Elsesser East Woodland

Bio-Inventory Report

Submitted to
MSU Campus Natural Areas Classroom, Curriculum and Conservation
Committee Submitted February 2024 by Sean Ward

Executive Summary and Recommendations

Elsesser East Woodland is a good representation of a southern mesic forest with its 13 tree species in the canopy and rich herbaceous ground layer. We found a total of 61 species of vascular plants in this woodlot. Of these, 36 were native species to Michigan. Based on a Floristic Quality Assessment for this woodland and the adjacent Clever Woodland, the plant diversity represented here is poor. Several non-native species were found, but abundance was generally low within the woodlot. Most non-native species are confined to the edges around the fence line. There is no evidence of past or ongoing research here, and trash was generally absent.

From a conservation perspective, the most notable feature here is the richness of the native wildflowers within the herbaceous layer. Most fragmented woodlots surrounded by agricultural land have highly grazed herbaceous layers (see Box Woodland and Clever Woodland reports). Elsesser East Woodland is surrounded by the MSU Swine Teaching and Research Center and University Farms Service Center, requiring clearance for access. Isolation from the public might give it value for research and teaching. This woodland was surveyed in June 2023.

Recommendations

1. The wildflower-rich herbaceous layer should be protected from deer browsing and other human or animal disturbances from the University Farms Service Center.
2. Invasive species should be managed before they become well established here.

Forest Inventory

Overstory

13 tree species were found in the overstory (>4" dbh) within Elsesser East Woodland. Of these, three were encountered in a fixed-area plot inventory and the other 10 were encountered during a meandering survey of the woodlot. Living overstory (>4" dbh) trees had a total basal area of 86.3 ft^2 ac^{-1} and a stem density of 180 trees per acre. Sugar maple (*Acer saccharum*) is this woodlot's most important overstory species and it has the highest relative density and frequency (Table 1). However, the large and abundant mature American beech has the highest relative dominance in this woodland.

The ten other overstory species which were identified during a meandering survey include black maple, bitternut hickory, hackberry, white ash, green ash, tulip tree, black cherry, red oak, ironwood, and common buckthorn.

Table 1. Overstory stand composition. Relative dominance is the percentage of the total stand basal area made up by each species, relative density is the percentage of total individuals and relative frequency is the percentage of plots in which a species was found. Importance Value (IV) is a summary statistic that averages across relative dominance, density, and frequency.

Species	Rel. Dominance	Rel. Density	Rel. Frequency	Importance Value
Acer saccharum	46.4	63.0	100.0	69.8
Fagus grandifolia	48.2	33.3	66.7	49.4
Ostrya virginiana	5.4	3.7	33.3	14.1

Understory

Elsesser East supports an estimated 1,930 sapling stems per acre (at least 4.5 feet tall and </= 4" dbh). The dominant species in the sapling class is sugar maple, with a 66% relative frequency. These saplings were common in two of three plots and throughout the rest of the woodlot. American beech has a 33% relative frequency (Table 2). The high density of dead understory saplings in the sapling layer coupled with a lack of representation from other species suggests that these two species will continue to dominate in the overstory.

Table 2. Composition and size class distribution of the sapling layer in Elsesser East Woodland. Relative density and relative frequency for each species are expressed as a percentage of the total number of saplings, whereas individuals within each sapling size class are expressed as trees per acre.

Species	**Rel. Dens.**	**Rel. Freq.**	**1" TPA**	**2" TPA**	**3" TPA**	**4" TPA**
Acer saccharum	63.8	66.7	35	1	1	0
Fagus grandifolia	5.2	33.3	1	1	1	0
Acer saccharum (dead)	24.2	66.7	13	0	1	0
Fagus grandifolia (dead)	6.8	33.3	0	0	4	0

Regeneration Layer

Four tree species were identified in fixed area seedling layer (<4.5 feet tall): sugar maple, American beech, green ash, and black cherry (Table 3). There is no real dominating species in the seedling layer. However, sugar maple occurs in all three plots and has an average estimated ground coverage of 10%. American beech seedlings were found in one plot, but at a 15% coverage.

Table 3. Coverage and relative frequency of tree species in the seedling layer. Coverage is an estimate of the ground area of the plot covered by that species and relative frequency is the percentage of plots in which that species was found.

Species	Average % Coverage	Rel. Frequency
Acer saccharum	10.8	100
Fagus grandifolia	15.0	33.3
Fraxinus pennsylvanica	2.5	33.3
Prunus serotina	2.5	66.7

Stand Condition, Snags and Coarse Woody Debris

All of the inventoried overstory trees were assigned to one of three Risk Classes based on structural integrity and evidence of disease/pest issues: RC1 = very low probability of dying during the next 20 years, RC2 = moderate probability of dying over the next 20 years, and RC3 = high probability of dying over next 20 years. Of the total stand basal area of 86.2 $ft^2\ ac^{-1}$, 92.7% (79.9 $ft^2\ ac^{-1}$) was in Risk Class 1 trees, 0.7% (0.6 $ft^2\ ac^{-1}$) was in Risk Class 2 with 6.5% (5.6 $ft^2\ ac^{-1}$) in Risk Class 3. On an individual tree basis, 88.8% (160 trees per acre) were in Risk Class 1, 3.6% (6.6 trees per acre) were in Risk Class 2, and 7.3% (13.3 trees per acre were in Risk Class 3. In addition to living trees, 2 standing dead (snags) trees were found per acre, which together accounted for 25.9 $ft^2\ ac^{-1}$. Of the 6.6 snags per acre 50% were in decay class 1, and 50% were in decay class 2.

Across the woodlot, an average of 44.0 $m^3\ ha^{-1}$ of coarse woody debris (CWD) was identified. Variability across the woodlot was ranged from 32 to 55 $m^2\ ha^{-1}$. A CV of 36% was identified.

Forest Inventory Summary and Conclusions

Elsesser East Woodland contains a good representation of a mesic southern forest as defined by the Michigan Natural Features Inventory (Cohen et al. 2020). The overstory is dominated by shade-tolerant sugar maple and American beech, but also has supporting species. Non-native plants were identified within Elsesser East Woodland with most being right along the fence line with Clever Woodland and the agricultural boundary. Non-native species may likely be amplified by Elsesser East's immediate placement next to agricultural land. The only invasive species consistently observed in the forest interior was Amur honeysuckle (*Lonicera maackii*) which appeared throughout the woodlot. All invasive shrubs occurred as widely spaced, isolated individuals with no apparent invasion front. Cut and spray treatments of these species would be quite manageable at this stage and could prevent further spread.

The spring ephemeral and native herbaceous layer in Elsesser East are unusually dense for a woodland of this size. Trillium, mayflowers, mayapple, blue cohosh, and bloodroot were remarkably abundant. Beech drops were identified around mature American beech trees – an indication of a high-quality woodland.

Botanical Assessment

Overall, 61 different species of vascular plants were found in Elsesser East Woodland (Table 4). Of the species identified, 36 were native and 25 were non-native. Only two of the native species have a high C value, indicative of fidelity to high quality native habitats. Specifically, these are tulip tree and beech drops. This species list resulted in a total Floristic Quality Index (FQI) of 19.5 for Elsesser East Woodland and Clever Woodland combined. This was likely brought down by the high abundance of non-native species present in Clever Woodland that might expand into Elsesser East. The FQI measures the botanical quality of a site from a biodiversity conservation perspective, an FQI score less than 20 indicates that the site is of insignificant value in terms of plant biodiversity, a score greater than 35 indicates an important site for plant biodiversity, and a score greater than 50 indicates a site with outstanding plant biodiversity value.

Table 4. Listing of all vascular plants identified to species in and around Elsesser East Woodland in June and July of 2023.

Scientific Name	**Family**	**Native**	**Physiognomy**
Abutilon theophrasti	Malvaceae	non-native	forb
Acer nigrum	Sapindaceae	native	tree
Acer saccharum	Sapindaceae	native	tree
Actaea pachypoda	Ranunculaceae	native	forb
Alliaria petiolata	Brassicaceae	non-native	forb
Amaranthus retroflexus	Amaranthaceae	non-native	forb
Arctium minus	Asteraceae	non-native	forb
Arisaema triphyllum	Araceae	native	forb

Berberis thunbergii	Berberidaceae	non-native	shrub
Carex albursina	Cyperaceae	native	sedge
Carya cordiformis	Juglandaceae	native	tree
Caulophyllum thalictroides	Berberidaceae	native	forb
Celtis occidentalis	Cannabaceae	native	tree
Centaurea stoebe	Asteraceae	non-native	forb
Cichorium intybus	Asteraceae	non-native	forb
Circaea canadensis	Onagraceae	native	forb
Comarum palustre	Rosaceae	native	forb
Datura stramonium	Solanaceae	non-native	forb
Daucus carota	Apiaceae	non-native	forb
Epifagus virginiana	Orobanchaceae	native	forb
Euonymus obovatus	Celastraceae	native	shrub
Fagus grandifolia	Fagaceae	native	tree
Fraxinus americana	Oleaceae	native	tree
Fraxinus pennsylvanica	Oleaceae	native	tree
Geum canadense	Rosaceae	native	forb
Hesperis matronalis	Brassicaceae	non-native	forb
Juglans nigra	Juglandaceae	native	tree
Leonurus cardiaca	Lamiaceae	non-native	forb
Liriodendron tulipifera	Magnoliaceae	native	tree
Lonicera maackii	Caprifoliaceae	non-native	shrub
Lotus corniculatus	Fabaceae	non-native	forb

Maianthemum racemosum	Convallariaceae	native	forb
Ostrya virginiana	Betulaceae	native	tree
Oxalis stricta	Oxalidaceae	native	forb
Parthenocissus quinquefolia	Vitaceae	native	vine
Phalaris arundinacea	Poaceae	native	grass
Phytolacca americana	Phytolaccaceae	native	forb
Pilea pumila	Urticaceae	native	forb
Plantago lanceolata	Plantaginaceae	non-native	forb
Poa pratensis	Poaceae	non-native	grass
Podophyllum peltatum	Berberidaceae	native	forb
Polygonatum pubescens	Convallariaceae	native	forb
Prunus serotina	Rosaceae	native	tree
Prunus virginiana	Rosaceae	native	shrub
Quercus rubra	Fagaceae	native	tree
Rhamnus cathartica	Rhamnaceae	non-native	tree
Ribes cynosbati	Grossulariaceae	native	shrub
Rubus occidentalis	Rosaceae	native	shrub
Rumex obtusifolius	Polygonaceae	non-native	forb
Sambucus racemosa	Adoxaceae	native	shrub
Sanguinaria canadensis	Papaveraceae	native	forb
Silene latifolia	Caryophyllaceae	non-native	forb
Smilax hispida	Smilacaceae	native	vine
Solanum dulcamara	Solanaceae	non-native	vine

Torilis japonica	Apiaceae	non-native	forb
Trifolium pratense	Fabaceae	non-native	forb
Trifolium repens	Fabaceae	non-native	forb
Trillium grandiflorum	Trilliaceae	native	forb
Verbascum blattaria	Scrophulariaceae	non-native	forb
Verbascum thapsus	Scrophulariaceae	non-native	forb
Verbena urticifolia	Verbenaceae	native	forb
Viola odorata	Violaceae	non-native	forb

Concerns, Threats, and Human Impacts

Research/Teaching Artifacts

There is no evidence of research and/or teaching activities within Elsesser East Woodland.

Trash, Structures or Other Human Disturbance

Very little non-research trash was evident anywhere within Elsesser East Woodland. A pile of dirt and rocks has been pushed to the edge of the woodland, likely from the agricultural field.

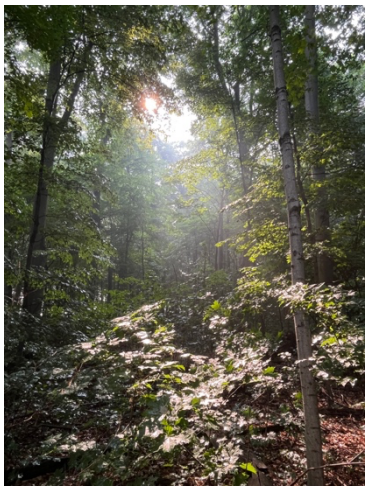
Figure 1. Disturbances: The pile of dirt, stones, and wood at the edge of the woodlot. The Clever boundary fence showing a rich understory in Elsesser East and a lack thereof in Clever.

Biotic Concerns

The rich herbaceous layer is one of this woodland's greatest assets and protecting this from over browsing from deer is important. No other biotic concerns were identified in this woodland.

Figure 2. Images showing (from left to right) spring wildflowers, a fixed area plot with a thick understory, and an opening in the canopy.

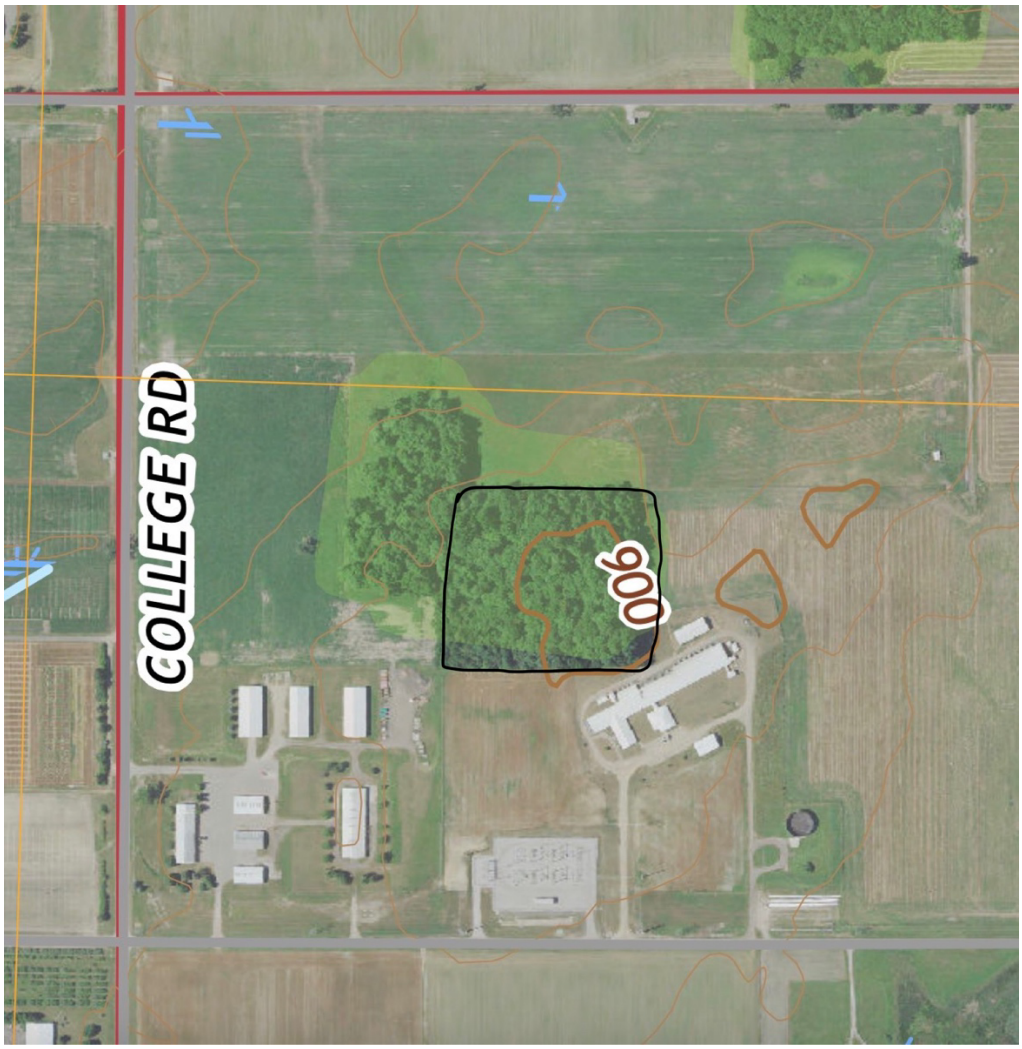




Water Features

No water features were observed in Elsesser East Woodland.

Figure 3. Map of Elsesser East



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References

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