Elsesser West Woodland

Bio-Inventory Report

Submitted to

MSU Campus Natural Areas Classroom, Curriculum and Conservation
Committee Submitted August 2021 by Matthew Peña

Executive Summary and Recommendations

Elsesser West Woodland is a fairly decent representation of a mature southern mesic forest. Its overstory is fairly diverse on paper, however it is important to note that some of its overstory species were observed either on the fence line, only a handful of times, or both. Elsesser West's biodiversity is expected to decrease over time due to the dominance of sugar maple in the understory and regeneration layers. We found a total of 43 vascular plants, 36 of which are native to Michigan. Based on a Floristic Quality Assessment, the plant diversity represented at Elsesser West is slightly underwhelming, however still fairly impressive given its small size. Several invasive species were observed at this woodland, but they were observed in very low numbers. Highly invasive species such as garlic mustard and tartarian honeysuckle were both observed very sparsely and should be very easy to manage. There is some evidence of research going on within the woodland that appears to be active, however we are unable to determine if it is. There are new plantings as well that are growing on the northwestern corner. There were 30 total individuals planted, however only 28 are currently alive.

Overall, the main observation is the relatively high biodiversity. Despite being a very small woodland, there are still 43 species of vascular plants that thrive within the forest. 3 of these species are currently growing only as the new plantings that were planted in 2019. The high concentration of sugar maple within the sapling and seedling layers will decrease the biodiversity over time, but with a good forest management plan that promotes non-sugar maple growth, this woodlot could very easily become a pocket of high quality diverse southern mesic forest.

Recommendations
1. There are currently no fences surrounding Elsesser West at all, so CNAC should talk with the farmers and decide whether it is best to leave this woodland unfenced, or if they should put up fencing.
2. Work with the farmers to monitor the health of the new plantings as 2 of them have died within a 2 year span.
3. Find out if the research experiments found in Elsesser West are active or not and deal with them accordingly.

Forest Inventory
Overstory

We found a total of 10 species of trees in the overstory (>4" dbh) at Elsesser West Woodland; 4 of these were encountered in our fixed-area plot inventory and 7 were found during our walking survey of the property. Living overstory (>4" dbh) trees at Elsesser West Woodland had a total basal area of 165.5 ft^2 ac^{-1} and a stem density of 140 trees per acre. Due to the size of the woodland, there was only 1 plot we surveyed, so it is hard to tell which species is the most important in the overstory. Based on the data from the plot, sugar maple (*Acer saccharum*) was the most dominant species with a relative dominance of 3.7, however red oak (*Quercus rubra*) was found to have the highest relative density, with a value of 42.9, as well as the highest importance value of 47.9 (Table 1). Based on our walking survey, there appeared to be more sugar maples in the overstory which would make it the most important species in Elsesser West, however there is no data to back up that claim. We also found basswood (*Tilia americana*), within our plot, which has the lowest relative dominance, density, and importance value of the plot. Black cherry (*Prunus serotina*) was also found within our plot, however only as a sapling. Overstory individuals of this species were observed outside of our plot. Along with those, there were 7 overstory species we observed on our walkthrough survey: American beech (*Fagus grandifolia*), American elm (*Ulmus americana*), black maple (*Acer nigrum*), boxelder maple (*Acer negundo*), green ash (*Fraxinus pennsylvanica*), silver maple (*Acer saccharinum*), and white oak (*Quercus alba*). American beech, American elm, and silver maple were all observed fairly frequently, however silver maple was only observed along the edges of the forest. This suggests that American beech and elm were the two most important overstory species that were not caught in our plot. Black maple and green ash were seen only a handful of times, and like silver maple, green ash was only observed on the forest's edges. Boxelder maple and white oak were only observed once each and both instances were on the edge. Silver maple, green ash, and boxelder maple were all observed around the northwestern corner of the woodland, an area that has been said to receive some flooding, and also the area where the new plantings are growing. The presence of these 3 species within the woodland's boundaries, albeit on the fence line, back up the claim that the northeastern corner is very wet and prone to flooding.

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	IV
Basswood	0.4	28.6	100	42.9
Red Oak	0.9	42.9	100	47.9
Sugar Maple	3.7	28.6	100	44.1

Understory

Based on our inventory plots we estimate that there are a total of 3000 stems per acre of trees recruiting into the sapling class (at least 4.5 feet tall and </= 4" dbh) at Elsesser West Woodland. Just based on our small sample size, sugar maple was the more dominant species as it accounted for 83.3% of the saplings we observed (Table 2). The only other sapling we observed within our plot, black cherry, accounted for 16.7% of the saplings we observed. Based on our small sample size, we can conclude that although sugar maple will be even more dominant in the future (due to the amount of 1" in. TPA), black cherry will still persist for a while as it exists within the 2" in. and 3" in. dbh classes. Along with these species, we also observed white ash (*Fraxinus americana*), ironwood (*Ostrya virginiana*), and common buckthorn (*Rhamnus cathartica*) as saplings within the woodland. None of these species occurred within our plot, and none were observed as overstory trees either.

Table 2. Composition and size class distribution of the sapling layer in Elsesser West 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
Black Cherry	16.7	100	100	300	100	0
Sugar Maple	83.3	100	2500	0	0	0

Regeneration Layer

We observed 3 species of trees regenerating in the seedling layer (<4.5 feet tall): bitternut hickory (*Carya cordiformis*), black cherry, and sugar maple. Sugar maple dominated this seedling layer as it covered roughly 62.5% of the plot ground. Black cherry had an average coverage percentage of 15%, and bitternut hickory had a 2.5% average coverage. Even despite a small sample size, we can conclude that sugar maple dominates the sapling class of Elsesser West based on both the plot data, and data collected from other woodlands. Just like in other woodlands we have collected data for (ex. Hudson, Toumey, Southworth, and Minnis), the majority of the seedling layer at Elsesser West is covered by sugar maple. Along with this, we observed lots of sugar maple regenerating in the seedling layer throughout our walking survey. Therefore, it would be a logical conclusion that sugar maple is the most dominant tree species that is regenerating within Elsesser West Woodland.

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
Bitternut Hickory	2.5	100
Black Cherry	15	100
Sugar Maple	62.5	100

New Plantings

      Due to farmers cutting down some trees from the woodland back in 2019, there are some new plantings in the woodland that have been given an area in the northeast corner to grow with full sunlight. While not a part of the current foliage of the woodland, these new plantings will eventually integrate in. The species that were planted are basswood, sycamore (*Platanus occidentalis),* swamp white oak (*Quercus bicolor*), and tuliptree (*Liriodendron tulipifera*). There are 30 total saplings planted: 7 basswood, 9 sycamore, 9 swamp white oak, and 5 tuliptree (Table 4). However, 2 of the sycamore saplings have died, which leaves 7 sycamore saplings left and 28 total living trees.

Table 4. Numbers of saplings per species of each of the new plantings in Elsesser West Woodland.

Species	# Living	# Dead
Basswood	7	0
Sycamore	7	2
Swamp White Oak	9	0
Tuliptree	5	0

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 165.5 ft^2 ac^{-1}, 100% of the trees were in Risk Class 1. There were no trees observed in Risk Classes 2 or 3. We also did not observe any dead trees within our plot.

      Inside of our plot, we observed 10.4 m^3 ha^{-1} of coarse woody debris (CWD). The CWD representation of this woodland consisted of only one log, which was observed in decay class 3.

Forest Inventory Summary and Conclusions

      Elsesser West Woodland contains a decent example of mature Mesic Southern Forest as defined by the Michigan Natural Features Inventory (Cohen et al. 2020). The overstory is largely composed of sugar maple, has many red oaks, and has a variety of many species, however several of these overstory species are seen in low quantities, on the forest fence line,

or both. The seedling and sapling layers both are dominated by sugar maple, which could suggest that sugar maple may out-compete other species as time goes on. The introduction of 3 new overstory species from the new plantings will help the forest maintain biodiversity as well once they get integrated into the woodland.

Botanical Assessment

Overall we found 43 different species of vascular plants in Elsesser West Woodland, although one of these could not be identified to species (Table 4). This species was an unidentified member of the family Apiaceae. Of the 42 species completely identified, 35 were native and 7 were non-native. Several of the native species have a high C value, indicative of fidelity to high quality native habitats. This species list resulted in an overall Floristic Quality Index (FQI) of 23.3 for Elsesser West Woodland. 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 West Woodland in June, 2021.

Scientific Name	Family	Native?	C	Form	Duration	Common Name
Acer negundo	Sapindaceae	native	0	tree	perennial	box-elder
Acer nigrum; a. saccharum	Sapindaceae	native	4	tree	perennial	black maple
Acer saccharinum	Sapindaceae	native	2	tree	perennial	silver maple
Acer saccharum	Sapindaceae	native	5	tree	perennial	sugar maple
Alliaria petiolata	Brassicaceae	non-native	0	forb	biennial	garlic mustard
Allium tricoccum	Alliaceae	native	5	forb	perennial	wild leek
Arctium minus	Asteraceae	non-native	0	forb	biennial	common burdock
Arisaema triphyllum	Araceae	native	5	forb	perennial	jack-in-the-pulpit
Berberis thunbergii	Berberidaceae	non-native	0	shrub	perennial	japanese barberry
Carya cordiformis	Juglandaceae	native	5	tree	perennial	bitternut hickory
Carya laciniosa	Juglandaceae	native	9	tree	perennial	shellbark hickory
Celtis occidentalis	Cannabaceae	native	5	tree	perennial	hackberry

Circaea canadensis; c. lutetiana	Onagraceae	native	2	forb	perennial	enchanters-nightshade
Cirsium vulgare	Asteraceae	non-native	0	forb	biennial	bull thistle
Euonymus obovatus	Celastraceae	native	5	shrub	perennial	running strawberry-bush
Fagus grandifolia	Fagaceae	native	6	tree	perennial	american beech
Fraxinus americana	Oleaceae	native	5	tree	perennial	white ash
Fraxinus pennsylvanica	Oleaceae	native	2	tree	perennial	red ash
Geranium maculatum	Geraniaceae	native	4	forb	perennial	wild geranium
Gillenia trifoliata; porteranthus t.	Rosaceae	native	8	forb	perennial	bowmans root
Liriodendron tulipifera	Magnoliaceae	native	9	tree	perennial	tulip tree
Lonicera tatarica	Caprifoliaceae	non-native	0	shrub	perennial	tartarian honeysuckle
Melilotus albus	Fabaceae	non-native	0	forb	biennial	white sweet-clover
Ostrya virginiana	Betulaceae	native	5	tree	perennial	ironwood; hop-hornbeam
Parthenocissus inserta	Vitaceae	native	4	vine	perennial	thicket creeper
Parthenocissus quinquefolia	Vitaceae	native	5	vine	perennial	virginia creeper
Platanus occidentalis	Platanaceae	native	7	tree	perennial	sycamore
Podophyllum peltatum	Berberidaceae	native	3	forb	perennial	may-apple
Prunus serotina	Rosaceae	native	2	tree	perennial	wild black cherry
Prunus virginiana	Rosaceae	native	2	shrub	perennial	choke cherry
Quercus alba	Fagaceae	native	5	tree	perennial	white oak
Quercus bicolor	Fagaceae	native	8	tree	perennial	swamp white oak

Quercus rubra	Fagaceae	native	5	tree	perennial	red oak
Rhamnus cathartica	Rhamnaceae	non-native	0	tree	perennial	common buckthorn
Rubus occidentalis	Rosaceae	native	1	shrub	perennial	black raspberry
Sambucus racemosa	Adoxaceae	native	3	shrub	perennial	red-berried elder
Tilia americana	Malvaceae	native	5	tree	perennial	basswood
Toxicodendron radicans	Anacardiaceae	native	2	vine	perennial	poison-ivy
Trillium grandiflorum	Trilliaceae	native	5	forb	perennial	common trillium
Ulmus americana	Ulmaceae	native	1	tree	perennial	american elm
Vitis riparia	Vitaceae	native	3	vine	perennial	river-bank grape
Zanthoxylum americanum	Rutaceae	native	3	shrub	perennial	prickly-ash

Invasive Species

While there are 7 non-native species that were observed in Elsesser West Woodland, there is currently not much of an issue with invasive species. The most concerning species, garlic mustard and tartarian honeysuckle, were observed in very small numbers. The only invasive species that was observed frequently was white sweet clover (*Melilotus albus*), however this species was only observed on the forest edge. It would be advised that while the invasive numbers are very low, the most concerning of these should be taken care of immediately before the invasive species spread. The garlic mustard we observed was concentrated around one overstory tree, and there were only a couple tartarian honeysuckle individuals. Compared to the other natural areas, this woodland would require the least time and resources when exterminating the invasive species.

Human Impacts

Research/Teaching Artifacts

We found 2 examples of research that is occurring within Elsesser West Woodland. One of these experiments appears to be dealing with moisture or precipitation, however we were unable to determine what either of these experiments may be studying (Figure 1).
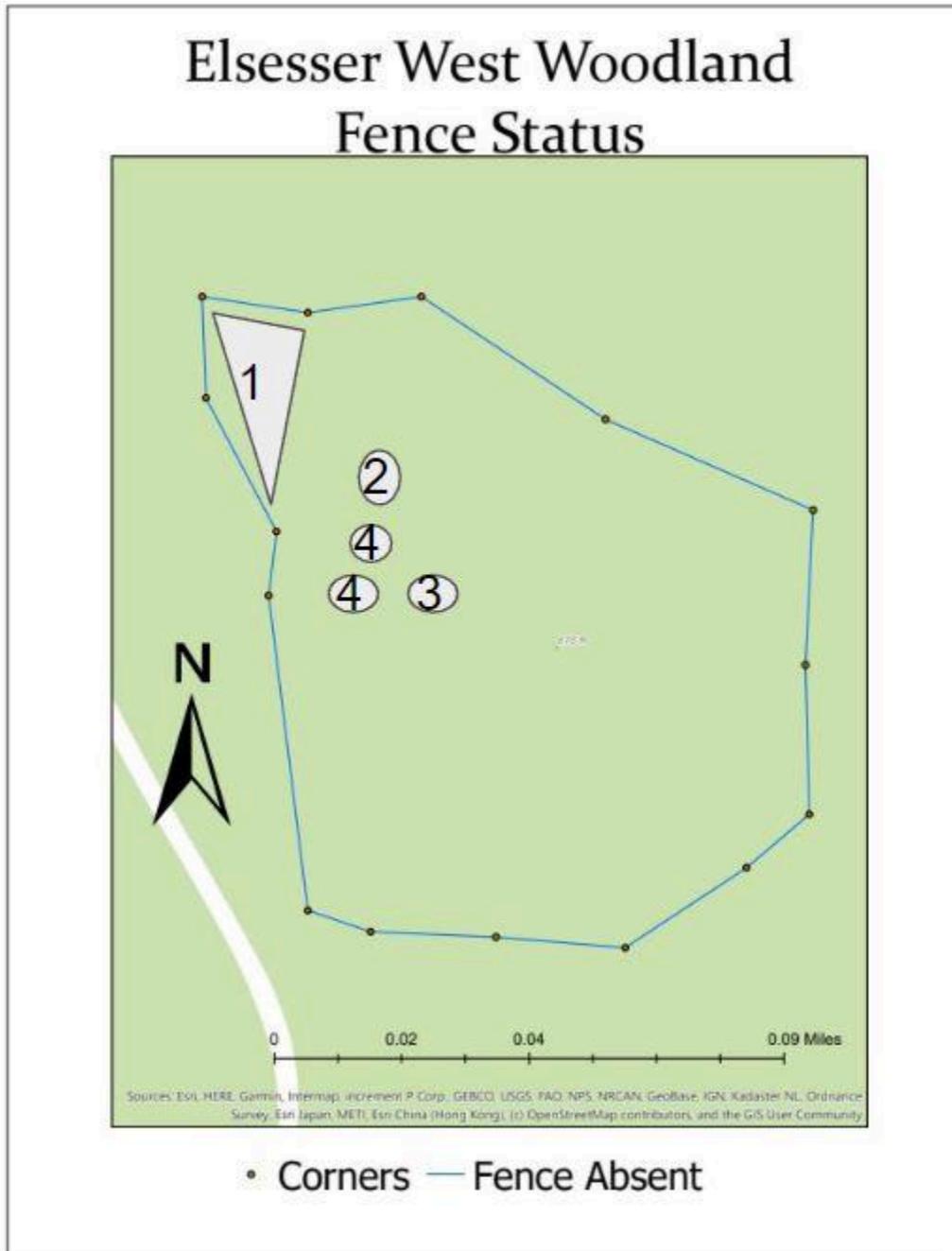
Figure 1. Photos of research materials.

Boundary Issues

There currently is no fencing whatsoever surrounding Elsesser West Woodland. Discussion should be had with the farmers to determine if adding a fence around the woodland would be a good idea.

Figure 2. Map of borders and features of Elsesser West Woodland.

Elsesser West Woodland
Fence Status

1

② ④ ④ ③

N

0   0.02   0.04   0.09 Miles

Sources: Esri, HERE, Garmin, Intermap, increment P Corp, GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

• Corners — Fence Absent

1. This area is where all the new plantings are. They are outside of the current forest, but as they get taller, they will expand the woodland back to this area.
2. Japanese barberry is here. Only one individual was spotted.
3. A small patch of garlic mustard is in this area at the foot of a large tree. No other garlic mustard was seen throughout the woodland.
4. There are two different research projects going on. We were unable to determine what the project may be.

Water Features
No wetlands, ponds or streams were observed in our survey of Elsesser West Woodland.

References
Cohen, J.G., M.A. Kost, B.S. Slaughter, D.A. Albert, J.M. Lincoln, A.P. Kortenhoven, C.M. Wilton, H.D. Enander, and K.M. Korroch. 2020. Michigan Natural Community Classification [web application]. Michigan Natural Features Inventory, Michigan State University Extension, Lansing, Michigan. Available https://mnfi.anr.msu.edu/communities/classification.