Minnis 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

Minnis Woodland is a small patch of mature mesic southern forest. The overstory has a relatively low diversity of tree species, with sugar maple dominating the overstory, understory, and regeneration layers. We observed a total of 44 vascular plants, 34 of which are native. Based on a Floristic Quality Assessment, the plant diversity and conservation value at Minnis is lower than most of our larger woodlands. Several invasive species were found, but there are only two, amur honeysuckle and dame's rocket, with significant populations at this time. There is currently one research project ongoing within Minnis, and there is also a large pile of farm equipment consisting of wooden panels and concrete cylinders that should be removed. The fences surrounding the woodland need improvement in some areas, however the most serious fencing issue is the lack of a fence along half of the southern border.

From a conservation perspective, this woodland is not particularly significant, due to its small size, dominance by sugar maple and lack of noteworthy native species. The small size of this parcel limits its value for recreation; however, given its location adjacent to the Pavilion parking lot, this woodland has outstanding public accessibility. The lack of noteworthy plant diversity and excellent accessibility means Minnis could be a good site for demonstration projects geared towards the general public or forestry class activities.

Recommendations

1. Treat the invasive species of Minnis Woodland, most notably amur honeysuckle and dame's rocket.

2. Talk with the farmers nearby to discuss the large pile of farm equipment dumped on the southern edge of the woodland and search for other areas where that equipment could be stored that is not within the woodland.
3. Discuss options for forest management demonstration/education projects with the forestry department.

Forest Inventory

Overstory

We found a total of 14 species of trees in the overstory (>4" dbh) at Minnis Woodland; 6 of these were encountered in our fixed-area plot inventory and 8 were found during our walking survey of the property. Living overstory (>4" dbh) trees at Minnis Woodland had a total basal area of 121.0779819 ft^2 ac^{-1} and a stem density of 125 trees per acre. Sugar maple (*Acer saccharum)* was by far the most important overstory tree species according to our plot survey having the highest relative dominance, density and frequency of any species (Table 1). The next most important species we observed was American elm (*Ulmus americana)* followed by black maple (*Acer nigrum)*, basswood (*Tilia americana)*, and then ended with black cherry (*Prunus serotina)* as the least important overstory species we observed. It is important to note that due to both the small size of the woodland and the abundance of sugar maple, all of the non-sugar maple species were only observed two times total at most.

Throughout our walking survey of the land, we observed 8 overstory tree species: American beech (*Fagus grandifolia)*, black walnut (*Juglans nigra)*, boxelder maple (*Acer negundo)*, bur oak (*Quercus macrocarpa)*, honeylocust (*Gleditsia triacanthos)*, ironwood (*Ostrya virginiana)*, red maple (*Acer rubrum)*, and staghorn sumac (*Rhus typhina)*. An important detail about our walking survey is that we had 2 species that were frequently observed throughout the woodland: American beech and black walnut. This suggests that our random sampling method failed to capture two of the more important aspects of this woodland. Bur oak, honeylocust, and staghorn sumac were overstory species that were observed multiple times, but not anywhere as frequently as American beech and black walnut. Bur oak and red maple had a few individuals spread out sparsely throughout the woodland, honey locust had a few individuals all located in the southwestern corner, and staghorn sumac was observed only in a large cluster along the middle of the southern fence. Finally, only one individual boxelder maple was observed nearby the cluster of staghorn sumac and along the fenceline.

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
American Elm	11.3	8	25	14.8
Basswood	2.2	4	25	10.4
Black Cherry	1.4	4	25	10.1
Black Maple	3.5	8	25	12.2

Sugar Maple	81.6	76	100	85.9

Understory

Based on our inventory plots we estimate that there are a total of 425 stems per acre of trees recruiting into the sapling class (at least 4.5 feet tall and </= 4" dbh) at Minnis Woodland. Sugar maple dominated Minnis Woodland's sapling class with a relative density of 64.7% and also occurred in every plot. Black maple also occurred fairly frequently with a relative density of 29.4% and occurring in 3 of our 4 plots. This creates a sapling layer in which the genus *Acer* accounts for a relative density of 94.1%. The only other sapling species we observed was white ash (*Fraxinus americana)*, which has a relative density of 5.9% while only being observed in 1 plot. While sugar maple is the only species observed within the 2" in. class and is the most frequent 4" in. class, the 1" in. class has an even number of sugar maple and white ash while black maple is the most abundant species within 3" in. size class. This suggests that while sugar maple will still be the most abundant species in the future, if left unmanaged, it wouldn't take over the woodland as fast as the sugar maple populations would in most other woodlands.

Table 2. Composition and size class distribution of the sapling layer in Minnis 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 Maple	29.4	75	0	0	100	25
Sugar Maple	64.7	100	25	125	50	75
White Ash	5.9	25	25	0	0	0

Regeneration Layer

We identified 5 species of trees regenerating in the seedling layer (<4.5 feet tall): American elm, black maple, sugar maple, common buckthorn (*Rhamnus cathartica)*, and red oak (*Quercus rubra)* (Table 3). The sapling class was dominated by sugar and black maple, with sugar maple having an average coverage percentage of 43.75% and black maple with a 30% average coverage percentage. Each of the other species, American elm, common buckthorn, and red oak, all had a 2.5% average coverage percentage. Along with that, sugar and black maple were the only species that were observed in more than 1 plot with sugar maple occurring in all 4 plots and black maple occurring in 3 of the 4 plots. American elm, common buckthorn, and red oak were all observed in only 1 plot each.

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
American Elm	2.5	25
Black Maple	30	75
Common Buckthorn	2.5	25
Red Oak	2.5	25
Sugar Maple	43.75	100

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 121.1 ft^2 ac^{-1}, 73% (88.4 ft^2 ac^{-1}) was in Risk Class 1 trees, and 27% (32.7 ft^2 ac^{-1}) was in Risk Class 2. On an individual tree basis, 84% (105 trees per acre) were in Risk Class 1, 16% (20 trees per acre) were in Risk Class 2. In addition to living trees, we found 15 standing dead (snags) trees per acre, which together accounted for 2.3 ft^2 ac^{-1}. Of the 15 snags per acre 33.3% were in decay class 1, 33.3% in decay class 3, and 33.3% in decay class 5. No snags were found in decay classes 2 or 4.

Across the woodland, we found only one instance of coarse woody debris. This one tree has 23.4 m^3 ha^{-1} of coarse woody debris (CWD) and is in decay class 3, and the woodland average for CWD is 5.8 m^3 ha^{-1}.

Forest Inventory Summary and Conclusions

Minnis 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 dominated by sugar maple and has sparse representation of other overstory species. The sapling and seedling layers are both heavily dominated by sugar and black maple with very little representation of other species in both categories. This suggests that if this woodland is not managed properly, it will very quickly diminish in overall biodiversity. Black maple will likely survive a long time alongside the sugar maple, however with sugar maple dominating the overstory class, black maple may disappear as well in the very far future.

Botanical Assessment

Overall we found 44 different species of vascular plants in Minnis Woodland, although two of them could not be identified to species (Table 4). One of these was an unknown member of the family *Asteraceae*, and the other was an unknown member of the family *Poaceae*. Of the 42 species completely identified, 32 were native and 10 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 17.5 for Minnis 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 Minnis 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 rubrum	Sapindaceae	native	1	tree	perennial	red maple
Acer saccharum	Sapindaceae	native	5	tree	perennial	sugar maple
Arctium minus	Asteraceae	non-native	0	forb	biennial	common burdock
Arisaema triphyllum	Araceae	native	5	forb	perennial	jack-in-the-pulpit
Celtis occidentalis	Cannabaceae	native	5	tree	perennial	hackberry
Circaea canadensis; c. lutetiana	Onagraceae	native	2	forb	perennial	enchanters-nightshade
Cornus alternifolia	Cornaceae	native	5	tree	perennial	alternate-leaved dogwood
Dryopteris carthusiana	Dryopteridaceae	native	5	fern	perennial	spinulose woodfern
Euonymus alatus	Celastraceae	non-native	0	shrub	perennial	winged euonymus
Euonymus obovatus	Celastraceae	native	5	shrub	perennial	running strawberry-bush
Fagus grandifolia	Fagaceae	native	6	tree	perennial	american beech
Galium aparine	Rubiaceae	native	0	forb	annual	annual bedstraw
Gleditsia triacanthos	Fabaceae	native	8	tree	perennial	honey locust
Glyceria striata	Poaceae	native	4	grass	perennial	fowl manna grass
Hedera helix	Araliaceae	non-native	0	vine	perennial	english ivy
Hesperis matronalis	Brassicaceae	non-native	0	forb	perennial	dames rocket
Juglans nigra	Juglandaceae	native	5	tree	perennial	black walnut

Leonurus cardiaca	Lamiaceae	non-native	0	forb	perennial	motherwort
Ligustrum vulgare	Oleaceae	non-native	0	shrub	perennial	common privet
Lonicera maackii	Caprifoliaceae	non-native	0	shrub	perennial	amur honeysuckle
Lunaria annua	Brassicaceae	non-native	0	forb	annual	money-plant
Onoclea sensibilis	Onocleaceae	native	2	fern	perennial	sensitive fern
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
Phytolacca americana	Phytolaccaceae	native	2	forb	perennial	pokeweed
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	chokecherry
Quercus macrocarpa	Fagaceae	native	5	tree	perennial	bur oak
Quercus rubra	Fagaceae	native	5	tree	perennial	red oak
Rhamnus cathartica	Rhamnaceae	non-native	0	tree	perennial	common buckthorn
Rhus typhina	Anacardiaceae	native	2	shrub	perennial	staghorn sumac
Rubus occidentalis	Rosaceae	native	1	shrub	perennial	black raspberry
Solanum dulcamara	Solanaceae	non-native	0	vine	perennial	bittersweet nightshade
Tilia americana	Malvaceae	native	5	tree	perennial	basswood
Toxicodendron radicans	Anacardiaceae	native	2	vine	perennial	poison-ivy
Ulmus americana	Ulmaceae	native	1	tree	perennial	american elm

Viola pubescens	Violaceae	native	4	forb	perennial	yellow violet
Vitis riparia	Vitaceae	native	3	vine	perennial	river-bank grape

Invasive Species

Within this woodland, we observed 10 invasive species, however only 1 of them, common motherwort (*Leonurus cardiaca)* was observed along the fenceline only, meaning that 9 invasive species are surviving throughout the interior of Minnis. Burdock (*Arctium minus)* occurred mostly along the woodland, however it has started spreading into the forest and even occurred within one of our plots. Privet (*Ligustrum vulgare*), a more concerning invasive species, was only observed once throughout the whole woodland. However, amur honeysuckle (*Lonicera maackii)* was seen many times, but there were no clear signs of a massive invasion as the individuals were fairly spread out throughout the woodland. The largest spread of an invasive species was with dame's rocket (*Hesperis matronalis)*. A very large cluster of this species was observed nearby plot 3 (42.70729N 84.48315W). Treatment of dame's rocket, amur honeysuckle, and privet would be advised, especially since the much more concerning species are very manageable at this point.

Human Impacts

Research Artifacts

We only found one research experiment occurring at Minnis Woodland, and it appears to still be an active insect experiment.

Figure 1. Photos of research material

Human Disturbances

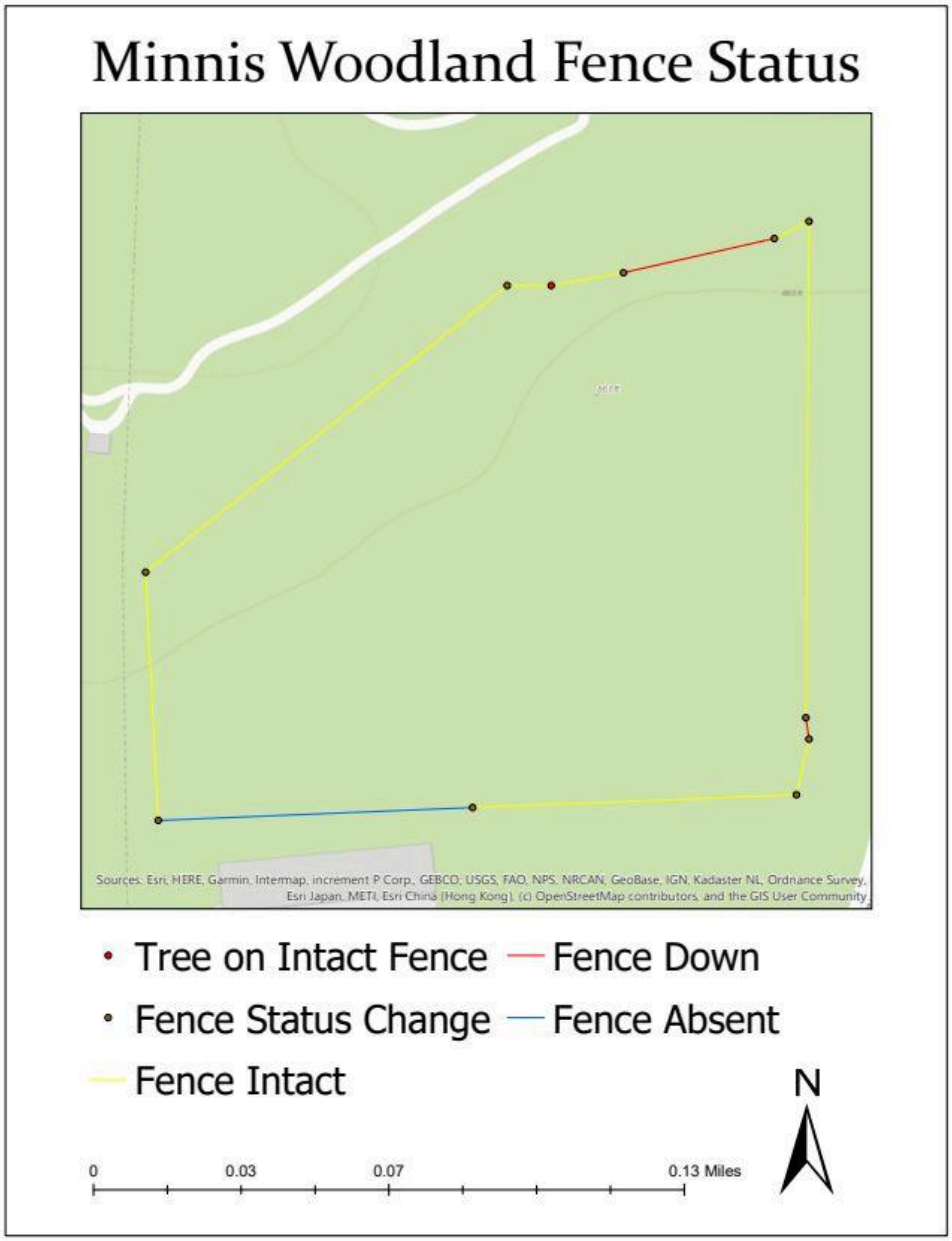
There are two instances of human disturbances occurring within this woodland. One of them is that there are golf balls found within the woodland due to the bordering golf course on the northern edge. The other disturbance that we noticed was a large pile of farm materials dumped along the southern edge of the forest (Figure 2). This needs to be taken care of as it is very intrusive and within the woodland, and it also blocks off a potential fence that may be put down along the southern edge.

Figure 2. Photo of old farm equipment dumped on the forest edge

Boundary Issues

The boundary at Minnis Woodland is in decent shape, however there are areas that need improvement (Figure 3). There are a couple areas along the northern fence line where the fence is down due to fallen trees. There is also a small area near the main gate in the southwestern corner where the fence is down and needs to be repaired. Finally, on the western side of the southern fence line, there is no fence at all, however this area does also border a building.

Figure 3. Map of Minnis Woodland fenceline



Water features

No wetlands, ponds or streams were observed in our survey of Minnis 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.