

Gardner Road Natural Beauty Road Assessment for Lapeer County Road Commission



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December 1, 2023

MNFI Report Number 2023-36



Suggested Citation:

Schilke, P. R., M. A. Sanders and E. A. Haber. 2023. Gardner Road Natural Beauty Road Assessment for Lapeer County Road Commission. Michigan Natural Features Inventory. Report No. 2023-36. Lansing, MI.

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Cover: Scenic vista along Gardner Road, Lapeer County, Michigan. Photos by Michael A. Sanders

EXECUTIVE SUMMARY

In May 2023, the Lapeer County Road Commission (LCRC), Lapeer County, Michigan, asked the Michigan Natural Features Inventory (MNFI) to review a segment of county roadway (Gardner Road – Dryden Road to Davison Lake Road) located in Lapeer County, Metamora Township. A local citizens group petitioned LCRC to designate this four-mile stretch of road as a Natural Beauty Road (NBR). The NBR program was established in 1994 as part of the Michigan’s Natural Resources and Environmental Protection Act (Public Act 451, Part 357, Natural Beauty Roads). The purpose of the NBR program is to “identify and preserve in a natural, essentially undisturbed condition, certain county local roads having unusual or outstanding natural beauty by virtue of native vegetation or other natural features within or associated with the right-of-way (ROW), for the use and enjoyment of local residents and the public in general without endangering the motoring public (Part 357, Natural Beauty Roads).” If the road meets the necessary qualifications, it can be designated as a NBR if approved by the local county road commission (in this case LCRC). This report contains the results of our assessment.

ACKNOWLEDGEMENTS

Thank you to Destain Gingell, P.E., Lapeer County Engineer, for convincing the Lapeer County Road Commission to hire MNFI for this work. General support came from Dr. Brian Klatt and Dr. Mike Monfils. We thank Ashley Adkins, Sarah Carter, and Deb Richardson for their administrative support and Nicole Smith, Becca Rogers, Courtney Ross, and Kraig Korroch for IT/GIS support.

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INTRODUCTION and METHODOLOGY

The Lapeer County Road Commission uses an internal points system to evaluate potential Natural Beauty Roads [NBR]. Nine categories are evaluated and given points based on quality (Appendix A). Michigan Natural Features Inventory [MNFI] evaluated six criteria: 1) Native vegetation in Right of Way [ROW]; 2) Rare Species in ROW; 3) Environmental Quality of ROW and surrounding area; 4) Scenic vistas; 5) Bodies of water, and 6) Wildlife. Prior to the field surveys, we reviewed MNFI's Natural Heritage Database for known occurrences of state endangered, threatened, and special concern plants and animals and also natural communities. We determined that one element occurrence of a state threatened plant, goldenseal (*Hydrastis canadensis*), intersected the survey area (Figure 1). In addition, several element occurrences occurred within an 8000 m (five-mile) buffer of the survey area (Table 1). We used the known element occurrences in the Gardner Road area to prioritize survey timing and target habitats. MNFI staff conducted site reviews on June 6-7, 2023, and October 10, 2023. Meander surveys were conducted on foot along the four-mile section of Gardner Road during which bird surveys, plant lists, and visual observations of wetlands, scenic vistas, and wildlife and wildlife habitat were compiled (Figure 2). We include additional details on how we evaluated the six NBR criteria below.

1) Native vegetation in ROW - to assess the native vegetation in the ROW we walked the ROW and noted the percent coverage of native and invasive species. We then mapped the coverage of native species in the ROW using the NBR coverage bins and calculated the overall coverage of native species for the entire four-mile stretch of Gardner Road. Lawns, driveways, and intersecting roads were excluded from the survey and coverage calculation.

2) Rare species in ROW – to determine whether rare species were present in the ROW we walked the ROW three times and identified all plants and animals we observed. We covered approximately 90% of the linear distance of the ROW and focused more intensive survey efforts on the highest-quality natural areas where rare species would be most expected.

3) Environmental quality of ROW and surrounding area - the environmental quality of the ROW was quantitatively and qualitatively assessed. We compiled a list of all plants in the ROW and used a Floristic Quality Assessment to calculate the Floristic Quality Index (FQI) of the ROW (Freyman et al. 2016). The FQI provides a quantitative way to compare a site to others based on the coefficients of conservatism assigned to the plant species that occur there (Swink and Wilhelm 1994). We also qualitatively assessed environmental quality by identifying plants, animals, and natural communities and determining whether they were unique at different spatial scales (township, county, state) listed in the NBR criteria. We identified natural communities within the ROW based on observed vegetation structure and species composition (Cohen et al. 2014). We used the Michigan Natural Heritage Database, plant collections in Michigan Herbaria (Michigan Flora Online), and personal experience to determine how unique a species or natural community occurrence is for the area.

4) Scenic vistas - we documented scenic vistas by recording GPS points of areas with panoramic natural views as we were walking the ROW. We assessed the quality of the scenic vistas by the expansiveness of the view and the extent to which it was natural as opposed to anthropogenic, based on the opinion of at least two surveyors.

5) Bodies of water - we noted bodies of water in the ROW and noted the condition of the water and the adjacent corridors. We made note of development, ditching, evidence of flooding, and presence of native vegetation and invasive species associated with waterbodies and wetlands.

6) Wildlife - we assessed wildlife habitat by documenting animals in the ROW and making note of unique features that could provide habitat for wildlife. We used the Michigan Natural Heritage Database and personal experience to determine if any wildlife observed was unique at different spatial scales (township, county, state) from the NBR criteria. We focused on birds and mammals while also noting any significant habitat for herptiles and insects and provide a general assessment in this report.

RESULTS AND DISCUSSION

1) We estimated that the overall coverage of non-native species in the ROW was greater than 50 percent. Native species coverage ranged from < 50 percent in some areas or the ROW to > 90 percent in other areas. We estimated the area of ROW along Garnder Road with greater than 85 percent native species cover is about 29 percent. About 15 percent of the ROW had 70 to 84 percent native species cover and the remaining 66 percent had less than 50 percent native species cover (Figure 3). ROW adjacent to agricultural fields or other open areas generally had lower coverage of native species (Figure 4). Forests and wetland areas generally had higher coverage of native species. Some areas with native forest trees, particularly native oaks in dry-mesic southern forest, had a high level of non-native species in the understory which caused a reduction in the overall native species coverage. Of the 244 plant taxa that we identified 48 were non-native (19.7%). Non-native species that accounted for a disproportionately high coverage in the ROW were common reed (*Phragmites australis*), glossy buckthorn (*Frangula alnus*), Japanese barberry (*Berberis thunbergii*), garlic mustard (*Alliaria petiolata*), narrowleaf cattail (*Typha angustifolia*), Morrow's honeysuckle (*Lonicera morrowii*), autumn olive (*Elaeagnus umbellata*), and black locust (*Robinia pseudoacacia*) (Appendix B). Overall, the ROW is typical of southern Michigan with relatively high coverage of non-native species associated with mixed land uses compared to other parts of the state with lower levels of development and agriculture that have lower coverage of non-native plants.

2) We documented eastern meadowlark (*Sturnella magna*, Special Concern) on June 9, 2023. The bird was heard singing in suitable grassland habitat just south of Brocker Road (Figure 5). This constitutes a new element occurrence for this recently listed species and the first for Lapeer County. On October 10, 2023, we observed a red-shouldered hawk, (*Buteo lineatus*, State Threatened) using mesic southern forest habitat in the ROW. However, the sighting did not meet the necessary criteria for an element occurrence due to lack of evidence of breeding and time of year. We did not document any endangered, threatened, or special concern plant, mammal, herptile, or insect species along the ROW.

3) The environmental quality of the ROW varied from common species and assemblages for the area to species and natural communities that are uncommon in the township and county. We did not identify any species or assemblages in the ROW that we considered unique in the state of Michigan. The mean coefficient of conservatism value of all the plant species in the ROW was 3.2, indicating many plant species adapted to anthropogenic disturbance. The Floristic Quality Index of the ROW was 35.8. FQI values greater than 35 are considered indicative of high-quality natural areas; however, we had a very high species richness (244 species) due to the variety of habitats found in the ROW, which likely inflates the FQI value compared to survey in homogeneous habitat. Less than six percent of the plant species we observed had coefficients of conservatism greater than 7, indicating they have high fidelity to unmodified, high-quality natural communities (Table 2). We identified 30 plant species in the ROW that do not have voucher specimens in Michigan herbaria from Lapeer County. Most of these were non-native plant species that have become more common only in recent decades rather than rare and infrequently observed species. The native species we found in the ROW with no specimens collected in Lapeer County are associated primarily with wetlands (Table 3).

We identified seven natural communities within the ROW (Table 4). Of these, two have an element occurrence in Lapeer County. The combination of previously undocumented bird and plant species and natural communities suggests that some portions of the ROW such as the hardwood-conifer swamp and rich tamarack swamp are not common in Lapeer County (Figure 6). There are several endangered and

threatened plants species associated with natural communities found within the ROW. For example, white lady-slipper is associated with rich tamarack swamp and was historically known from the Metamora area. While white lady-slipper and other rare species could be present in the surrounding privately-owned lands, it is unlikely that these species would be found in the ROW due to their sensitivity to ecological degradation associated with fragmentation and invasive species.

There were several notable features of the natural communities in the ROW. The mesic southern forests showed evidence of past disturbance, likely due to grazing, in the form of open understories with low plant diversity and a relatively high cover of sedges, ferns, and unpalatable shrubs such as Japanese barberry (Figure 7). Some areas were also fenced although we did not observe evidence of current grazing. The inundated shrub swamp was extremely limited in size to less than 100 m². The hardwood-conifer swamp, rich tamarack swamp, and southern wet meadow areas had the highest environmental quality in the ROW. These areas had minor changes in hydrology caused by the road itself and localized presence of invasive species. Portions of the rich tamarack swamp have abundant narrowleaf cattail (*Typha angustifolia*) in the understory. Common reed (*Phragmites australis*) (Figure 8) is also prevalent in the ROW and beginning to invade the higher quality natural communities. These invasive species will likely continue to spread and further degrade the rich tamarack swamp and other wetland natural communities in the ROW. Common reed and cattail invasions are often associated with changes in hydrology, increased nutrient inputs into wetlands, and loss of native species diversity.

4) We identified six scenic vistas along Gardner Road (Figure 9) (Table 5). Most of the scenic vistas had partially obstructed panoramic views and contained partially anthropogenic landscapes such as row crops, pasture, or meadows (Figure 10, Figure 11, Figure 12). Of the six vistas, scenic vista 1 (Figure 10) had the widest panoramic view.

5) There were several wetlands within the ROW including one large stream crossing (South Branch Flint River) and two small stream crossings (Table 6). There were also areas of southern wet meadow, southern shrub-carr, a very small, inundated shrub swamp, rich tamarack swamp, and hardwood-conifer swamp. The large stream crossing consisted of a bridge with large rock riprap lining the embankment (Figure 13, Figure 14). The stream corridor had little to no development evident upstream and a buffer of riparian vegetation. The water quality appeared to be good. The stream bottom appeared to be gravelly but was partially covered by silt in some areas suggesting possible flooding or upstream erosion of croplands. The smaller streams appeared to have good water quality and contained the plant *Nasturtium sp.* (watercress) which is an indicator of groundwater seepage or springs feeding the stream (Figure 15). The smaller stream crossings flowed through culverts at their crossings with Gardner Road. All of the water bodies and wetlands in the ROW are likely impacted by development and agriculture within the South Branch Flint River watershed.

6) Wildlife habitat in the ROW included a large number of cover types in both wetland and upland areas. Habitats identified and reported on are anthropogenic grassland, rich tamarack swamp, hardwood-conifer swamp, mesic southern forest, wetlands, and backyard (mowed lawns). Although we documented listed species and some uncommon natural communities along the ROW, the stretch of Gardner Road is typical of the area rather than unique in terms of wildlife.

Wildlife habitat types

Grasslands provide habitat for a wide variety of wildlife species. Some species of birds cannot live in any other ecosystem. On June 9, 2023, we documented eastern meadowlark (*Sturnella magna*, Special

Concern) singing in suitable grassland habitat just south of Brocker Road (Figure 5). This constitutes a new element occurrence for this species. Bird associates in the same area included bobolink (*Dolichonyx oryzivorus*), savannah sparrow (*Passerculus sandwichensis*), field sparrow (*Spizella pusilla*), common yellowthroat (*Geothlypis trichas*) and eastern bluebird (*Sialia sialis*). Sandhill cranes (*Antigone canadensis*) were seen (breeding pair with young) and heard during both survey periods (Figure 15). A planted grassland (5-10 acres) of warm season bunchgrasses (big bluestem (*Andropogon gerardi*), Indiangrass (*Sorghastrum nutans*) and switchgrass (*Panicum virgatum*) is located on the west side of the ROW. Grassland stands from one to five acres in size are ideal for white-tailed deer (*Odocoileus virginianus*), foxes, rabbits, and wild turkey (*Meleagris gallopavo*) providing a reliable food source, as well as nesting sites, brood rearing areas, roosting cover, and cover from predators (Sargent and Carter 199u). This is a planted grassland and was not included in the native cover assessment.

Rich tamarack swamp occurs in outwash channels, outwash plains, and kettle depressions throughout southern Lower Michigan. The structure of this community is largely shaped by tamarack (*Larix laricina*), the dominant tree species (Cohen et al 2014). Fall migrating songbirds, other resident birds, and small mammals feed on the abundance of fruit produced by the dense shrub in this natural community. The tamarack tree cricket (*Oecanthus laricis*, Special Concern) inhabits dense to open tamarack swamps and can occur in both large intact wetland complexes as well as smaller, disturbed sites. This cricket occurs on upper branches of tamarack where they blend in with foliage. The habitat on Gardner Road is extensive enough that it could support the cricket within the ROW and adjacent habitat. There is a 2000 Lapeer County record for this species (MNFI 2023).

There is a small area of hardwood-conifer swamp along the ROW. These forested wetlands receive nutrients through groundwater and are dominated by a mixture of lowland hardwoods and conifers; they contain organic (i.e., peat) and poorly drained mineral soils. This community occurs on a variety of glacial landforms and is often associated with headwater streams and areas of groundwater discharge. Species composition and dominance patterns can vary regionally (Cohen et al 2014). Northern white cedar (*Thuja occidentals*), tamarack, red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*) were recorded on Gardner Road (Appendix B). Windthrow and fluctuating water levels are the primary natural disturbances that structure hardwood-conifer swamps. Several woodland songbirds use these forested wetlands. We recorded warbling vireo (*Vireo gilvus*), Baltimore oriole (*Icterus galbula*), red-eyed vireo (*Vireo olivaceus*), indigo bunting (*Passerina cyanea*), cedar waxwing (*Bombycilla cedrorum*) and eastern wood-pewee (*Contopus virens*) during our surveys. These areas also benefit eastern cottontail (*Sylvilagus floridanus*), raccoon (*Procyon lotor*), American woodcock (*Scolopax minor*), white-tailed deer, and wild turkey (Sargent and Carter 199u). Seasonal vernal pools within these forests are important for migratory birds, frogs, toads, and salamanders (Michigan Vernal Pools Partnership, 2023).

Mesic southern forest is an American beech- and sugar maple-dominated natural community found throughout the lower Peninsula (Sargent and Carter 199u). The natural community is found mainly south of the climatic tension zone on flat to rolling topography with predominantly loam soils. The natural disturbance regime is characterized by gap-phase dynamics where frequent, small windthrow gaps allow for the regeneration of shade-tolerant, canopy species (Cohen et al 2015). These forests offer varied habitat used by a wide range of wildlife groups including songbirds, invertebrates, amphibians, and mammals. The deep leaf litter (fallen branches and logs) of the forest floor supports species of detritus-based food webs including insects, salamanders, mice, and chipmunks (Sargent and Carter 199u). These forests provide important habitat for cavity nesters, canopy-dwelling species, roost sites for wild turkey, and interior forest obligates.

The trees, shrubs, and vines common to mesic southern forests provide food and shelter for wildlife, and we recorded several of these species along the ROW. Black walnut (*Juglans nigra*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), black cherry (*Prunus serotina*), and white oak (*Quercus alba*) are important sources of mast (fruits, nuts, seeds). Important shrubs include prickly gooseberry (*Ribes cyonsbati*) and *Viburnum* species., which attract cedar waxwing (*Bombycilla cedrorum*), gray catbird (*Dumetella carolinensis*), American robin (*Turdus migratorius*), and brown thrasher (*Toxostoma rufum*). Important vines are wild grape (*Vitis spp.*), which attracts more than 50 species of birds, and Virginia creeper (*Parthenocissus quinquefolia*), whose winter fruit is important for winter survival of many birds (Cornell Lab of Ornithology 2023). Mesic southern forests also contain vernal pools that provide critical habitat for several rare reptiles and amphibians (Michigan Vernal Pools Partnership 2023).

A variety of wetland types with both dense and sparse cover of vegetation are found along the ROW, including grassy riverbanks, streams, cattail stands and wooded swamps (Figure 13, Figure14) (Table 6). These areas are important food sources (i.e., insects, fish, and seeds) for a variety of wetland birds. Common yellowthroat, yellow warbler (*Setophaga petechia*), belted kingfisher (*Megaceryle alcyon*), red-winged blackbird (*Agelaius phoeniceus*), willow flycatcher (*Empidonax traillii*), swamp sparrow (*Melospiza georgiana*) and great blue heron (*Ardea herodias*) were observed. Blanding's turtle (*Emydoidea blandingii*, Special Concern) inhabits clean, shallow waters with abundant aquatic vegetation and soft, muddy bottoms over firm substrates and occurs in similar habitats in Lapeer County (MNFI 2023).

Backyard habitat in the form of mowed lawns and private homes is abundant along the ROW (more abundant in the northern part the survey area). While lawns are practical and acceptable landscapes, they are much less beneficial to wildlife than natural areas due to lower diversity. Some of the lawns in the ROW are several acres in size. The increase in rural estates along the road has fragmented the forest habitat. Interior forest songbirds like wood thrush (*Hylocichla mustelina*), ovenbird (*Seiurus aurocapilla*), and scarlet tanager (*Piranga olivacea*) are edge-sensitive, preferring large blocks of contiguous forests and may not occur here (Cornell Lab of Ornithology 2023). We observed more common bird species that seem to tolerate fragmentation and smaller habitat patches such as northern cardinal (*Cardinalis cardinalis*), chipping sparrow (*Spizella passerina*), black-capped chickadee (*Poecile atricapillus*), American robin (*Turdus migratorius*), house wren (*Troglodytes aedon*), mourning dove (*Zenaid macroura*), eastern kingbird (*Tyrannus tyrannus*) and eastern bluebird (*Sialia sialis*). Some common species we observed like northern flicker (*Colaptes auratus*), brown-headed cowbird (*Molothrus ater*), and Canada goose (*Branta canadensis*) forage in the short grasses of mowed lawns.

Wildlife groups

Birds

Many habitat types occur along the four-mile corridor, and this is reflected in the wide variety of bird species we observed (Table 7). Grassland species included eastern meadowlark, bobolink, savannah sparrow, field sparrow, wild turkeys and sandhill cranes, which were observed with young. Wetland species recorded were common yellowthroat, belted kingfisher, red-winged blackbird, willow flycatcher and swamp sparrow. Some of the forest dwellers included hairy woodpecker, eastern wood-pewee, and red-eyed vireo. The forest is heavily fragmented, especially in the northern section of Gardner Road; we observed species like northern cardinal, chipping sparrow, and black-capped chickadee, that can tolerate fragmentation and smaller areas of forest habitat. Forest edge species observed included Baltimore oriole, indigo bunting, and chipping sparrow. Common backyard birds seen were American

robin, downy woodpecker, house wren, mourning dove, and eastern bluebird, all of which will nest in suburban habitats like those found along the ROW. Wild turkeys have ample food and shelter with the mixture of forest and agricultural lands, and we observed wild turkeys during both visits.

Bats/Small mammals

Michigan is home to nine bat species including the northern long-eared bat (*Myotis septentrionalis*, Federally Endangered), Indiana bat (*M. sodalis*, Federally Endangered) and the little brown bat (*M. lucifugus*, State Threatened). Michigan bats feed on a variety of moths, flies, beetles, and other insects. When feeding under normal conditions they can capture 600 to 1,000 mosquito-sized insects per hour. Bats are most often found in forested habitat near water, which are insect rich areas (Sargent and Carter 199u). During the summer, Northern long-eared bats are not tied to a specific natural community type and will inhabit any forest with large trees that offer bark that is loose or has deep enough crevices to roost in. Little brown bats will also roost in tree hollows and under loose bark. Little brown bats often forage over streams and ponds (MNFI 2023). Although there are no Lapeer County records for these species (MNFI 2023), there are several potential roost trees (snags and loose bark) (Figure 17) and foraging sites over water within the ROW (Figure 13, Figure14).

Suitable habitat for many common mammals such as eastern cottontails, squirrels, and eastern chipmunk (*Tamias striatus*) was found along the ROW. Eastern cottontails are edge- dependent species and do well in areas where habitats meet. There's brushy thickets, dry and wet grassy wetland edges, hayfields, brushy fencerows, and dense understories; dense understories provide escape cover from ground predators (e.g., foxes and coyotes) (Figure 18) and provide thermal protection during cold weather (Sargent and Carter 199u). Eastern gray squirrels (*Sciurus carolinensis*), fox squirrels (*Sciurus niger*) and American red squirrels (*Tamiasciurus hudsonicus*) were observed along the ROW. Gray squirrels like dense timber stands with large trees that provide mast (nuts and acorns) and denning sites. Fox squirrels prefer open farm country, being attracted to woodlots located next to farm fields. American red squirrels prefer mixed conifer/hardwood stands where they feed on both hardwood mast and pine seeds. We found several large hard mast trees (i.e., acorns, and walnuts) (Sargent and Carter 199u) along the ROW. Eastern chipmunks typically occur in deciduous forest or bushland with rocky outcrops or rock piles as well as an abundance of logs and tree stumps (Animalia 2023); they also do well in fragmented landscapes and backyards with gardens or areas surrounding houses and outbuildings.

Reptiles and Amphibians

Michigan is home to many reptiles (snakes, turtles, and lizards) and amphibians (frogs, toads, and salamanders). These animals are important environmental indicators as they are extremely sensitive to changes in temperature, moisture, and toxin levels. They also play essential roles in our ecosystem by consuming harmful insects and rodents, and in turn are important food sources for other animals in the food web including fish and birds. Amphibians and most reptiles require lowland habitat that has standing water for at least part of the year. Turtles typically inhabit permanent waters (Figure 13) such as lakes, ponds, or slow-moving rivers (Sargent and Carter 199u.). Because most frogs, turtles and snakes use different habitats at certain times of the year, they are vulnerable if/when they must move. Blanding's turtles have a strong nest fidelity returning to the same site each year to lay eggs and can travel > 6000m in the process (Mifsud 2023).

Roughly 60% of Michigan's herpetofauna (reptiles and amphibians) (Herps) are considered rare with habitat destruction, degradation, and fragmentation being primarily responsible for the decline in Michigan and the United States. (Mifsud 2023). Reductions in water quality and connectivity between habitats and invasive species have also contributed to population declines. Roadkill claims large numbers of these migrant breeders each year (Sargent and Carter 199u.); we observed flattened frogs, turtles (painted and snapping) and snakes in the road. Opportunities exist to help reduce road mortalities like maintaining vegetative corridors along waterways and installing wildlife friendly road crossing structures. Encourage residents to identify and maintain nesting areas and provide quality wetland habitat can help minimize road mortality (MNFI 2023). Existing culverts and stream crossing should be cleared to ensure animals are not blocked from going through. Also controlling *Phragmites* is necessary since it can quickly make wetlands unsuitable for most Herps. Minimizing road salt applications will help to maintain water quality (Mifsud 2023).

RECOMMENDATIONS

After evaluating the Natural Beauty criteria for Gardner Road, we found that the stretch of ROW did not possess a high cover of native vegetation, did not possess outstanding scenic vistas, and had average environmental quality, water quality, and wildlife habitat compared to the surrounding area.

To increase environmental quality and wildlife habitat we recommend control efforts for invasive species in the ROW and on adjacent private lands. With the high cover of invasive species precautions should be taken when mowing the ROW to avoid facilitating further spread of invasives. Washing equipment and avoiding mowing when invasive species have seed heads could slow the spread of invasives along the ROW. Efforts to limit spread of invasive species is especially recommended given the presence of nuisance weeds such as poison hemlock (*Conium maculatum*) and garlic mustard (*Alliaria petiolata*) in the ROW that are known to easily spread by mowing. Invasive control efforts would likely be most effective beginning with the least degraded areas in the south and middle sections of Gardner Road and moving outward toward areas with higher coverage of invasive species. To have a meaningful impact on the prevalence of invasive species, control efforts would likely need to involve adjacent private landowners and continue over an extended time period of several years to decades. Choosing native species and local ecotypes for any plantings in or near the ROW will reduce the risk of introducing additional invasive species and also provide habitat for wildlife. Maintaining and clearing culverts is recommended to facilitate movement of amphibians and reduce road mortality. Minimizing salt and herbicide applications can help protect reptiles and amphibians and plants in the ROW.

To preserve the high diversity of habitats along the ROW we recommend limiting development and intensive land use. Maintaining vegetation buffers and avoiding any filling or ditching of stream crossings and wetlands will help protect water quality and also provide wildlife corridors. Most wetlands in the ROW are buffered from agriculture and development and these areas should be protected and maintained. Development and intensive land use will continue to fragment the natural areas in and adjacent to the ROW and reduce the diversity of wildlife and wildlife habitat. We also recommend retaining the large mast-producing trees found in the ROW when possible. These trees provide food for wildlife and habitat for birds and insects. Current agricultural land use adjacent to the ROW is providing habitat for grassland bird species and we recommend encouraging continued low-intensity land use such as lightly-grazed pasture or grass cover that is not cut before late summer or early fall to provide breeding habitat for this declining group of birds.

TABLES

Table 1. Element occurrences (EO) in Michigan Natural Heritage Database within (8000 m) five-mile radius of Gardner Road, Lapeer County, Michigan.

Species	Type	EO ID	Year last observed
Goldenseal (<i>Hydrastis canadensis</i>)	Plant	8791	1933
Cooper's Milkvetch (<i>Astragalus neglectus</i>)	Plant	2195	1922
Rich conifer swamp	Natural community	18677	2011
Dry-mesic southern forest	Natural community	6830	1986
Pickerel Frog (<i>Lithobates palustris</i>)	Frog	23478, 23312	2005, 2015
Orange-fringed orchid (<i>Platanthera ciliaris</i>)	Plant	4338	1923
Narrow-leaved sedge (<i>Carex amphibola</i>)	Plant	23035	1975
Tamarack Tree Cricket (<i>Oecanthus laricis</i>)	Insect	706	2000
Blanding's Turtle (<i>Emydoidea blandingii</i>)	Turtle	8034; 24622	2019; 2021
Richardson's sedge (<i>Carex richardsonii</i>)	Plant	3140	1895
Clinton's bulrush (<i>Tricophorum clintonii</i>)	Plant		1918
White lady Slipper (<i>Cypripedium candidum</i>)	Plant	10238	1918
Purple false oats (<i>Grappheporum melicoides</i>)	Plant	22892	1895
Grooved flax (<i>Linum sulcatum</i>)	Plant	6656	1927
Hairy angelica (<i>Angelica venenosa</i>)	Plant	6161	1956
Osprey (<i>Pandion haliaetus</i>)	Bird	21983	2019
Big water crayfish (<i>Cambarus robustus</i>)	Crayfish	23202	2015

Table 2. Plant species in ROW with coefficient of conservatism (c-value) of 7 or higher indicating fidelity to high-quality, natural habitats.

Scientific name	Common name	C-value
<i>Betula alleghaniensis</i>	Yellow birch	7
<i>Campanula aparinoides</i>	Marsh bellflower	7
<i>Carex lasiocarpa</i>	Woollyfruit sedge	8
<i>Carex plantaginea</i>	Plantainleaf sedge	8
<i>Cephalanthus occidentalis</i>	Buttonbush	7
<i>Cercis canadensis</i> *	Eastern redbud	8
<i>Gleditsia triacanthos</i> *	Honeylocust	8
<i>Lathyrus palustris</i>	Marsh pea	7
<i>Mitella diphylla</i>	Two-leaved miterwort	8
<i>Quercus bicolor</i>	Swamp white oak	8
<i>Quercus palustris</i>	Pin oak	8
<i>Rhamnus alnifolia</i>	Alderleaf buckthorn	8
<i>Salix pedicellaris</i>	Bog willow	8

*Indigenous to Southern Michigan but most likely planted or spread from plantings at this site

Table 3. Plant species recorded in ROW with no previous herbarium vouchers from Lapeer County, Michigan.

Scientific name	Common name	Native/non-native	Notes
<i>Carex bromoides</i>	Broom-like sedge	Native	Occasional in conifer-hardwood swamp
<i>Carex hirtifolia</i>	Hairy-leaved sedge	Native	Rare in mesic southern forest
<i>Carex lacustris</i>	Lake sedge	Native	Common in southern wet meadow
<i>Carex plantaginea</i>	Plantainleaf sedge	Native	Common in mesic southern forest
<i>Cephalanthus occidentalis</i>	Buttonbush	Native	Rare; comprising very small area of inundated shrub swamp
<i>Cercis canadensis</i>	Eastern redbud	Likely spread from plantings	
<i>Cinna latifolia</i>	Wood reedgrass	Native	Rare in hardwood-conifer swamp
<i>Conium maculatum</i>	Poison hemlock	Non-native	Roadside
<i>Elymus virginicus</i>	Virginia wild rye	Native	Occasional in mesic southern forest
<i>Epipactis helleborine</i>	Broadleaf helleborine	Non-native	
<i>Fraxinus nigra</i>	Black ash	Native	
<i>Galium odoratum</i>	Sweet woodruff	Non-native	
<i>Hackelia virginiana</i>	Beggar's lice	Native	
<i>Heracleum maximum</i>	Cow parsnip	Native	
<i>Lathyrus palustris</i>	Marsh pea	Native	Rare in southern wet meadow
<i>Ligustrum vulgare</i>	Common privet	Non-native	
<i>Nasturtium officinale/microphyllum</i>	Watercress sp.	Unknown	Common in small stream
<i>Picea abies</i>	Norway spruce	Non-native (likely planted)	
<i>Ribes hirtellum</i>	Swamp gooseberry	Native	Rare in southern wet meadow
<i>Salix nigra</i>	Black willow	Native	

<i>Salix pedicellaris</i>	Bog willow	Native	
<i>Securigera varia</i>	Crown vetch	Non-native	
<i>Symphotrichum puniceum</i>	Purplestem aster	Native	Rare in southern wet meadow/ southern shrub-carr
<i>Symphotrichum urophyllum</i>	Arrowleaf aster	Native	
<i>Tussilago farfara</i>	Sweet coltsfoot	Non-native	Rare in Rich tamarack swamp
<i>Typha angustifolia</i>	Common cattail	Non-native	Common in rich tamarack swamp
<i>Viburnum cassinoides</i>	Wild raisin	Native	

Table 4. Natural communities in ROW and previous element occurrences (EO) in Lapeer County, Michigan.

Natural Community	Previously documented EO in Lapeer County	Notes
Dry-mesic southern forest	x	Common in north and central portion of Gardner Road – highly degraded by invasive species
Inundated shrub swamp		Very small area of buttonbush
Mesic southern forest		Common in north part of Gardner Road – degraded by grazing and invasive shrubs
Rich tamarack swamp		South part of Gardner Road. Some high-quality areas but beginning to be degraded by common reed and cattail
Hardwood-conifer swamp		Central portion – small but high quality
Southern shrub-carr		Several small patches of fair to high quality
Southern wet meadow	x	Several small patches of fair to high quality

Table 5. Approximate locations and descriptions of scenic vistas along Gardner Road.

GPS points of scenic vistas	Notes
1-42.927945, -83.263625	Unobstructed view from crest of hill of an agricultural field with forest in backdrop
2-42.91143, -83.262874	Partially obstructed looking out over pasture with forest/hedgerow in background
3-42.907442, - 83.262574	Partially obstructed looking out over pasture with forest in backdrop
4-42.903312, - 83.261766	Partially obstructed looking out over agricultural field with forest in the backdrop
5-42.90168, - 83.261874	Partially obstructed looking out over agricultural field with forest in the backdrop
6-42.893, -83.261	Partially obstructed looking out over marsh/rich tamarack swamp heading south

Table 6. Small stream crossings with Gardner Road.

GPS point of stream crossings	Notes
1 – 42.92055, -83.26311	Small stream with culvert; appears to be groundwater fed with watercress
2 -42.916987, -83.263163	South Branch Flint River; mostly intact buffer of shrub-carr and little to no development in the immediate area
3 – 42.8887, -83.26102	Small stream with culvert; appears to be groundwater fed with watercress

Table 7. Bird species detected during June (breeding season) and October (fall migration) surveys of Gardner Road.

Bird species	Visits observed
American crow (<i>Corvus brachyrhynchos</i>)	Jun, Oct
American goldfinch (<i>Spinus tristis</i>)	Oct
American robin (<i>Turdus migratorius</i>)	Jun, Oct
Baltimore oriole (<i>Icterus galbula</i>)	Jun
Belted kingfisher (<i>Megaceryle alcyon</i>)	Jun
Black-capped Chickadee (<i>Poecile atricapillus</i>)	Jun, Oct
Blue jay (<i>Cyanocitta cristata</i>)	Jun, Oct
Bobolink (<i>Dolichonyx oryzivorus</i>)	Jun
Brown thrasher (<i>Toxostoma rufum</i>)	Jun
Brown-headed Cowbird (<i>Molothrus ater</i>)	Jun
Canada geese (<i>Branta canadensis</i>)	Jun
Cedar waxwing (<i>Bombycilla cedrorum</i>)	Jun, Oct
Chipping sparrow (<i>Spizella passerina</i>)	Jun, Oct
Common yellowthroat (<i>Geothlypis trichas</i>)	Jun
Downy woodpecker (<i>Dryobates pubescens</i>)	Jun, Oct
Eastern bluebird (<i>Sialia sialis</i>)	Jun, Oct
Eastern kingbird (<i>Tyrannus tyrannus</i>)	Jun
Eastern meadowlark (<i>Sturnella magna</i>)	Jun
Eastern wood-pewee (<i>Contopus virens</i>)	Jun
Field sparrow (<i>Spizella pusilla</i>)	Jun
Golden-crowned kinglet (<i>Regulus satrapa</i>)	Oct
Gray catbird (<i>Dumetella carolinensis</i>)	Jun
Great blue heron (<i>Ardea herodias</i>)	Jun

Bird species	Visits observed
Hairy woodpecker (<i>Dryobates villosus</i>)	Oct
House wren (<i>Troglodytes aedon</i>)	Jun
Indigo bunting (<i>Passerina cyanea</i>)	Jun
Killdeer (<i>Charadrius vociferus</i>)	Oct
Mallard (<i>Anas platyrhynchos</i>)	Jun
Mourning dove (<i>Zenaidura macroura</i>)	Jun, Oct
Northern cardinal (<i>Cardinalis cardinalis</i>)	Jun, Oct
Northern flicker (<i>Colaptes auratus</i>)	Jun, Oct
Red-bellied woodpecker (<i>Melanerpes carolinus</i>)	Jun, Oct
Red-eyed vireo (<i>Vireo olivaceus</i>)	Jun
Red-shouldered hawk (<i>Buteo lineatus</i>)	Oct
Red-winged blackbird (<i>Agelaius phoeniceus</i>)	Jun, Oct
Ruby-crowned kinglet (<i>Corthylio calendula</i>)	Oct
Rusty blackbird (<i>Euphagus carolinus</i>)	Oct
Sandhill crane (<i>Antigone canadensis</i>)	Jun, Oct
Savannah sparrow (<i>Passerculus sandwichensis</i>)	Jun
Swamp sparrow (<i>Melospiza georgiana</i>)	Jun
Warbling vireo (<i>Vireo gilvus</i>)	Jun
White-breasted nuthatch (<i>Sitta carolinensis</i>)	Jun, Oct
White-throated sparrow (<i>Zonotrichia albicollis</i>)	Oct
Wild turkey (<i>Meleagris gallopavo</i>)	Jun, Oct
Willow flycatcher (<i>Empidonax traillii</i>)	Jun
Yellow warbler (<i>Setophaga petechia</i>)	Jun
Yellow-rumped warbler (<i>Setophaga coronata</i>)	Oct

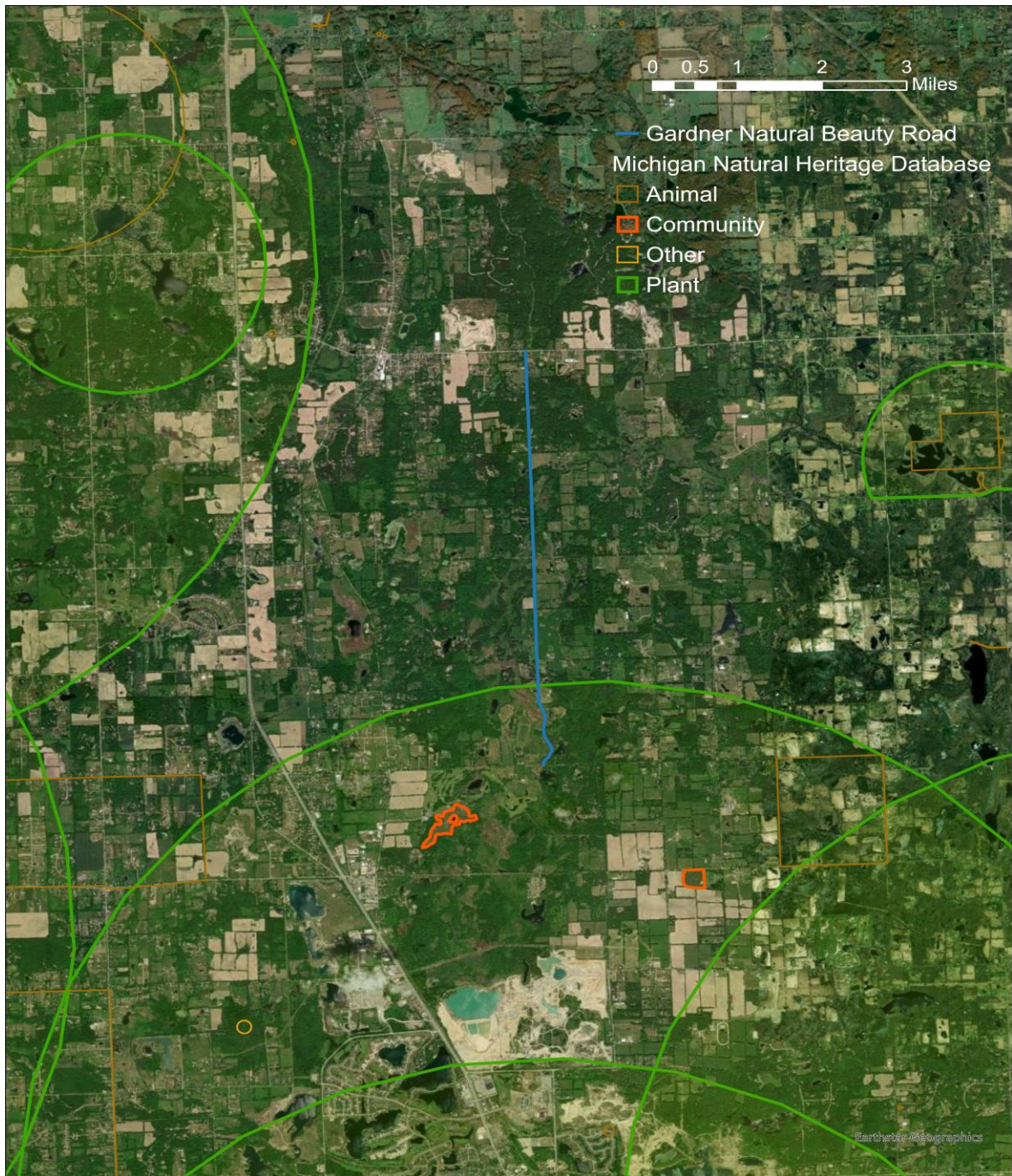


Figure 1. Gardner Road Natural Beauty Road survey showing element occurrences within five-mile radius in Michigan Natural Heritage Database.



Figure 2. MNFI staff conducted stie visits on June 8-9, 2023, and October 10, 2023. Photo by Michael A. Sanders.

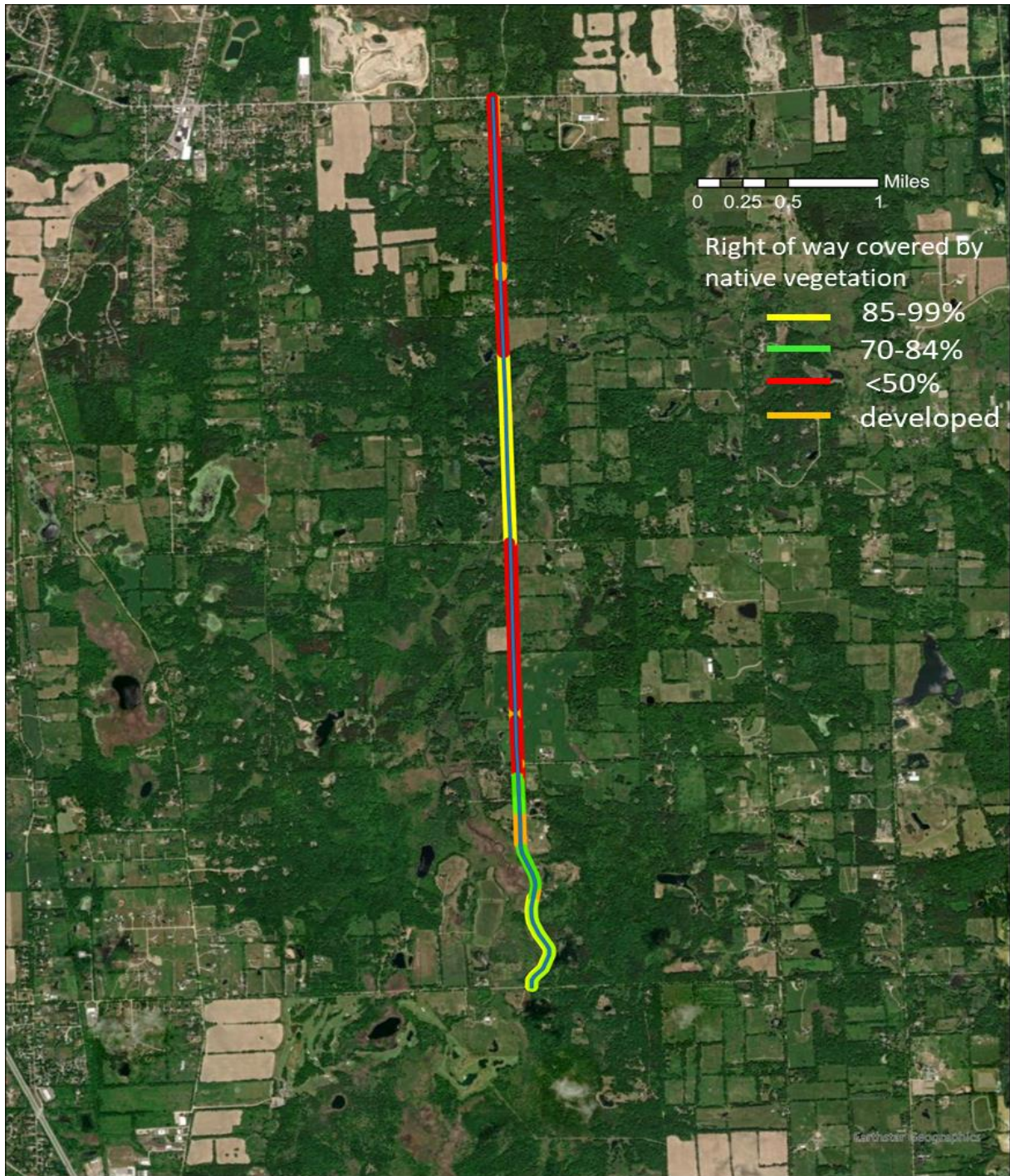


Figure 3. Estimated coverage of native vegetation in the Gardner Road ROW. Developed areas shown in orange included driveways, road crossings, and residential lawns. These areas were eluded from the overall estimate of native vegetation cover.



Figure 4. Areas of the Right of Way adjacent to agricultural fields had <50% cover of native vegetation, including species such as smooth brome (*Bromus inermis*), in the understory but often contained trees valuable to wildlife like oaks (*Quercus spp.*) and black walnut (*Juglans nigra*). Photo by Elizabeth A. Haber.



Figure 5. On June 9, 2023, we documented Eastern meadowlark (*Sturnella magna*, Special Concern) singing in suitable grassland habitat just south of Brocker Road. Photo by Michael A. Sanders.



Figure 6. Portions of the ROW such as the hardwood-conifer swamp and rich tamarack swamp are not common in Lapeer County. Photo by Michael A. Sanders.



Figure 7. Invasive shrubs like Japanese barberry (*Berberis thunbergia*) and multiflora rose (*Rosa multiflora*) are common in the understory of southern mesic forest and roadside edges. Photo by Elizabeth A. Haber.



Figure 8. Common reed (*Phragmites australis*) is prevalent in the ROW and beginning to invade higher quality natural communities. Photo by Elizabeth A. Haber.

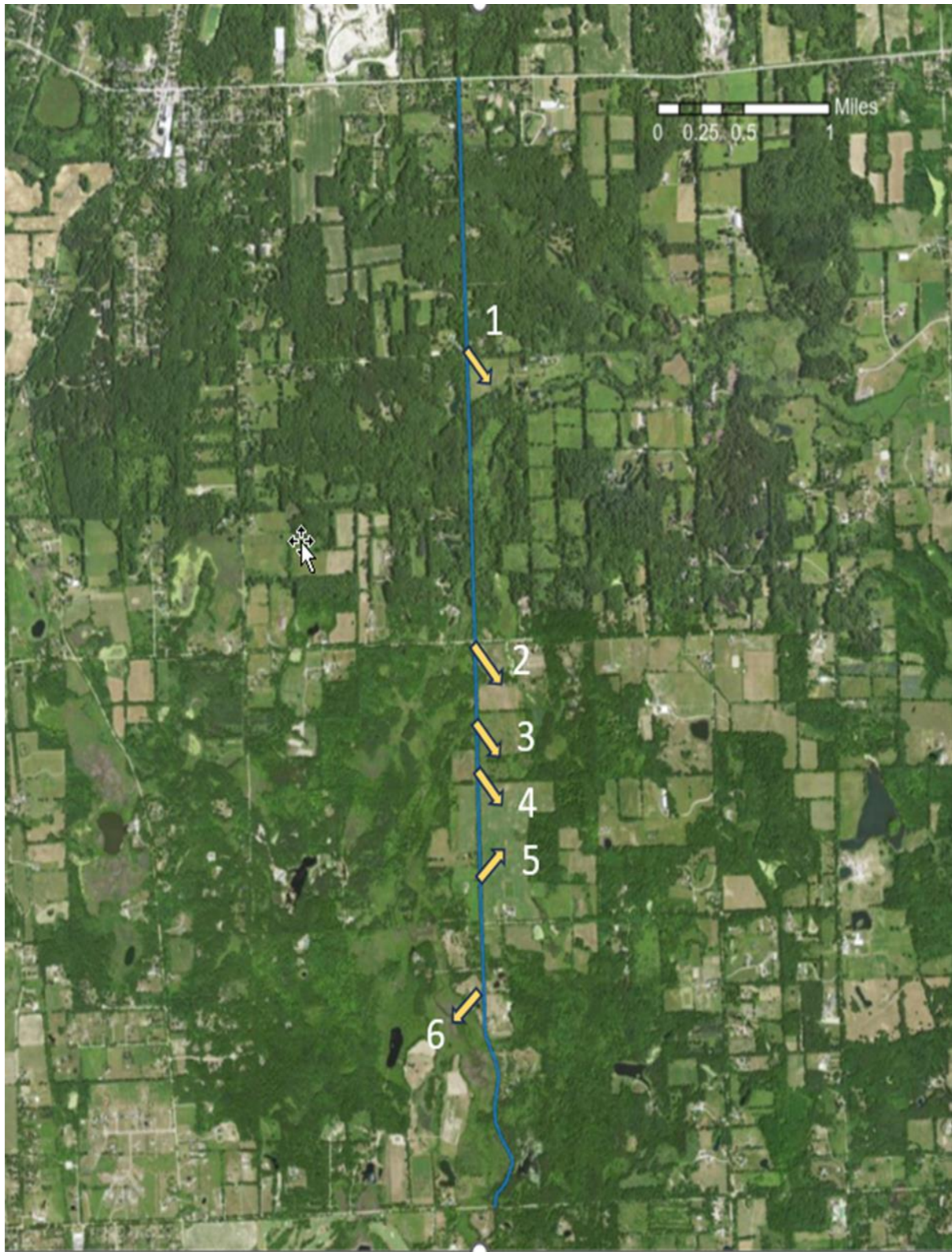


Figure 9. We identified six possible scenic vistas along the Gardner Road ROW.



Figure 10. Scenic vista 1 on June 9, 2023. This is the best scenic vista of the six possible. Photo by Michael A. Sanders.



Figure 11. Scenic vista 2 on June 9, 2023. Photo by Michael A. Sanders.



Figure 12. Scenic vista 3 on June 9, 2023. Photo by Michael A. Sanders.



Figure 13. The South Branch Flint River stream crossing consisted of a bridge with large rock riprap lining the embankment – looking west. Turtles typically inhabit permanent waters such as lakes, ponds, or slow-moving rivers. Photo by Michael A. Sanders.



Figure 14. The South Branch Flint River stream crossing consisted of a bridge with large rock riprap lining the embankment – looking east. Photo by Michael A. Sanders.



Figure 15. The smaller streams appeared to have good water quality and contained the plant *Nasturtium sp.* (watercress) which is an indicator of groundwater seepage or springs feeding the stream. Culverts allow turtles and other animals to avoid crossing roadways. Photo by Elizabeth A. Haber.



Figure 16. Sandhill cranes (*Antigone canadensis*) were seen (observed breeding pair with young) and heard during both survey periods. Photo by Michael A. Sanders.



Figure 17. There are several potential roost trees (snags and loose bark) and foraging sites over water for bats within the ROW. Photo by Michael A. Sanders.



Figure 18. Dense understories provide escape cover from ground predators (e.g., foxes and coyotes) and provide thermal protection during cold weather. Photo by Michael A. Sanders.

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APPENDIX A: LAPEER COUNTY NATIONAL BEAUTY ROAD RATING CRITERIA

Potential Items for Review:

1. Native vegetation in Right of Way:

Percentage of length of Right of Way covered by native vegetation (subtract footage of driveways, farm lane, residential lawns, etc. from the total length).

- 100% coverage
- 85% to 99% coverage
- 70% to 84% coverage
- 50% to 69% coverage
- < 50% coverage

2. Rare species in the Right of Way:

- Protected Species
- Rare Species
- Endangered Species

3. Environmental Quality of Right of Way and surrounding area:

- Common in Township
- Unique in Township
- Unique in County
- Unique in State

4. Scenic Vistas:

- Panoramic View of Natural Areas
- Some vantage points, partially developed areas
- Views not conducive to Sightseeing

5. Bodies of Water:

- Natural streams or ponds with relatively undisturbed upstream areas
- Some upstream development, water quality good
- Agricultural ditches, poor water quality

6. Wildlife (as indicator of environmental quality):

- A variety of wildlife indicating natural ecosystem
- Species not usually found in County
- Species not usually found in Township
- Little species variety, except urban associated type

7. Development potential:

- Land ownership and zoning hinder changes in land use
- Minimal residential or small subdivision development potential, small projected population increases
- Commercial or large subdivision development potential, significant projected population increases

8. Number of Driveways, access, or subdivision streets:

- 8 or less per mile
- 9 to 16 per mile
- 17 to 30 per mile
- > 30 per mile

9. Adequacy of Road:

- Road surface, speed and design adequate for Sightseeing Traffic
- Minor surface or drainage work expected to handle additional Sightseeing Traffic
- Major improvements anticipated for expected traffic volumes, to meet minimum safety or design standards

10. Other Items of Note:

APPENDIX B: COMPREHENSIVE PLANT LIST

Species Scientific Name*	Family	Native?	C	W	Physiognomy	Duration	Common Name
<i>Acer negundo</i>	Sapindaceae	native	0	0	tree	perennial	box-elder
<i>Acer nigrum; a. saccharum</i>	Sapindaceae	native	4	3	tree	perennial	black maple
<i>Acer rubrum</i>	Sapindaceae	native	1	0	tree	perennial	red maple
<i>Acer saccharum</i>	Sapindaceae	native	5	3	tree	perennial	sugar maple
<i>Acorus calamus</i>	Acoraceae	non-native	0	-5	forb	perennial	calamus
<i>Adiantum pedatum</i>	Pteridaceae	native	6	3	fern	perennial	maidenhair fern
<i>Agrimonia gryposepala</i>	Rosaceae	native	2	3	forb	perennial	tall agrimony
<i>Agrostis gigantea</i>	Poaceae	non-native	0	-3	grass	perennial	redtop
<i>Alliaria petiolata</i>	Brassicaceae	non-native	0	3	forb	biennial	garlic mustard
<i>Amphicarpaea bracteata</i>	Fabaceae	native	5	0	vine	annual	hog-peanut
<i>Andropogon gerardii</i>	Poaceae	native	5	0	grass	perennial	big bluestem
<i>Anemone quinquefolia</i>	Ranunculaceae	native	5	3	forb	perennial	wood anemone
<i>Anemone virginiana</i>	Ranunculaceae	native	3	3	forb	perennial	thimbleweed
<i>Apios americana</i>	Fabaceae	native	3	-3	vine	perennial	groundnut
<i>Apocynum androsaemifolium</i>	Apocynaceae	native	3	5	forb	perennial	spreading dogbane
<i>Apocynum cannabinum; a. sibiricum</i>	Apocynaceae	native	3	0	forb	perennial	indian-hemp
<i>Aquilegia canadensis</i>	Ranunculaceae	native	5	3	forb	perennial	wild columbine
<i>Arctium minus</i>	Asteraceae	non-native	0	3	forb	biennial	common burdock
<i>Asarum canadense</i>	Aristolochiaceae	native	5	5	forb	perennial	wild-ginger
<i>Asclepias incarnata</i>	Apocynaceae	native	6	-5	forb	perennial	swamp milkweed
<i>Asclepias syriaca</i>	Apocynaceae	native	1	5	forb	perennial	common milkweed
<i>Athyrium filix-femina</i>	Athyriaceae	native	4	0	fern	perennial	lady fern
<i>Berberis thunbergii</i>	Berberidaceae	non-native	0	3	shrub	perennial	japanese barberry
<i>Betula alleghaniensis</i>	Betulaceae	native	7	0	tree	perennial	yellow birch
<i>Betula papyrifera</i>	Betulaceae	native	2	3	tree	perennial	paper birch
<i>Bromus ciliatus</i>	Poaceae	native	6	-3	grass	perennial	fringed brome
<i>Bromus inermis</i>	Poaceae	non-native	0	5	grass	perennial	smooth brome
<i>Calamagrostis canadensis</i>	Poaceae	native	3	-5	grass	perennial	blue-joint
<i>Caltha palustris</i>	Ranunculaceae	native	6	-5	forb	perennial	marsh-marigold
<i>Campanula aparinoides</i>	Campanulaceae	native	7	-5	forb	perennial	marsh bellflower
<i>Cardamine pensylvanica</i>	Brassicaceae	native	1	-3	forb	biennial	pennsylvania bitter cress

<i>Carex blanda</i>	Cyperaceae	native	1	0	sedge	perennial	sedge
<i>Carex bromoides</i>	Cyperaceae	native	6	-3	sedge	perennial	sedge
<i>Carex gracillima</i>	Cyperaceae	native	4	3	sedge	perennial	sedge
<i>Carex hirtifolia</i>	Cyperaceae	native	5	3	sedge	perennial	sedge
<i>Carex hystericina</i>	Cyperaceae	native	2	-5	sedge	perennial	sedge
<i>Carex intumescens</i>	Cyperaceae	native	3	-3	sedge	perennial	sedge
<i>Carex lacustris</i>	Cyperaceae	native	6	-5	sedge	perennial	sedge
<i>Carex lasiocarpa</i>	Cyperaceae	native	8	-5	sedge	perennial	sedge
<i>Carex pensylvanica</i>	Cyperaceae	native	4	5	sedge	perennial	sedge
<i>Carex plantaginea</i>	Cyperaceae	native	8	5	sedge	perennial	sedge
<i>Carex rosea; c. convoluta</i>	Cyperaceae	native	2	5	sedge	perennial	curly-styled wood sedge
<i>Carex stipata</i>	Cyperaceae	native	1	-5	sedge	perennial	sedge
<i>Carex stricta</i>	Cyperaceae	native	4	-5	sedge	perennial	sedge
<i>Carpinus caroliniana</i>	Betulaceae	native	6	0	tree	perennial	blue-beech
<i>Carya cordiformis</i>	Juglandaceae	native	5	0	tree	perennial	bitternut hickory
<i>Celastrus orbiculatus</i>	Celastraceae	non-native	0	5	vine	perennial	oriental bittersweet
<i>Cephalanthus occidentalis</i>	Rubiaceae	native	7	-5	shrub	perennial	buttonbush
<i>Cercis canadensis</i>	Fabaceae	native	8	3	tree	perennial	redbud
<i>Chamerion angustifolium; epilobium a.</i>	Onagraceae	native	3	0	forb	perennial	fireweed
<i>Cicuta bulbifera</i>	Apiaceae	native	5	-5	forb	perennial	water hemlock
<i>Cicuta maculata</i>	Apiaceae	native	4	-5	forb	biennial	water hemlock
<i>Cinna latifolia</i>	Poaceae	native	5	-3	grass	perennial	wood reedgrass
<i>Circaea canadensis; c. lutetiana</i>	Onagraceae	native	2	3	forb	perennial	enchanters-nightshade
<i>Cirsium arvense</i>	Asteraceae	non-native	0	3	forb	perennial	canada thistle
<i>Cirsium muticum</i>	Asteraceae	native	6	-5	forb	biennial	swamp thistle
<i>Cirsium vulgare</i>	Asteraceae	non-native	0	3	forb	biennial	bull thistle
<i>Clematis virginiana</i>	Ranunculaceae	native	4	0	vine	perennial	virgins bower
<i>Conium maculatum</i>	Apiaceae	non-native	0	-3	forb	biennial	poison-hemlock
<i>Cornus amomum</i>	Cornaceae	native	2	-3	shrub	perennial	silky dogwood
<i>Cornus foemina</i>	Cornaceae	native	1	0	shrub	perennial	gray dogwood
<i>Cornus sericea; c. stolonifera</i>	Cornaceae	native	2	-3	shrub	perennial	red-osier
<i>Corylus americana</i>	Betulaceae	native	5	3	shrub	perennial	hazelnut
<i>Cypripedium parviflorum; c. calceolus</i>	Orchidaceae	native	5	0	forb	perennial	yellow lady-slipper
<i>Dactylis glomerata</i>	Poaceae	non-native	0	3	grass	perennial	orchard grass

<i>Daucus carota</i>	Apiaceae	non-native	0	5	forb	biennial	queen-annes-lace
<i>Dioscorea villosa</i> ; <i>dioscorea villosa</i>	Dioscoreaceae	native	4	0	forb	perennial	wild yam
<i>Doellingeria umbellata</i> ; <i>aster u.</i>	Asteraceae	native	5	-3	forb	perennial	flat-topped white aster
<i>Dryopteris cristata</i>	Dryopteridaceae	native	6	-5	fern	perennial	crested shield fern
<i>Elaeagnus umbellata</i>	Elaeagnaceae	non-native	0	3	shrub	perennial	autumn-olive
<i>Elymus hystrix</i> ; <i>hystrix patula</i>	Poaceae	native	5	3	grass	perennial	bottlebrush grass
<i>Elymus virginicus</i>	Poaceae	native	4	-3	grass	perennial	virginia wild-rye
<i>Epipactis helleborine</i>	Orchidaceae	non-native	0	0	forb	perennial	helleborine
<i>Equisetum arvense</i>	Equisetaceae	native	0	0	fern	perennial	common horsetail
<i>Equisetum hyemale</i>	Equisetaceae	native	2	0	fern	perennial	scouring rush
<i>Erigeron strigosus</i>	Asteraceae	native	4	3	forb	perennial	daisy fleabane
<i>Euonymus obovatus</i>	Celastraceae	native	5	3	shrub	perennial	running strawberry-bush
<i>Eupatorium perfoliatum</i>	Asteraceae	native	4	-3	forb	perennial	boneset
<i>Eurybia macrophylla</i> ; <i>aster m.</i>	Asteraceae	native	4	5	forb	perennial	big-leaved aster
<i>Euthamia graminifolia</i>	Asteraceae	native	3	0	forb	perennial	grass-leaved goldenrod
<i>Eutrochium maculatum</i> ; <i>eupatorium m.</i>	Asteraceae	native	4	-5	forb	perennial	joe-pye-weed
<i>Fragaria virginiana</i>	Rosaceae	native	2	3	forb	perennial	wild strawberry
<i>Frangula alnus</i> ; <i>rhamnus frangula</i>	Rhamnaceae	non-native	0	0	shrub	perennial	glossy buckthorn
<i>Fraxinus americana</i>	Oleaceae	native	5	3	tree	perennial	white ash
<i>Fraxinus nigra</i>	Oleaceae	native	6	-3	tree	perennial	black ash
<i>Fraxinus pennsylvanica</i>	Oleaceae	native	2	-3	tree	perennial	red ash
<i>Galium aparine</i>	Rubiaceae	native	0	3	forb	annual	annual bedstraw
<i>Galium asprellum</i>	Rubiaceae	native	5	-5	vine	perennial	rough bedstraw
<i>Galium odoratum</i>	Rubiaceae	non-native	0	5	forb	perennial	sweet woodruff
<i>Galium triflorum</i>	Rubiaceae	native	4	3	forb	perennial	fragrant bedstraw
<i>Gentiana andrewsii</i>	Gentianaceae	native	5	-3	forb	perennial	bottle gentian
<i>Geranium maculatum</i>	Geraniaceae	native	4	3	forb	perennial	wild geranium
<i>Glechoma hederacea</i>	Lamiaceae	non-native	0	3	forb	perennial	ground-ivy
<i>Gleditsia triacanthos</i>	Fabaceae	native	8	0	tree	perennial	honey locust
<i>Glyceria striata</i>	Poaceae	native	4	-5	grass	perennial	fowl manna grass
<i>Hackelia deflexa</i>	Boraginaceae	native	2	5	forb	biennial	stickseed
<i>Hamamelis virginiana</i>	Hamamelidaceae	native	5	3	shrub	perennial	witch-hazel
<i>Helianthus divaricatus</i>	Asteraceae	native	5	5	forb	perennial	woodland sunflower

<i>Hemerocallis fulva</i>	Hemerocallidaceae	non-native	0	5	forb	perennial	orange day-lily
<i>Heracleum maximum</i>	Apiaceae	native	3	-3	forb	perennial	cow-parsnip
<i>Hieracium caespitosum</i>	Asteraceae	non-native	0	5	forb	perennial	king devil
<i>Hylodesmum glutinosum;</i> <i>desmodium g.</i>	Fabaceae	native	5	5	forb	perennial	clustered-leaved tick-trefoil
<i>Hypericum prolificum</i>	Hypericaceae	native	5	3	shrub	perennial	shrubby st. johns-wort
<i>Ilex verticillata</i>	Aquifoliaceae	native	5	-3	shrub	perennial	michigan holly
<i>Impatiens capensis</i>	Balsaminaceae	native	2	-3	forb	annual	spotted touch-me-not
<i>Iris versicolor</i>	Iridaceae	native	5	-5	forb	perennial	wild blue flag
<i>Juglans nigra</i>	Juglandaceae	native	5	3	tree	perennial	black walnut
<i>Juncus effusus</i>	Juncaceae	native	3	-5	rush	perennial	soft-stemmed rush
<i>Juniperus communis</i>	Cupressaceae	native	4	3	shrub	perennial	common or ground juniper
<i>Lappula squarrosa</i>	Boraginaceae	non-native	0	5	forb	annual	european stickseed
<i>Larix laricina</i>	Pinaceae	native	5	-3	tree	perennial	tamarack
<i>Lathyrus palustris</i>	Fabaceae	native	7	-3	vine	perennial	marsh pea
<i>Leonurus cardiaca</i>	Lamiaceae	non-native	0	5	forb	perennial	motherwort
<i>Lespedeza frutescens; l. violacea</i>	Fabaceae	native	5	5	forb	perennial	violet bush-clover
<i>Leucanthemum vulgare;</i> <i>chrysanthemum leucanthemum</i>	Asteraceae	non-native	0	5	forb	perennial	ox-eye daisy
<i>Ligustrum vulgare</i>	Oleaceae	non-native	0	3	shrub	perennial	common privet
<i>Lonicera dioica</i>	Caprifoliaceae	native	5	3	vine	perennial	red honeysuckle
<i>Lonicera maackii</i>	Caprifoliaceae	non-native	0	5	shrub	perennial	amur honeysuckle
<i>Lonicera morrowii</i>	Caprifoliaceae	non-native	0	3	shrub	perennial	morrow honeysuckle
<i>Lythrum salicaria</i>	Lythraceae	non-native	0	-5	forb	perennial	purple loosestrife
<i>Maianthemum racemosum; smilacina r.</i>	Convallariaceae	native	5	3	forb	perennial	false spikenard
<i>Medicago lupulina</i>	Fabaceae	non-native	0	3	forb	annual	black medick
<i>Melilotus albus</i>	Fabaceae	non-native	0	3	forb	biennial	white sweet-clover
<i>Mentha canadensis; m. arvensis</i>	Lamiaceae	native	3	-3	forb	perennial	wild mint
<i>Mitchella repens</i>	Rubiaceae	native	5	3	forb	perennial	partridge-berry

<i>Mitella diphylla</i>	Saxifragaceae	native	8	3	forb	perennial	bishops-cap
<i>Myriophyllum spicatum</i>	Haloragaceae	non-native	0	-5	forb	perennial	eurasian water-milfoil
<i>Onoclea sensibilis</i>	Onocleaceae	native	2	-3	fern	perennial	sensitive fern
<i>Oryzopsis asperifolia</i>	Poaceae	native	6	5	grass	perennial	rough-leaved rice-grass
<i>Osmunda cinnamomea</i>	Osmundaceae	native	5	-3	fern	perennial	cinnamon fern
<i>Osmunda regalis</i>	Osmundaceae	native	5	-5	fern	perennial	royal fern
<i>Ostrya virginiana</i>	Betulaceae	native	5	3	tree	perennial	ironwood; hop-hornbeam
<i>Packera aurea; senecio a.</i>	Asteraceae	native	5	-3	forb	perennial	golden ragwort
<i>Panicum virgatum</i>	Poaceae	native	4	0	grass	perennial	switch grass
<i>Parthenocissus inserta</i>	Vitaceae	native	4	3	vine	perennial	thicket creeper
<i>Parthenocissus quinquefolia</i>	Vitaceae	native	5	3	vine	perennial	virginia creeper
<i>Persicaria lapathifolia; polygonum l.</i>	Polygonaceae	native	0	-3	forb	annual	nodding smartweed
<i>Phalaris arundinacea</i>	Poaceae	native	0	-3	grass	perennial	reed canary grass
<i>Phragmites australis var. americanus</i>	Poaceae	native	5	-3	grass	perennial	reed
<i>Physocarpus opulifolius</i>	Rosaceae	native	4	-3	shrub	perennial	ninebark
<i>Picea pungens</i>	Pinaceae	non-native	0	3	tree	perennial	blue spruce
<i>Pinus resinosa</i>	Pinaceae	native	6	3	tree	perennial	red pine
<i>Pinus strobus</i>	Pinaceae	native	3	3	tree	perennial	white pine
<i>Poa compressa</i>	Poaceae	non-native	0	3	grass	perennial	canada bluegrass
<i>Poa pratensis</i>	Poaceae	non-native	0	3	grass	perennial	kentucky bluegrass
<i>Podophyllum peltatum</i>	Berberidaceae	native	3	3	forb	perennial	may-apple
<i>Populus balsamifera</i>	Salicaceae	native	2	-3	tree	perennial	balsam poplar
<i>Populus deltoides</i>	Salicaceae	native	1	0	tree	perennial	cottonwood
<i>Populus grandidentata</i>	Salicaceae	native	4	3	tree	perennial	big-tooth aspen
<i>Populus tremuloides</i>	Salicaceae	native	1	0	tree	perennial	quaking aspen
<i>Potentilla simplex</i>	Rosaceae	native	2	3	forb	perennial	old-field cinquefoil
<i>Prenanthes alba</i>	Asteraceae	native	5	3	forb	perennial	white lettuce
<i>Prunus americana</i>	Rosaceae	native	4	5	tree	perennial	american wild plum
<i>Prunus serotina</i>	Rosaceae	native	2	3	tree	perennial	wild black cherry
<i>Prunus virginiana</i>	Rosaceae	native	2	3	shrub	perennial	choke cherry
<i>Pteridium aquilinum</i>	Dennstaedtiaceae	native	0	3	fern	perennial	bracken fern
<i>Quercus alba</i>	Fagaceae	native	5	3	tree	perennial	white oak
<i>Quercus bicolor</i>	Fagaceae	native	8	-3	tree	perennial	swamp white oak
<i>Quercus macrocarpa</i>	Fagaceae	native	5	3	tree	perennial	bur oak
<i>Quercus palustris</i>	Fagaceae	native	8	-3	tree	perennial	pin oak
<i>Quercus rubra</i>	Fagaceae	native	5	3	tree	perennial	red oak

<i>Quercus velutina</i>	Fagaceae	native	6	5	tree	perennial	black oak
<i>Ranunculus abortivus</i>	Ranunculaceae	native	0	0	forb	perennial	small-flowered buttercup
<i>Ranunculus hispidus</i>	Ranunculaceae	native	5	0	forb	perennial	swamp buttercup
<i>Ranunculus recurvatus</i>	Ranunculaceae	native	5	-3	forb	perennial	hooked crowfoot
<i>Rhamnus alnifolia</i>	Rhamnaceae	native	8	-5	shrub	perennial	alder-leaved buckthorn
<i>Rhamnus cathartica</i>	Rhamnaceae	non- native	0	0	tree	perennial	common buckthorn
<i>Rhus typhina</i>	Anacardiaceae	native	2	3	shrub	perennial	staghorn sumac
<i>Ribes cynosbati</i>	Grossulariaceae	native	4	3	shrub	perennial	prickly or wild gooseberry
<i>Ribes hirtellum</i>	Grossulariaceae	native	6	-3	shrub	perennial	swamp gooseberry
<i>Robinia pseudoacacia</i>	Fabaceae	non- native	0	3	tree	perennial	black locust
<i>Rosa multiflora</i>	Rosaceae	non- native	0	3	shrub	perennial	multiflora rose
<i>Rosa palustris</i>	Rosaceae	native	5	-5	shrub	perennial	swamp rose
<i>Rubus allegheniensis</i>	Rosaceae	native	1	3	shrub	perennial	common blackberry
<i>Rubus pubescens</i>	Rosaceae	native	4	-3	shrub	perennial	dwarf raspberry
<i>Rubus strigosus</i>	Rosaceae	native	2	0	shrub	perennial	wild red raspberry
<i>Rudbeckia hirta</i>	Asteraceae	native	1	3	forb	perennial	black-eyed susan
<i>Rudbeckia laciniata</i>	Asteraceae	native	6	-3	forb	perennial	cut-leaf coneflower
<i>Salix amygdaloides</i>	Salicaceae	native	3	-3	tree	perennial	peach-leaved willow
<i>Salix discolor</i>	Salicaceae	native	1	-3	shrub	perennial	pussy willow
<i>Salix exigua</i>	Salicaceae	native	1	-3	shrub	perennial	sandbar willow
<i>Salix nigra</i>	Salicaceae	native	5	-5	tree	perennial	black willow
<i>Salix pedicellaris</i>	Salicaceae	native	8	-5	shrub	perennial	bog willow
<i>Sambucus canadensis</i>	Adoxaceae	native	3	-3	shrub	perennial	elderberry
<i>Sanguinaria canadensis</i>	Papaveraceae	native	5	3	forb	perennial	bloodroot
<i>Saponaria officinalis</i>	Caryophyllaceae	non- native	0	3	forb	perennial	bouncing bet
<i>Sassafras albidum</i>	Lauraceae	native	5	3	tree	perennial	sassafras
<i>Scirpus atrovirens</i>	Cyperaceae	native	3	-5	sedge	perennial	bulrush
<i>Securigera varia;</i> <i>coronilla v.</i>	Fabaceae	non- native	0	5	forb	perennial	crown-vetch
<i>Setaria viridis</i>	Poaceae	non- native	0	5	grass	annual	green foxtail
<i>Sium suave</i>	Apiaceae	native	5	-5	forb	perennial	water-parsnip
<i>Smilax hispida; s.</i> <i>tamnoides</i>	Smilacaceae	native	5	0	vine	perennial	bristly greenbrier
<i>Solanum dulcamara</i>	Solanaceae	non- native	0	0	vine	perennial	bittersweet nightshade
<i>Solidago caesia</i>	Asteraceae	native	6	3	forb	perennial	bluestem goldenrod
<i>Solidago canadensis</i>	Asteraceae	native	1	3	forb	perennial	canada goldenrod
<i>Solidago flexicaulis</i>	Asteraceae	native	6	3	forb	perennial	zigzag goldenrod
<i>Solidago gigantea</i>	Asteraceae	native	3	-3	forb	perennial	late goldenrod

<i>Solidago patula</i>	Asteraceae	native	6	-5	forb	perennial	swamp goldenrod
<i>Solidago rugosa</i>	Asteraceae	native	3	0	forb	perennial	rough-leaved goldenrod
<i>Sonchus arvensis; s. uliginosus</i>	Asteraceae	non-native	0	3	forb	perennial	perennial sow-thistle
<i>Sorghastrum nutans</i>	Poaceae	native	6	3	grass	perennial	indian grass
<i>Sparganium americanum</i>	Typhaceae	native	6	-5	forb	perennial	american bur-reed
<i>Spiraea alba</i>	Rosaceae	native	4	-3	shrub	perennial	meadowsweet
<i>Symphyotrichum cordifolium; aster c.</i>	Asteraceae	native	4	5	forb	perennial	heart-leaved aster
<i>Symphyotrichum firmum; aster puniceus</i>	Asteraceae	native	4	-3	forb	perennial	smooth swamp aster
<i>Symphyotrichum lanceolatum; aster l.</i>	Asteraceae	native	2	-3	forb	perennial	panicked aster
<i>Symphyotrichum lateriflorum; aster l.</i>	Asteraceae	native	2	0	forb	perennial	calico aster
<i>Symphyotrichum pilosum; aster p.</i>	Asteraceae	native	1	3	forb	perennial	hairy aster
<i>Symphyotrichum puniceum; aster p.</i>	Asteraceae	native	5	-5	forb	perennial	swamp aster
<i>Symphyotrichum urophyllum; aster sagittifolius</i>	Asteraceae	native	2	5	forb	perennial	arrow-leaved aster
<i>Symplocarpus foetidus</i>	Araceae	native	6	-5	forb	perennial	skunk-cabbage
<i>Syringa vulgaris</i>	Oleaceae	non-native	0	5	shrub	perennial	common lilac
<i>Taraxacum officinale</i>	Asteraceae	non-native	0	3	forb	perennial	common dandelion
<i>Thalictrum dasycarpum</i>	Ranunculaceae	native	3	-3	forb	perennial	purple meadow-rue
<i>Thalictrum dioicum</i>	Ranunculaceae	native	6	3	forb	perennial	early meadow-rue
<i>Thelypteris palustris</i>	Thelypteridaceae	native	2	-3	fern	perennial	marsh fern
<i>Thuja occidentalis</i>	Cupressaceae	native	4	-3	tree	perennial	arbor vitae
<i>Tilia americana</i>	Malvaceae	native	5	3	tree	perennial	basswood
<i>Toxicodendron radicans</i>	Anacardiaceae	native	2	0	vine	perennial	poison-ivy
<i>Toxicodendron vernix</i>	Anacardiaceae	native	6	-5	shrub	perennial	poison sumac
<i>Trifolium hybridum</i>	Fabaceae	non-native	0	3	forb	perennial	alsike clover
<i>Tussilago farfara</i>	Asteraceae	non-native	0	3	forb	perennial	coltsfoot
<i>Typha angustifolia</i>	Typhaceae	non-native	0	-5	forb	perennial	narrow-leaved cat-tail
<i>Typha latifolia</i>	Typhaceae	native	1	-5	forb	perennial	broad-leaved cat-tail
<i>Ulmus americana</i>	Ulmaceae	native	1	-3	tree	perennial	american elm
<i>Uvularia grandiflora</i>	Convallariaceae	native	5	5	forb	perennial	bellwort
<i>Verbascum thapsus</i>	Scrophulariaceae	non-native	0	5	forb	biennial	common mullein
<i>Verbena hastata</i>	Verbenaceae	native	4	-3	forb	perennial	blue vervain

<i>Verbena urticifolia</i>	Verbenaceae	native	4	0	forb	perennial	white vervain
<i>Viburnum cassinoides</i>	Adoxaceae	native	6	3	shrub	perennial	wild-raisin
<i>Viburnum trilobum</i> ; <i>v. opulus</i>	Adoxaceae	native	5	-3	shrub	perennial	american highbush-cranberry
<i>Vinca minor</i>	Apocynaceae	non-native	0	5	shrub	perennial	periwinkle
<i>Vitis riparia</i>	Vitaceae	native	3	0	vine	perennial	river-bank grape
<i>Zanthoxylum americanum</i>	Rutaceae	native	3	3	shrub	perennial	prickly-ash
<i>Zizia aurea</i>	Apiaceae	native	6	0	forb	perennial	golden alexanders