field Sparrow	3	Singing in old fields
Song Sparrow	8	Singing in old field and spotted a pair there
Orchard Oriold	1	Singing near ravine and entrance to country storage
Baltimore Oriole	2	Singing and chattering
Red-winged Blackbird	10	Singing males and female in old fields
Brown-headed Cowbird	1	Singing
Common Grackle	1	Carrying food and agitated
Northern Cardinal	7	Singing
Indigo Bunting	3	Singing along edges of old fields

Transect #4 — 6/20 Meander from Pinhook Park			
Survey Time: 10:01–11:04 am	Start Temp: 84° F	Beaufort Wind Code: 1	Sky Code: 0
Distance Travelled: 1.86 miles	Avg Speed: 1.77 mph	Practictioner(s): Steve Sass	

Species	Quan.	Notes
Chimney Swift	1	
Downy Woodpecker	1	
Eastern Wood-Pewee	1	Singing

Transect #4 — 6/20 Meander from Pinhook Park		
Red-eyed Vireo	1	Singing
Blue Jay	1	
Black-capped Chickadee	2	Singing
Tufted Titmouse	1	
White-breasted Nuthatch	1	Singing
House Wren	1	Singing
Gray Catbird	1	Singing
American Robin	10	
House Sparrow	3	
American Goldfinch	2	Pair
Song Sparrow	2	Singing
Baltimore Oriole	1	Chattering
Red-winged Blackbird	1	
Northern Cardinal	2	Singing
Rose-breasted Grosbeak	1	Singing
Indigo Bunting	1	Singing

Transect #5 — 6/27 Northern Agricultural Field Meander			
Survey Time: 9:58–11:58 am	Start Temp: 64° F	Beaufort Wind Code: 3	Sky Code: 0
Distance Travelled: 1.56 miles	Avg Speed: 0.78 mph	Practictioner(s): Steve Sass	
Species	**Quan.**	**Notes**	
Chimney Swift	1		
Killdeer	1		
Turkey Vulture	1		
Red-tailed Hawk	1	Flying over NW field	
Blue Jay	1		
Tufted Titmouse	1		
N. Rough-winged Swallow	2		
Barn Swallow	1		
House Wren	1	Singing	
Gray Catbird	1	Singing	
European Starling	5		
American Robin	15	Fledged young	
House Sparrow	1		
American Goldfinch	2		

Transect #5 — 6/27 Northern Agricultural Field Meander		
Chipping Sparrow	1	Singing near NW field
Field Sparrow	1	Singing
Song Sparrow	7	Singing
Baltimore Oriole	1	Singing
Red-winged Blackbird	4	
Rose-breasted Grosbeak	1	
Indigo Bunting	1	Singing

Appendix E — Additional Fauna

Family	Common Name	Taxonomic Name
Class *Arachnida*		
Order *Ixodida*		
Ixodidae	American dog tick	*Dermacentor variabilis*
Order *Opiliones*		
	harvestman	*Opiliones sp.*
Class *Insecta*		
Order *Coleoptera*		
Cantharidae	goldenrod soldier beetle	*Chauliognathus pensylvanicus*
Cerambycidae	red milkweed beetle	*Tetraopes tetrophthalmus*
Chrysomelidae	Colorado potato beetle	*Leptinotarsa decemlineata*
Coccinellidae	Asian lady beetle	*Harmonia axyridis*
Order *Diptera*		
Asilidae	robber fly	*Laphria* sp.
Culicidae	mosquito	*Culicidae* sp.
Tabanidae	deer fly	*Chrysopsinae* sp.
Order *Hemiptera*		
Lygaeidae	large milkweed bug	*Oncopeltus fasciatus*
Miridae	tarnished plant bug	*Lygus lineolaris*
Order *Hymenoptera*		
Apidae	European honey bee	*Apis mellifera*
	great northern bumble bee	*Bombus fervidus*
	small carpenter bee	*Ceratina sp.*
Halictidae	sweat bee	*Agepostemon* sp.
	furrow bee	*Halictus* sp.
Ichneumonidae	bent-shielded besieger wasp	*Gnamptopelta obsidianator*
Sphecidae	great black wasp	*Sphex pensylvanicus*
Scoliidae	noble scoliid wasp	*Scolia nobilitata nobilitata*
Vespidae	metric paper wasp	*Polistes metricus*
Order *Lepidoptera*		
Attevidae	ailanthus webworm moth	*Atteva aurea*
Crambidae	common grass veneer	*Crambus praefectellus*
	changeable grass veneer	*Fissicrambus mutabilis*

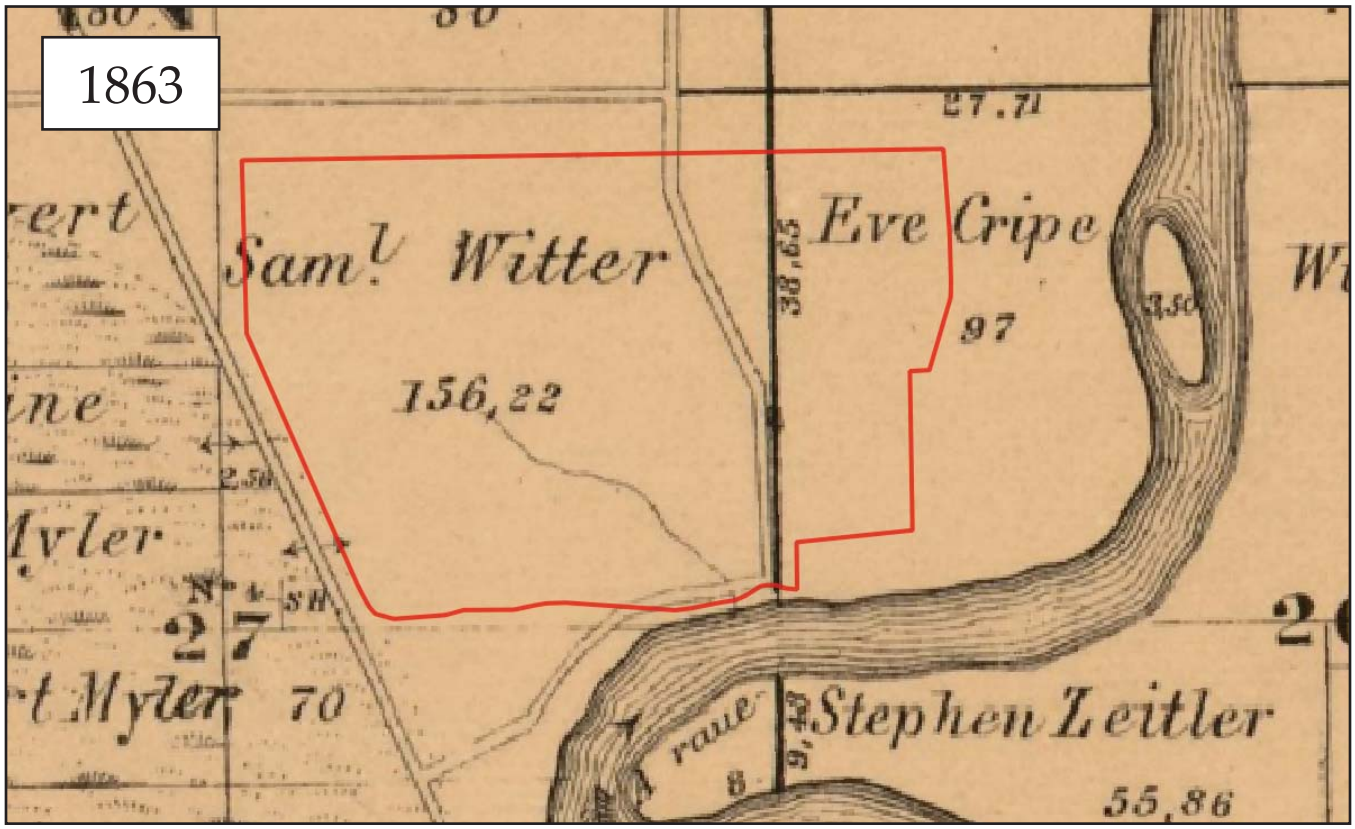
	lucerne moth	*Nomophila nearctica*
	two-banded petrophila moth	*Petrophila bifascialis*
	celery leaftier	*Udea rubigalis*
Eribidae	forage looper moth	*Caenurgina erechtea*
	yellow-collared scape moth	*Cisseps fulvicollis*
	LeConte's haploa	*Haploa lecontei*
	painted lichen moth	*Hypoprepia fucosa*
	angulate fan foot	*Macrochilo litophora*
	dark-banded owlet	*Phalaenophana pyramusalis*
	Virginia tiger moth	*Spilosoma virginica*
	grayish zanclognatha	*Zanclognatha pedipilalis*
Gelechiidae	lanceolate helcystogramma moth	*Helcystogramma hystricella*
Geometridae	common gray	*Anavitrinella pampinaria*
	one-spotted variant	*Hypagyrtis unipunctata*
	common metarranthis	*Metarranthis hypochraria*
	red-fringed emerald	*Nemoria bistriaria*
	common tan wave moth	*Pleuroprucha insulsaria*
Hesperiidae	common checkered skipper	*Burnsius communis*
	wild indigo duskywing	*Erynnis baptisiae*
	silver-spotted skipper	*Epargyreus clarus*
Lycaenidae	azure butterfly	*Celastrina* sp.
Nolidae	confused meganola	*Meganola minuscula*
Notodontidae	small heterocampa	*Heterocampa subrotata*
	white-dotted prominent	*Nadata gibbosa*
Nymphalidae	monarch	*Danaus plexippus*
	buckeye	*Junonia coenia*
	viceroy	*Limenitis archippus*
	red-spotted purple	*Limenitis arthemis*
	little wood satyr	*Megisto cymela*
	eastern comma	*Polygonia comma*
	question mark	*Polygonia interrogationis*
	pearl crescent	*Phyciodes tharos*
	red admiral	*Vanessa atalanta*
Papilionidae	black swallowtail	*Papilio polyxenes*
	eastern tiger swallowtail	*Papilio glaucus*
Pieridae	clouded sulphur	*Colias philodice*
	cabbage white	*Pieris rapae*

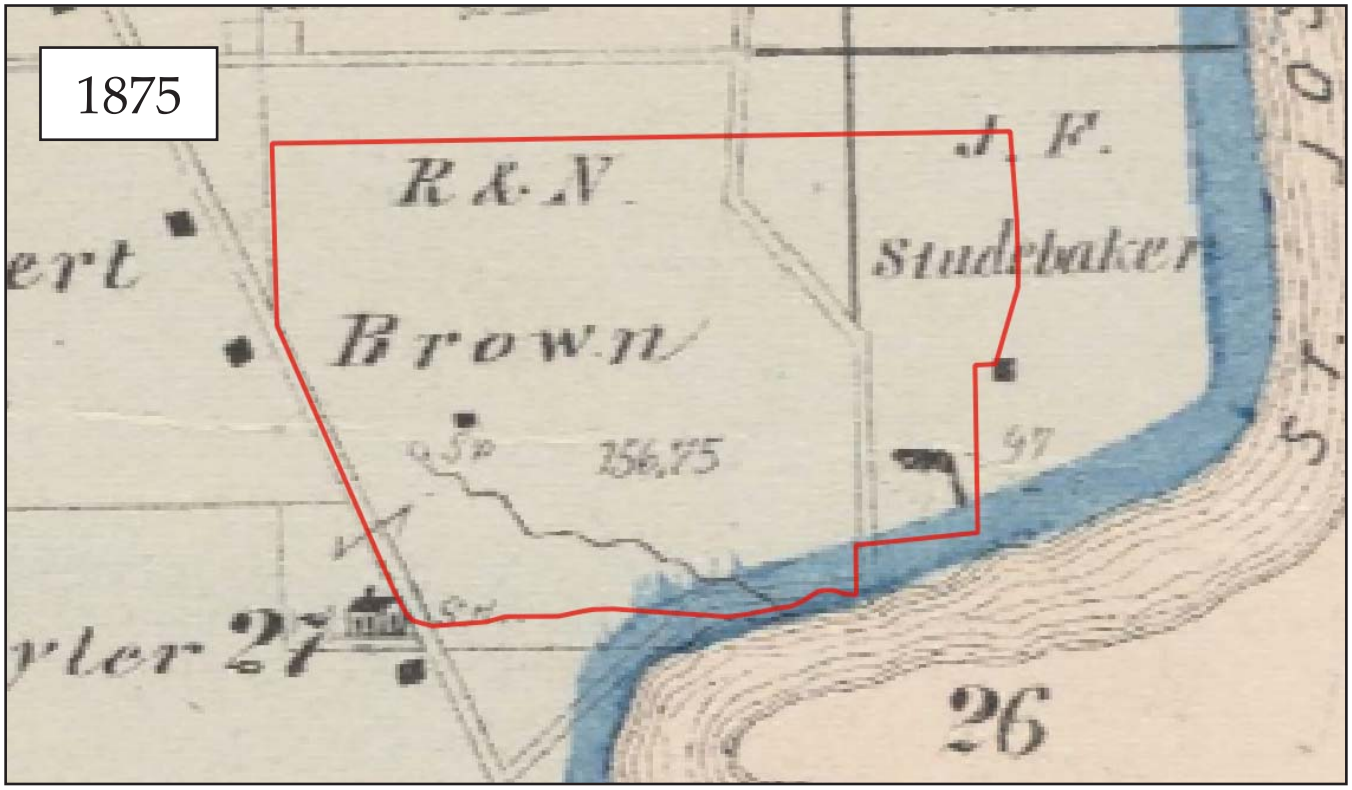
Pterophoroidea	grape plume moth	*Geina periscelidactylus*
Sphingidae	snowberry clearwing	*Hemaris diffinis*
Tortricidae	oblique-banded leafroller	*Choristoneura rosaceana*
	The Batman moth	*Coelostathma discopunctana*
Nymphalidae	hackberry emperor	*Asterocampa celtis*
Order *Neuroptera*		
Chrysopidae	green lacewing	*Chrysopinae* sp.
Order *Odanata*		
Aeshnidae	green darner	*Anax junius*
Libellulidae	calico pennant	*Celithemis elisa*
	Halloween pennant	*Celithemis eponina*
	eastern amberwing	*Perithemis tenera*
	common whitetail	*Plathemis lydia*
	ruby meadowhawk	*Sympetrum rubicundulum*
Class *Mammalia*		
Order *Artiodactyla*		
Cervidae	white-tailed deer	*Odocoileus virginianus*
Order *Carnivora*		
Procyonidae	raccoon	*Procyon lotor*
Order *Lagomorpha*		
Leporidae	eastern cottontail	*Sylvilagus floridanus*
Order *Rodentia*		
Sciuridae	groundhog	*Marmota monax*
	eastern gray squirrel	*Sciurus carolinensis*
	fox squirrel	*Sciurus niger*
	eastern chipmunk	*Tamias striatus*
Class *Reptilia*		
Order *Squamata*		
Colubridae	DeKay's brown snake	*Storeria dekayi*
Order *Testudines*		
Chelydridae	common snapping turtle	*Chelydra serpentina*

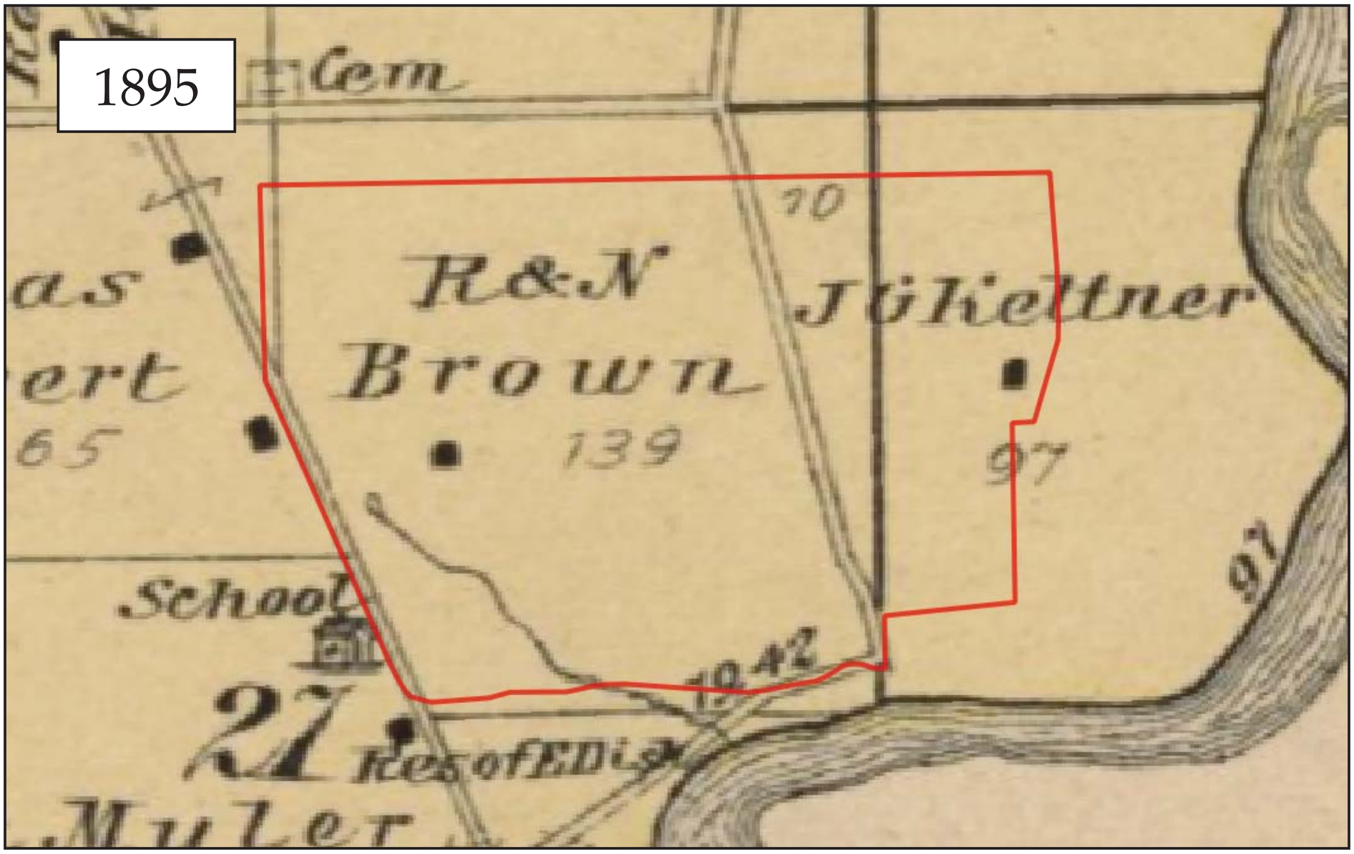
Appendix F — Fungi

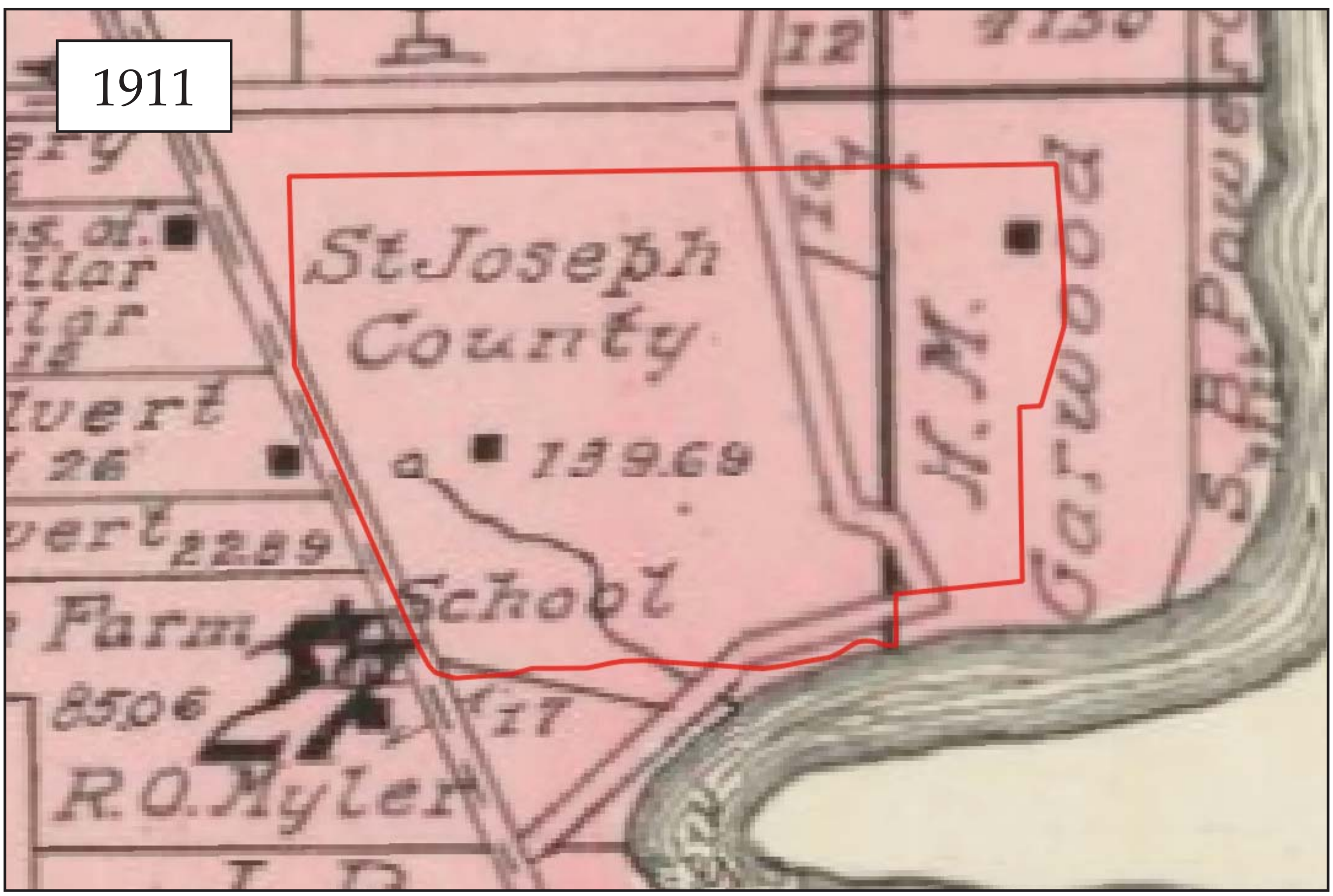
Family	Common Name	Taxonomic Name
Class *Agaricomycetes*		
Order *Agaricales*		
Lycoperdaceae	pear-shaped puffball	*Apioperdon pyriforme*
Psathyrellaceae	pleated inkcap	*Parasola plicatilis*
Strophariaceae	sulfer tuft	*Hypholoma fasciculare*
Order *Polyporales*		
Ganodermataceae	artist conk	*Ganoderma applanatum*
Polyporaceae	tinder fungus	*Fomes fomentarius*
Order *Russulales*		
Stereaceae	false turkey tail	*Stereum* sp.

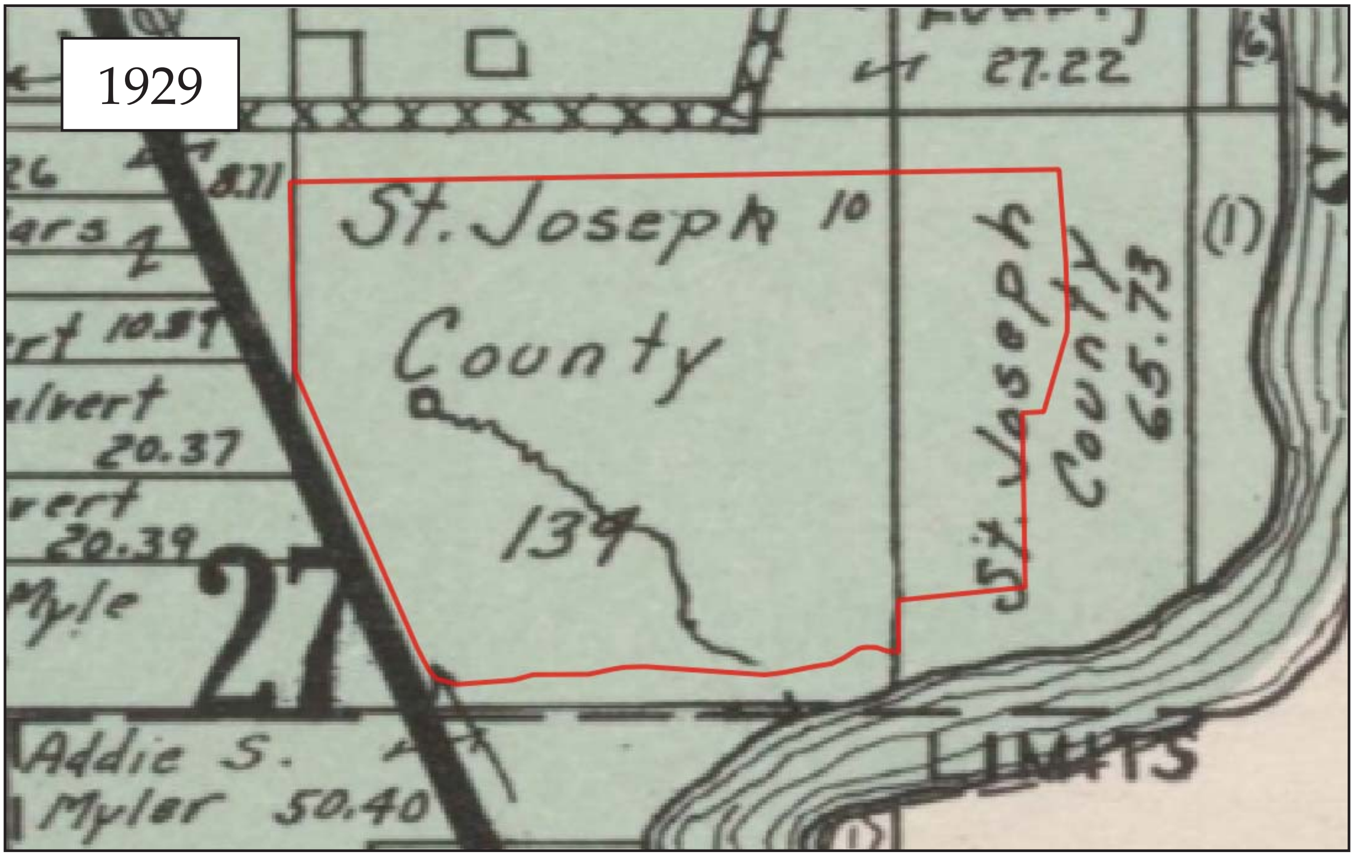
Appendix G — Historical Maps and Aerial Imagery

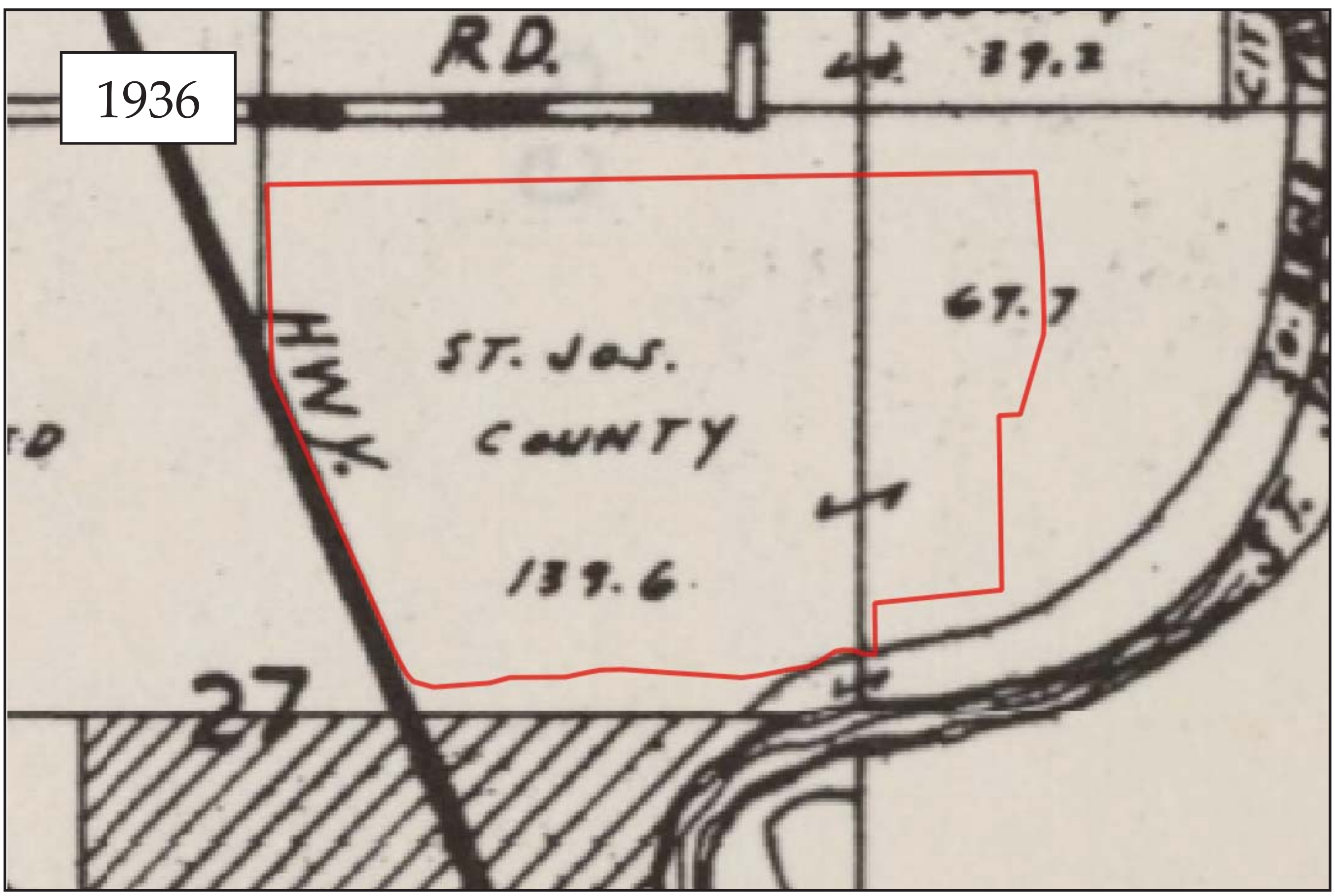


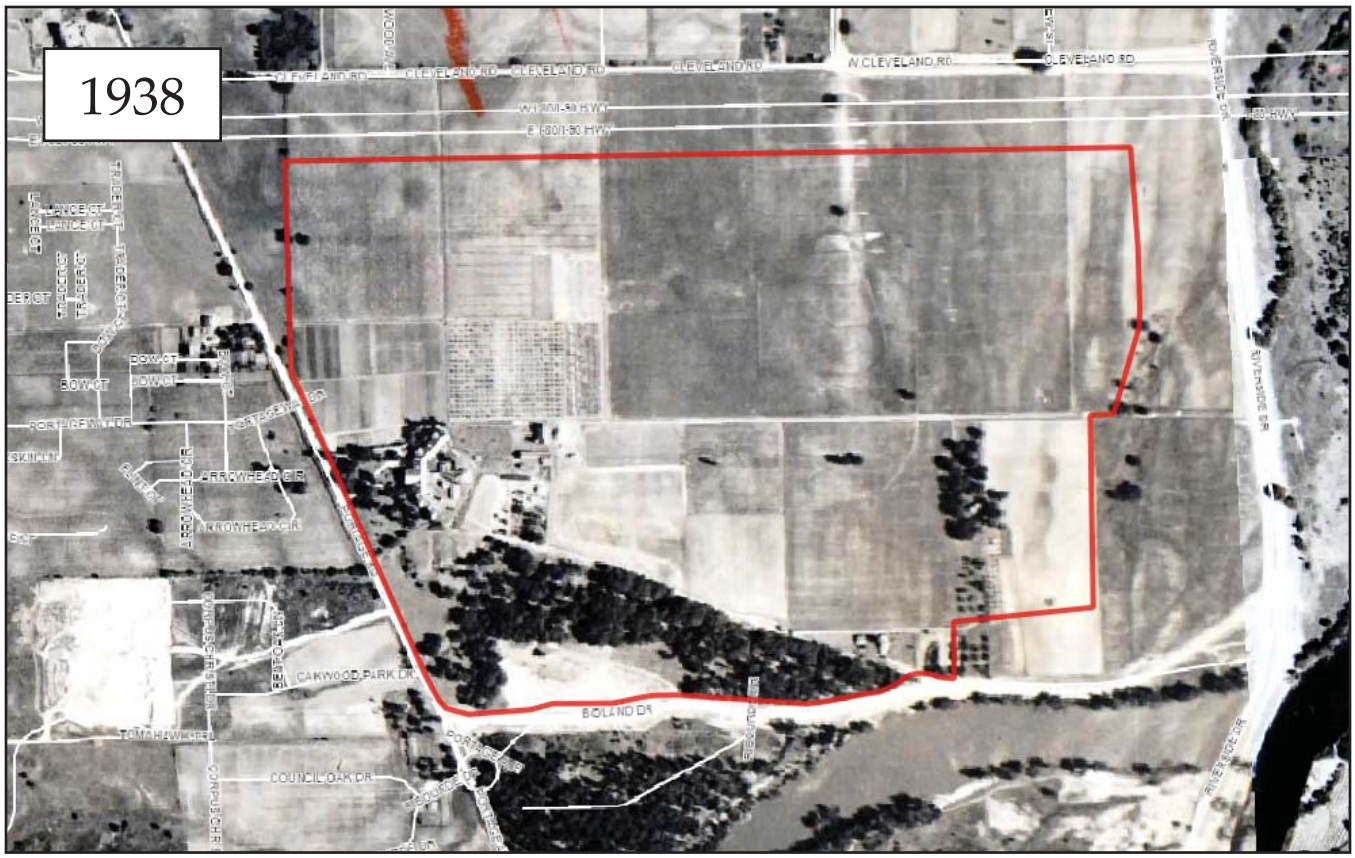


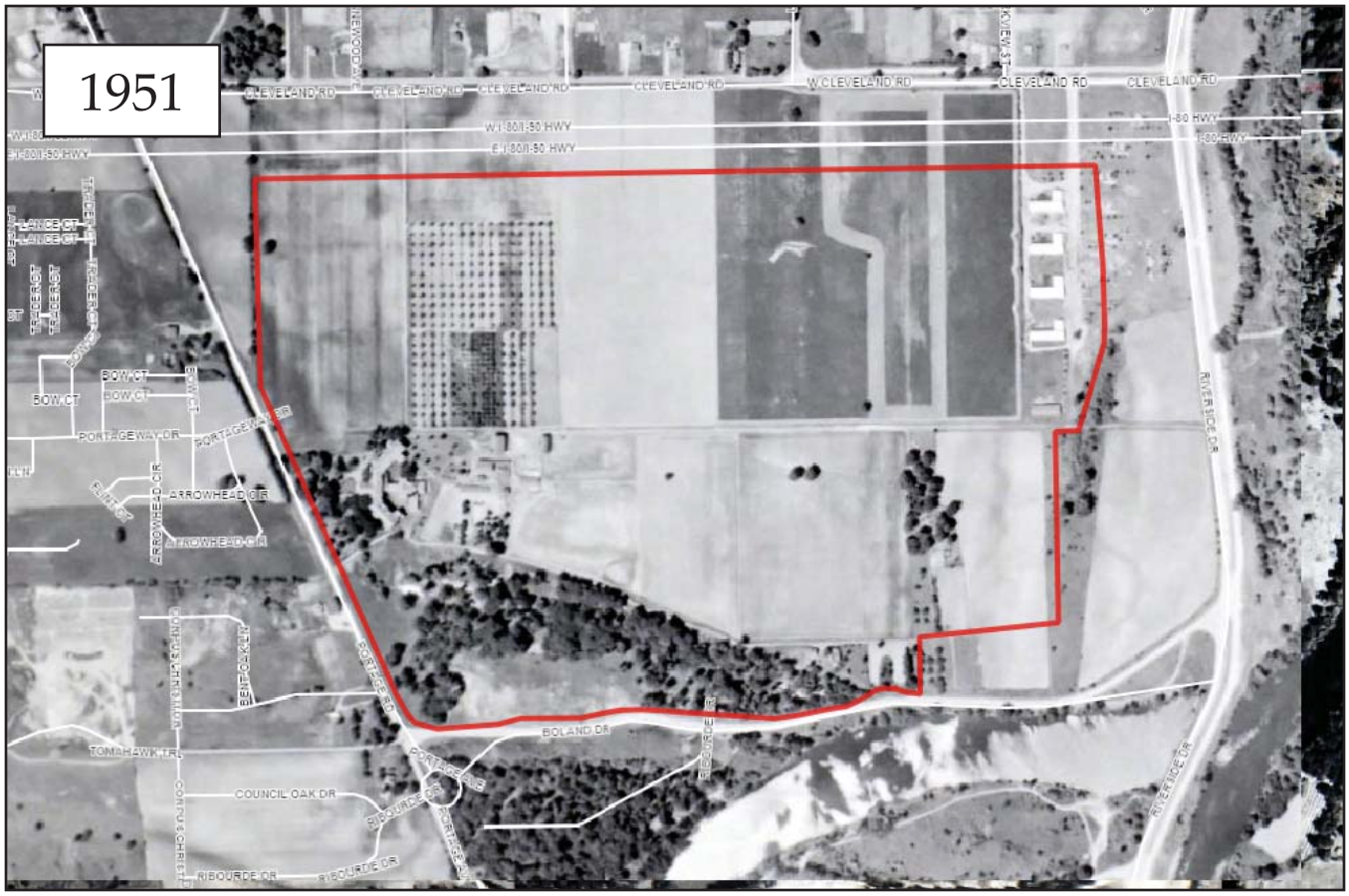

1895
Cem
70
R&N
Brown
139
J.G.Kettner
97
School
27
1942
ResofEDi
Myler
97

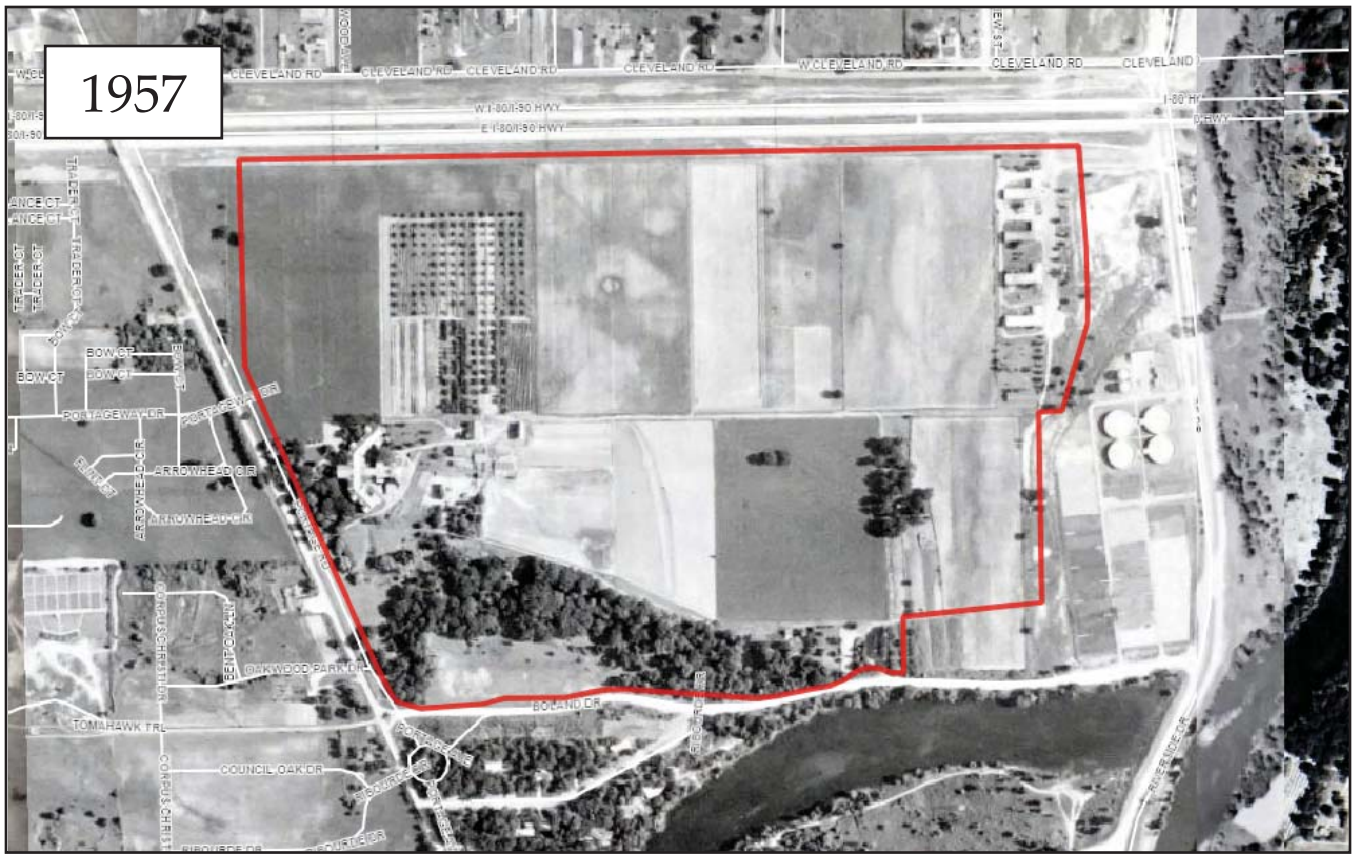

1911
12
St.Joseph
County
139.69
School
Garwood
Farm
8506
R.O.Myler
17
2289
26

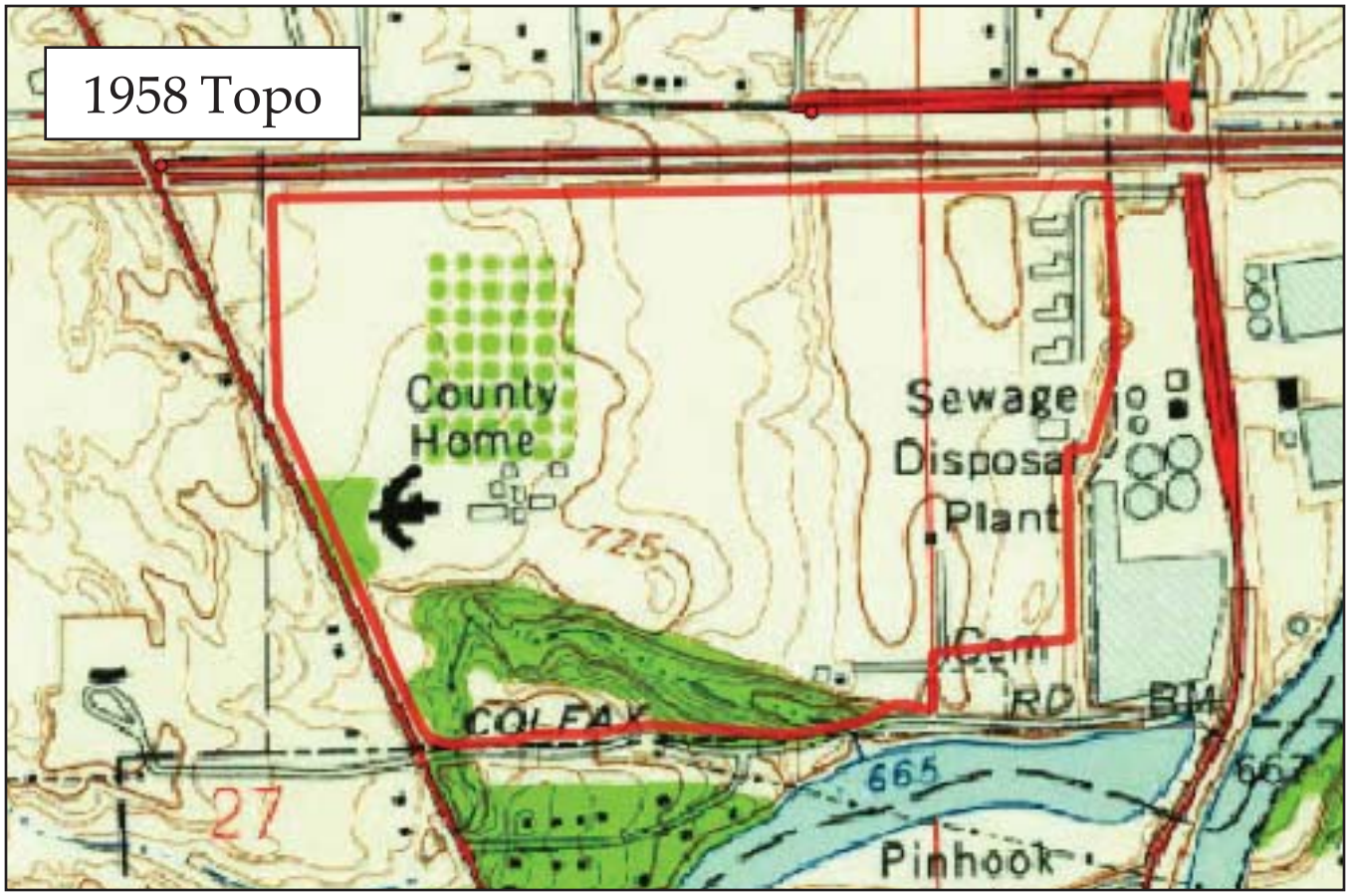

1929
27.22
8.71
St. Joseph
10
County
139
St. Joseph County
65.73
(1)
10.59
20.37
20.39
27
Addie S.
Myler 50.40
LIMITS

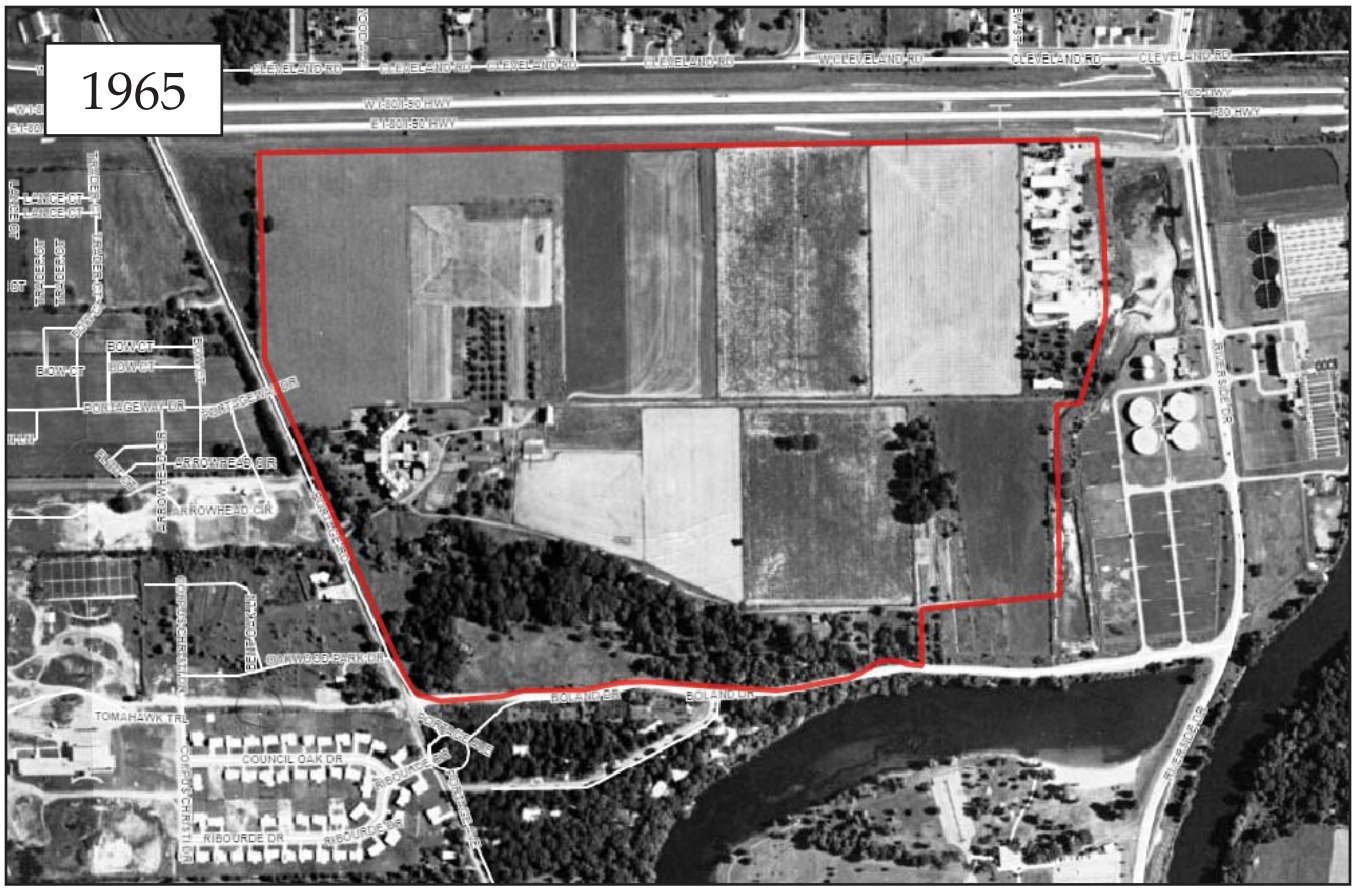

1936
RD.
67.7
ST. JOS.
COUNTY
139.6
HWY.
27


1938
W CLEVELAND RD
CLEVELAND RD
W I-80/I-90 HWY
E I-80/I-90 HWY
RIVERSIDE DR
BOW CT
PORTAGE WAY DR
ARROWHEAD CIR
OAKWOOD PARK DR
BOLAND DR
TOMAHAWK TRL
COUNCIL OAK DR
RIBOURDE DR

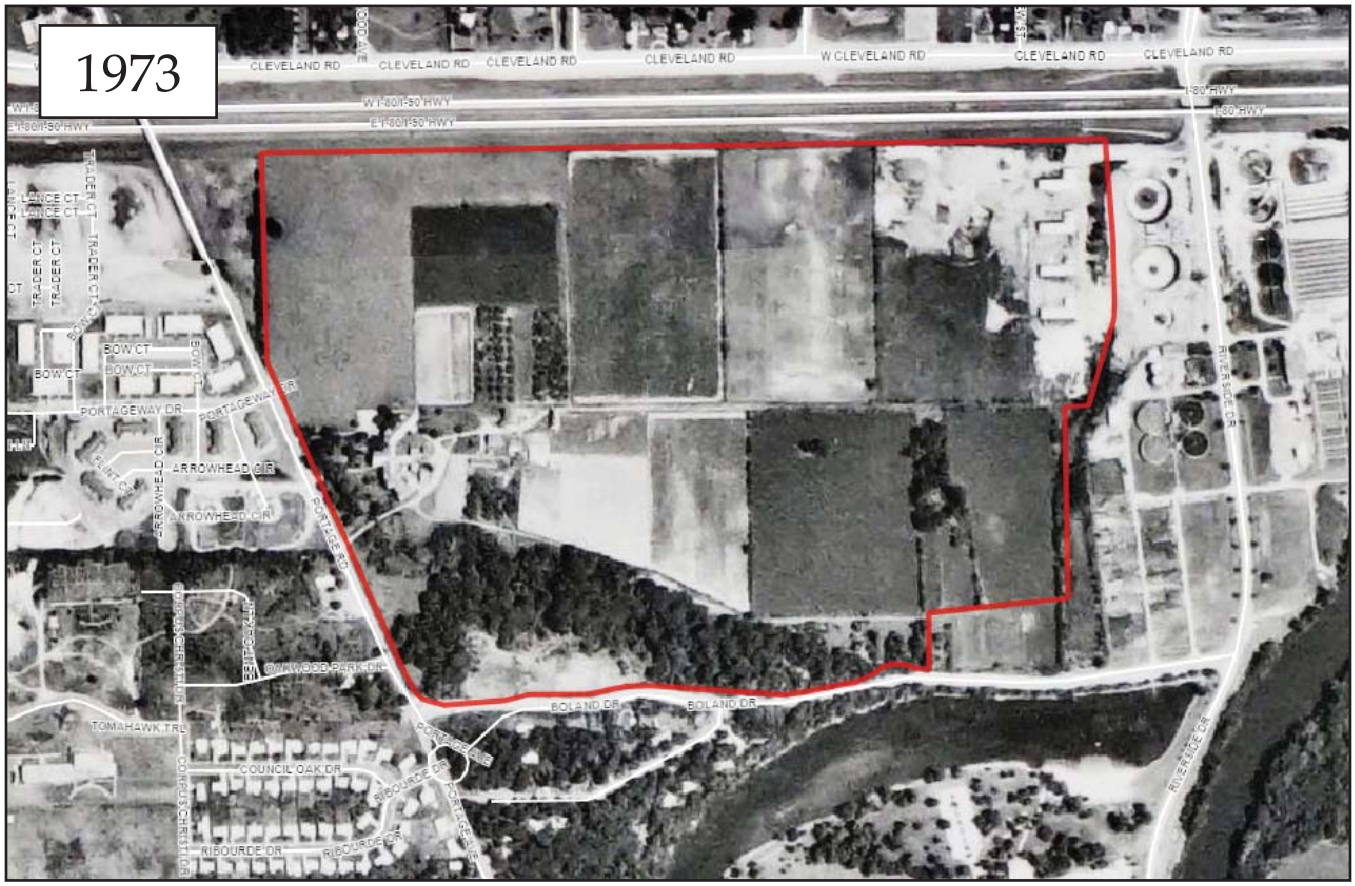

1951
CLEVELAND RD
W CLEVELAND RD
W I-80/I-90 HWY
E I-80/I-90 HWY
I-80 HWY
RIVERSIDE DR
BOW CT
PORTAGE WAY DR
ARROWHEAD CIR
BOLAND DR
TOMAHAWK TRL
COUNCIL OAK DR
RIBOURDE DR


1957
CLEVELAND RD
W I-80/I-90 HWY
E I-80/I-90 HWY
BOLAND DR
OAKWOOD PARK DR
TOMAHAWK TRL
COUNCIL OAK DR
ARROWHEAD CIR
PORTAGEWAY DR
BOW CT


1958 Topo
County Home
Sewage Disposal Plant
725
COLFAX
RD
665
Pinhook
27


1965
CLEVELAND RD
W HIGHLAND HWY
E HIGHLAND HWY
BOW CT
PORTAGE WATER DR
ARROWHEAD DR
ARROWHEAD CIR
OAKWOOD PARK DR
BOLAND DR
TOMAHAWK TRL
COUNCIL OAK DR
RIBOURDE DR


1969 TOPO
County
Home
Sewage
Disposal
725
Christi
ch
27
RD
BM
665


1973
CLEVELAND RD
W I-80/I-90 HWY
E I-80/I-90 HWY
I-80 HWY
BOW CT
PORTAGEWAY DR
ARROWHEAD CIR
OAKWOOD PARK DR
BOLAND DR
TOMAHAWK TRL
COUNCIL OAK DR
RIBOURDE DR
RIVERSIDE DR


1976
CLEVELAND RD
W I-80/I-90 HWY
I-80 HWY
BOW CT
PORTAGEWAY DR
ARROWHEAD CIR
OAKWOOD PARK DR
BOLAND DR
TOMAHAWK TRL
COUNCIL OAK DR
RIVERSIDE DR

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