Rare Plant Species Surveys for the Michigan Department of Transportation: Barton Drive Interchange in Ann Arbor, Washtenaw County. MDOT project No. 212668 (1008E).

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Cover photo: Diverse herbaceous wetland. Photo by Amanda K. Klain.

All photos in this report were taken by Amanda K. Klain.

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Abstract

MDOT Project #212668 was surveyed for rare plant species in the 2022 field season to assess potential impacts of road improvement projects. Surveys at the Barton Road interchange along M-14, Washtenaw County, Michigan revealed that although the area is generally disturbed, high quality areas with a diversity of native species are interspersed, and its location within a larger greenbelt provides an important linkage between conservation areas. No rare species were found, however, a follow-up survey for a newly reported 2021 observation of lesser ladies'-tresses is recommended.

Introduction

This report provides a summary of rare plant surveys conducted at the interchange of Barton Road and M-14 in Washtenaw County. Project #212668 is an approximately 15-acre parcel of land that spans both east and west sides of M-14 and encompasses parts of the City of Ann Arbor's Bandemer Park and Onder Park (Fig. 1). These surveys were conducted to ensure compliance related with MDOT Project #212668, involving construction of a new interchange at this location.

Figure 1. *Overview map of 212668 project area highlighted in yellow.*

Methods

A review of the Michigan Natural Heritage database (MNFI 2022) was conducted for natural communities, federal and state listed plants, and state special concern plants that have been previously documented within a recommended three-mile radius of the project area.

Forty-nine rare plant species have been previously documented within this three-mile buffer. Twenty-seven of those species are historical records that have not been confirmed since 1937, seven were last observed between 1959 and 2001, 12 have been recorded in the last 20 years, and three lack observation dates (Table 1). The surveyor focused on these target species; however, all suitable habitat was checked for rare plants in case other species have yet to be documented in the area.

Table 1. Documented occurrences of rare plant species within a three-mile radius of the project area.

Latin name	Common name	State status*	Target season	Last year observed
Agrimonia rostellata	beaked agrimony	T	early	2012
Angelica venenosa	hairy Angelica	SC	mid	1924
Asclepias purpurascens	purple milkweed	T	mid	2018
Asclepius sullivantii	Sullivant's milkweed	T	mid	2013
Astragalus neglectus	Cooper's milk vetch	SC	mid	1930
Carex lupuliformis	false hop sedge	T	mid-late	1926
Carex trichocarpa	hairy-fruited sedge	SC	early	1937
Chelone obliqua	purple turtlehead	E	mid	2013
Chenopodium standleyanum	woodland goosefoot	SC	mid	1959
Collinsia verna	blue-eyed Mary	SC	early	1894
Conioselinum chinense	hemlock-parsley	SC	mid	2011
Corispermum americanum	American bugseed	SC	mid	unknown
Cypripedium candidum	white lady-slipper	T	mid	1960
Dichanthelium leibergii	Leiberg's panic grass	T	mid	2011
Echinacea purpurea	purple coneflower	X	early-late	1868
Endodeca serpentaria	Virginia snakeroot	T	mid	recent
Euonymus atropurpureus	wahoo	SC	early-late	2001
Galearis spectabilis	showy orchis	T	mid	1894
Gentiana alba	white gentian	E	mid	1906
Gentianella quinquefolia	stiff gentian	T	late	2012
Geum virginiana	white avens	SC	mid	1895
Graphephorum melicoides	trisetum	SC	mid-late	1892
Helianthus hirsutus	whiskered sunflower	SC	mid	1868
Hybanthus concolor	green violet	T	early	1919
Hydrastis canadensis	goldenseal	T	early-late	2018

Jeffersonia diphylla	twinleaf	SC	early	1924
Justicia americana	water willow	T	mid-late	2017
Lechea minor	least pinweed	T	mid-late	1924
Linum virginianum	Virginia flax	T	early-mid	1862
Lithospermum latifolium	broad-leaved puccoon	SC	early-mid	2018
Morus rubra	red mulberry	T	early-late	1880
Muhlenbergia richardsonii	mat muhly	T	mid-late	1981
Panax quinquefolius	ginseng	T	early-late	1867
Paronychia fastigiata	low-forked chickweed	X	mid-late	1909
Penstemon pallidus	pale beard tongue	SC	early-late	1936
Polemonium reptans	Jacob's ladder	T	early	1982
Potentilla canadensis	Canada cinquefoil	SC	early-late	1963
Prunus umbellata	Alleghany plum	SC	early-late	2011
Ranunculus rhomboideus	prairie buttercup	T	early	1924
Sanguisorba canadensis	American burnet	E	mid-late	unknown
Scleria triglomerata	tall nut rush	SC	early-mid	1838
Silphium laciniatum	compass plant	T	mid-late	1928
Spiranthes ovalis	lesser ladies'-tresses	T	late	1997
Strophostyles helvula	trailing wild bean	SC	mid-late	1924
Symphyotrichum praealtum	willow aster	SC	mid-late	unknown
Tradescantia virginiana	Virginia spiderwort	SC	early	1918
Trichophorum clintonii	Clinton's bullrush	SC	early	1935
Trillium sessile	toadshade	T	early	1924
Valeriana edulis var. ciliata	edible valerian	T	early	1860
* T = threatened; SC = special concern; E = endangered; X = extirpated				

Satellite maps showing the survey boundaries and all documented rare species within the three-mile radius were developed using Field Maps. These were georeferenced and loaded onto a Samsung tablet with the Field Maps application for use in the field. This enabled surveyors to view their location and occurrences of natural features while surveying.

The project corridor was walked using the meander survey method throughout all parts of the survey area focusing attention on high quality areas. Early-mid, mid-late and late season surveys were conducted and timed to coincide with sufficient-to-optimal survey periods for the target species. Early-mid season surveys were conducted on May 25, June 2, 24, 2022; mid-late season survey on Sept 1, 2022; and late season survey on Nov 12, 2022. General habitat conditions, dominant plant species, non-native invasive species, and any other notable features were recorded.

Results

No rare species were observed during surveys; however, while surveying, a new report of a 2021 observation of state threatened lesser ladies'-tresses (*Spiranthes ovalis)* within the survey

boundaries was provided to MNFI for entry into the Michigan Natural Heritage Database. This species occurs in openings, shrub thickets, and prairie-like habitats. It was not relocated during late-season surveys; however, it was not relocated at other known nearby sites this year either, suggesting that populations in the area are not blooming well this year. It is not uncommon for this species to bloom only in some years.

While only a small piece of Bandemer Park and Onder Park are designated city parks within the project area, surveys revealed that there is an extensive foot trail system that has been used for decades, mostly by residents of the surrounding area. The east and west sides of M-14 are linked by an underground tunnel with a boardwalk, providing important habitat connectivity for wildlife. In the east segment there is a double-story playhouse structure. It has a seven-foot tall chain link fence surrounding a yard-like area, with a meandering natural stream and a nearby pond (Figs. 2-5).

Figure 2. *One of many well-used trails throughout the project area.*

Figure 3. *Trail to the tunnel, through a successional meadow community.*

Figure 4. *The double-story playhouse in the east segment, close to Onder Park.*

Figure 5. *Underground tunnel connecting the east and west segments.*

The highest quality natural features are remnants of mesic forest with hollows, diverse wetlands, successional meadow communities, and a white cedar (*Thuja occidentalis*) and red cedar (*Juniper virginiana*) grove with prairie-like openings (Fig. 6).

Small streams and tributaries meander through the open and forested moist areas. Within these communities there is good diversity including several species with moderate-to-high coefficient of conservatism (CoC) values (Table 2).

Figure 6. Map with general natural communities and areas of unsuitable habitat.

Table 2. Species with moderate-to-high coefficient of conservatism (CoC) values.

Latin name	Common name	CoC value*	Location**
Acer saccharum	sugar maple	5	east and west
Allium tricoccum	wild leek	5	east
Arisaema triphyllum	Jack-in-the-pulpit	5	east and west
Asarum canadense	wild ginger	5	east
Asclepias incarnata	swamp milkweed	5	east and west
Cardamine bulbosa	spring cress	4	east
Carya ovata	shagbark hickory	5	east

Cicuta maculata	water hemlock	4	east and west
Clematis virginiana	virgin's bower	4	east
Cornus alternifolia	alternate-leaved dogwood	5	east and west
Erythronium americanum	yellow trout lily`	5	east
Lobelia siphilitica	great blue lobelia	4	east and west
Maianthemum stellatum	starry false Solomon's-seal	5	east and west
Ostrya virginiana	ironwood	5	east
Packera aurea	golden ragwort	5	east and west
Polygonatum pubescens	Solomon's-seal	5	east
Quercus alba	white oak	5	east and west
Quercus rubra	red oak	5	east and west
Ranunculus hispidus	swamp buttercup	5	east
Ribes americanum	wild black currant	6	east
Sanguinaria canadensis	bloodroot	5	east
Solidago flexicaulis	zigzag goldenrod	6	east
Solidago speciosa	showy goldenrod	5	east and west
Spiranthes magnicamporum	prairie ladies'-tresses	9	west
Staphylea trifolia	bladdernut	9	east
Symphyotrichum firmum	smooth swamp aster	4	east and west
Symplocarpus foetidus	skunk cabbage	6	east and west
Tilia americana	basswood	5	east and west
Viburnum lentago	nannyberry	4	east
Zizia aurea	golden Alexander	6	east

*Coefficient of Conservatism: Ranges from 0-10 for native species with increasing fidelity to habitat present prior to widespread European settlement. 0: low fidelity; 10: high fidelity.
**East and/or west of US-23.

Aside from the higher-quality areas, the landscape generally is a mix of successional openings dominated by red cedar, common buckthorn (*Rhamnus cathartica),* and non-native honeysuckle (*Lonicera* spp*.)* shrub thickets, and forested areas containing a mix of native and non-native trees such as cottonwood (*Populus deltoides*), black cherry (*Prunus serotina*), box elder (*Acer negundo*), black locust (*Robinia pseudoacacia*), and Siberian elm (*Ulmus pumila*). These dense shrub and forested thickets limit the vegetative diversity in these areas. (Fig. 7).

The rights-of-way along the highway and the interchanges are either mowed and/or generally dominated by Eurasian grasses, non-native shrub thickets, and both native and non-native successional shrubs and forbs (Fig. 8). A lot of garbage in the form of car parts, construction debris, and road trash was also observed in these areas, especially along M-14.

A list of the most common non-native invasive species is provided in Table 3.

Figure 7. *Dense shrub and forested thickets with invasive shrub regeneration.*

Figure 8. *Rights-of-way along M-14 lined with crown vetch (Securigera varia).*

Table 3. Most common invasive species.

Latin name	Common name	Density	Location
Bromus inermis	smooth brome	abundant	widespread
Celastrus orbiculatus	Oriental bittersweet	sparse	isolated
Cirsium arvense	Canada thistle	frequent	widespread
Convallaria majalis	lily-of-the-valley	locally abundant	scattered
Dipsacus fullonum	wild teasel	abundant	widespread
Dipsacus laciniatus	cut-leaf teasel	abundant	widespread
Elaeagnus umbellata	autumn-olive	abundant	widespread
Fallopia japonica	Japanese knotweed	scarce	isolated
Hedera helix	English ivy	common	widespread
Hesperis matronalis	dame's rocket	common	widespread
Lonicera spp.	Eurasian honeysuckle	abundant	widespread
Lythrum salicaria	purple loosestrife	abundant	widespread
Melilotus spp.	sweet clover	abundant	widespread in row
Phragmites australis ssp. australis	phragmites	abundant	in wet areas
Rhamnus cathartica	common buckthorn	abundant	widespread
Robinia pseudoacacia	black locust	common	widespread
Securigera varia	crown vetch	abundant	widespread in row
Solidago sempervirens	seaside goldenrod	frequent	widespread
Typha angustifolia	narrow-leaved cat-tail	abundant	widespread in wet
Ulmus pumila	Siberian elm	common	widespread
Vinca minor	periwinkle	common	widespread

Descriptions of plant communities by survey segment

West Segment

The survey area in the south extends to the river's edge, with a densely vegetated riverbank composed of invasive species including common buckthorn, glossy buckthorn (*Frangula alnus*), non-native honeysuckles, phragmites (*Phragmites australis* ssp. *australis*), and seaside goldenrod (*Solidago sempervirens*). Native species include common elderberry (*Sambucus canadensis*), rushes (*Juncus dudleyi, J. bufonius)*, swamp milkweed (*Asclepias incarnata),* river-bank grape (*Vitis riparia*), and staghorn sumac (*Rhus typhina*) (Fig. 9).

Figure 9. *Vegetation at the Huron River's edge, Bandemer Park.*

Small streams and tributaries meander through these herbaceous wetlands, which are succeeding to wetland shrub communities with willows (*Salix exigua, S. bebbiana*) and glossy buckthorn. There is a diversity of native species throughout, including swamp milkweed (*Asclepias incarnata*), Joe-pye weed (*Eutrochium maculatum*), boneset (*Eupatorium perfoliatum*), rough avens (*Geum laciniatum*), water hemlock (*Cicuta maculata),* jewelweed (*Impatiens capensis)*, water horehound (*Lycopus americanum)*, sedges (*Carex hystericina, Eleocharis* spp.), wild-mint (*Mentha canadensis*), smooth swamp aster (*Symphyotrichum firmum*), willow-herb (*Epilobium* sp.), Torrey's rush (*Juncus torreyi*), and Riddell's goldenrod (*S. riddellii*) (Fig. 10). These wetlands are becoming inundated by dense narrow-leaved and hybrid cat-tail (*Typha angustifolia, T. ×glauca*) and purple loosestrife (*Lythrum salicaria*) (Fig. 11)

Figure 10. *Wetland diversity at Bandemer Park along north side of Barton Drive.*

Figure 11. *Wetland diversity with hybrid cat-tail (Typha ×glauca) on the left.*

The white cedar and red cedar grove has a diversity of native prairie species including big bluestem (*Andropogon gerardii*), little blue-stem (*Schizachyrium scoparium*), purple top (*Tridens flava*), showy goldenrod (*Solidago speciosa*), foxglove beard-tongue (*Penstemon digitalis*), black eyed-Susan (*Rudbeckia hirta*), daisy fleabane (*Erigeron strigosus*), prairie ladies'-tresses (*S. magni-camporum*), and sky-blue aster (*Symphyotrichum oolentangiensis*) (Fig 12).

Figure 12. *White cedar (Thuja occidentalis) and red cedar (Juniperus virginiana) grove with prairie openings.*

The successional meadows dispersed throughout the area, make up a large component of the landscape, and have a mix of native and non-native species including Queen Anne's lace (*Daucus carota*), chicory (*Cichorium intybus*), asters (*Symphyotrichum* spp.), goldenrods (*Solidago* spp.), dogbane (*Apocynum androsaemifolium*), yarrow (*Achillea millefolium*), common milkweed (*Asclepias syriaca*), and black-eyed Susan (Fig. 13).

Figure 13. *Successional meadows with red cedar and shrubs in background.*

East Segment

The vegetation in the vicinity of the playhouse has several naturalized non-native invasive species present, including Japanese knotweed (*Fallopia japonica*), day-lilies (*Hemerocaulis fulva*), periwinkle (*Vinca minor;* Fig. 14), dames rocket (*Hesperis matronalis*), garlic mustard (*Alliaria petiolata*), English ivy (*Hedera helix*), bedstraw (*Galium odoratum*), moneywort (*Lysimachia nummularia*), and a cultivated purple iris (*Iris* sp.).

A small pond exists near the fence around the playhouse area, where frogs and other aquatic wildlife were observed. Hybrid cat-tail, carpet bugle (*Ajuga reptans*), bluestem goldenrod (*Solidago caesia*), sedges (*Carex rosea, C. cephalophora, C. blanda*), swamp buttercup, jewel-weed, white vervain (*Verbena urticifolia*), wild ginger (*Asarum canadense*), and boneset occur around the edges (Fig. 15).

Figure 14. *Carpet of periwinkle (Vinca minor) near playhouse area.*

Figure 15. *Small pond with hybrid cat-tail (Typha ×glauca).*

There are forested areas that are severely disturbed and infested with invasive species, and yet still display surprising diversity. Canopy trees include red and white oak (*Quercus alba, Q. rubra*), shagbark hickory (*Carya ovata*), sugar maple (*Acer saccharum*), and white pine (*Pinus strobus*). In the understory, ironwood (*Ostrya virginiana*), groves of bladdernut (*Staphylea trifolia),* nannyberry (*Viburnum lentago*), and huge alternate-leaved dogwoods (*Cornus alternifolia*) were observed. Other native species include wild black currant (*Ribes americanum),* bloodroot (*Sanguinaria canadensis*), huge jack-in-the-pulpits (*Arisaema triphyllum*), Solomon-seal (*Polygonatum pubescens*), starry false Solomon-seal (*Maianthemum stellatum*), wild leek (*Allium tricoccum*), and carpets of zig-zag goldenrod (*Solidago flexicaulis).*

Species found in hollows include great blue lobelia (*Lobelia siphilitica)*, virgin's bower (*Clematis virginiana)*, spring-cress (*Cardamine bulbosa*), skunk cabbage (*Symplocarpus foetidus*), golden Alexander (*Zizia aurea*), tall meadow rue (*Thalictrum dasycarpum*), and marsh marigold (*Caltha palustris*) (Fig. 16).

Figure 16. *Wild geranium (Geranium maculatum), swamp buttercup (Ranunculus hispidus), and marsh marigold (Caltha palustris) along stream bank.*

Discussion

While the project area is generally disturbed with many invasive species, high quality areas with a diversity of native species are interspersed, including some species with high coefficient of conservatism values. The state threatened lesser ladies'-tresses documented in 2021 was not relocated, however, there is ample suitable habitat. This species occurs in moist fields, moist to dry shrub thickets, open forests, and prairie-like habitats (Voss and Reznicek, 2012), and it likely persists in this project area. It is recommended that the area be surveyed again for exact population and location data in 2023.

This project area is currently an integral part of the officially designated Ann Arbor greenbelt system that protects open spaces and high-quality natural areas for ecosystem health (City of Ann Arbor, 2022). Because of its strategic location, it links to other parts of the greenbelt providing corridors for wildlife within a developed urban area. It connects directly to large, protected conservation areas to the west, and in conjunction with the City of Ann Arbor right-of-way (Fig. 17), provides a contiguous connection to large conservation areas to the east.

Because of its overall species diversity and ecological and social conservation value, it is recommended that impacts be avoided or minimized as much as possible, so that current habitat and native species are sustained. The project area abuts the Huron River so measures should be taken to protect the existing habitat and water quality along the river shoreline as well.

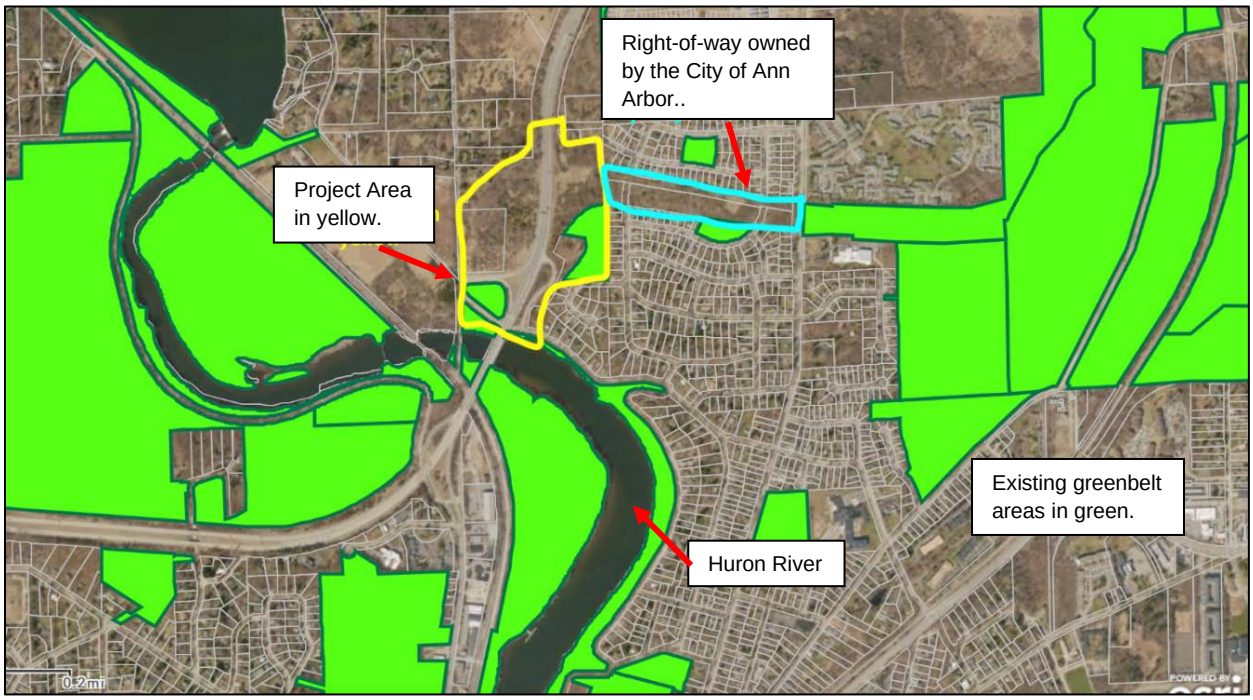

Figure 17. *Map of project area and existing Ann Arbor Greenbelt corridor.*

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