Rare Plant Species Surveys for the Michigan Department of Transportation: M–139 Benton Harbor. MDOT Project No. 210875



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Cover: Clockwise from top left: Green dragon (*Arisaema dracontium*) in the woods in section 6D; State threatened prairie trillium (*Trillium recurvatum*) in the woods in section 6D; Ox Creek in section 6B. All photos in this report, unless otherwise stated in captions, were taken by Julie McLaughlin.

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Abstract

A summary of rare plant surveys for MDOT project area 210875 along M-139 in Benton Harbor is presented in this report. The full site was surveyed once by car, with two additional surveys conducted at four sections with potential rare plant habitat. A significant population of state threatened prairie trillium (*Trillium recurvatum*) was documented within the road right-of-way in Section 6D. Direct impacts to plants and canopy disturbance, as well as treatments of garlic mustard and honeysuckle will be needed to sustain population health. If this is not feasible, transplantation of the trillium to a suitable site elsewhere is recommended.

Introduction and Methods

A summary of rare plant surveys for MDOT project area 210875 is presented in this report. These surveys are required to ensure compliance with regulations regarding potential impacts of road improvement projects on rare plants. The project area is located in Berrien County and spans southbound from M-139 at 0.44 miles south of I-94 to I-94 BL-Main St (Fig. 1). Road construction will include pavement reconstruction, curb and gutter repairs, drainage improvements, sidewalk ramp upgrades, non-motorized improvements, permanent signing, and permanent pavement markings. There will also be culvert replacements with new or reconstructed sidewalks, Handcock and Eastman County Drain work, potential ADA ramp work at the NW guad of M-139 SB/Highland Ave., and possible signal upgrades. Guardrail runs will be upgraded throughout the project limits to current standards and may be extended. Consents to grade, possible proposed ROW, cross slope and super elevation corrections, and a detour are likely to be needed.

Figure 1. Map of project area in red with survey sections in yellow. The project area is located along M-139 from 0.5 mile south of I-94 to I-94 BL (Main St.) in Benton Harbor and Fair Plain, Berrien County.



Michigan Natural Heritage Database was queried to identify previously documented rare plant and high-quality natural community occurrences found within a two-mile buffer of the project area (MNFI 2022). Twenty-seven rare plant species¹ were identified; one state extirpated, 21 state threatened, and five as state special concern (Table 1). Survey efforts focused on suitable habitat for these target species; however, surveyors looked for any rare species along the corridor in case others have yet to be documented. The majority of the target species occur in wet and forested habitats such as mesic southern forest, southern hardwood swamp, and floodplain forest, and several species occur in prairie habitat that was not present in the survey area. These habitats were identified by aerial photo review and visual encounters in the field.

Table 1: Documented occurrences of rare plant species within two miles of the project area.				
Latin name	Common name	State status*	Target season	
Asclepias purpurascens	purple milkweed	Т	early - late summer	
Baptisia lactea	white or prairie false indigo	SC	mid - late summer	
Berula erecta	cut-leaved water parsnip	Т	early - late summer	
Carex trichocarpa	hairy-fruited sedge	SC	mid-spring – early summer	
Collinsia verna	blue-eyed Mary	SC	mid-spring – early summer	
Conioselinum chinense	hemlock-parsley	SC	late summer – mid-autumn	
Corydalis flavula	yellow fumewort	Т	early spring	
Cypripedium candidum	white lady slipper	Т	mid-spring – early summer	
Dryopteris celsa	small log fern	Т	early summer – mid-autumn	
Endodeca serpentaria	Virginia snakeroot	Т	mid – late summer	
Euphorbia commutata	tinted spurge	Т	mid - late spring	
Filipendula rubra	queen-of-the-prairie	Т	early – late summer	
Fraxinus profunda	pumpkin ash	Т	late summer	
Galearis spectabilis	showy orchis	Т	mid-spring – early summer	
Hieracium paniculatum	panicled hawkweed	Т	late summer – early autumn	
Hydrastis canadensis	goldenseal	Т	mid-spring – late summer	
Ipomoea pandurata	wild potato vine	Т	mid – late summer	
Jeffersonia diphylla	twinleaf	SC	mid-spring	
Morus rubra	red mulberry	Т	mid-spring – mid-autumn	
Oxalis violacea	violet wood sorrel	Х	mid-spring – early summer	
Panax quinquefolius	ginseng	Т	early summer – mid-autumn	
Polemonium reptans	Jacob's ladder	Т	mid-spring – early summer	
Sabatia angularis	rose-pink	Т	mid-summer – early autumn	
Silphium integrifolium	rosinweed	Т	mid-summer – early autumn	
Smallanthus uvedalia	yellow-flowered leafcup	Т	mid-spring – late summer	
Trillium recurvatum	prairie trillium	Т	early spring - early summer	
Trillium sessile toadshade T early spring – early summer			early spring - early summer	
* T = state threatened; SC = state special concern; X = state extirpated				

¹ State and federal threatened and endangered status are codified under Part 365 of PA 451, 1994 Michigan Natural Resources and Environmental Protection Act. State special concern and presumed extirpated status are NatureServe designations for species that appear to be declining, and those that are presumed extirpated based on extensive searching of historical sites.

Aerial photos were reviewed, and the entire corridor was briefly surveyed from a vehicle during the early visit to identify areas of potentially suitable habitat for rare species. Three surveys were conducted during the 2022 growing season. These corresponded as closely as possible to early, mid, and late season phenology to capture the changing plant species composition and abundance over time and to maximize the chances of observing the target species. Early surveys were conducted on June 1-2, mid-season surveys on July 18-19, and late season surveys on August 29-30.

Rare species occurrence data were captured using Survey 123, and isolated, high-impact invasive species occurrences were captured using the Midwest Invasive Species Information Network (MISIN) phone app. General habitat conditions, dominant plants, more widespread invasive species, and any other notable features were also recorded.

Results

The majority of this corridor falls within urban and developed areas that are mowed and maintained throughout the year and lack suitable habitat for rare species. Weedy and non-native species were found throughout the project area, especially on the dry, mowed rights-of-way. These are listed in Table 2 and referenced as "roadside weeds" in the rest of the report.

Table 2: Plant species frequently encountered along dry, mowed roadsides.			
Latin name	Common name	Origin	Habit
Achillea millefolium	yarrow	native	forb
Agrostis gigantea	redtop	non-native	grass
Ambrosia artemisiifolia	common ragweed	native	forb
Asclepias syriaca	common milkweed	native	forb
Asclepias verticillata	whorled milkweed	native	forb
Bromus inermis	smooth brome	non-native	grass
Centaurea stoebe	spotted knapweed	non-native	forb
Cichorium intybus	chicory	non-native	forb
Cirsium arvense	Canada thistle	non-native	forb
Conium maculatum	poison hemlock	non-native	forb
Dactylis glomerata	orchard grass	non-native	grass
Daucus carota	Queen Anne's lace	non-native	forb
Dipsacus fullonum	wild teasel	non-native	forb
Dipsacus laciniatus	cut-leaf teasel	non-native	forb
Elymus repens	quack grass	non-native	grass
Erechtites hieraciifolius	fireweed	native	forb
Erigeron philadelphicus	common fleabane	native	forb
Euthamia graminifolia	grass-leaved goldenrod	native	forb
Hypericum perforatum	St. John's-wort	non-native	forb
Leucanthemum vulgare	ox-eye daisy	non-native	forb
Medicago lupulina	black medic	non-native	forb
Melilotus albus	white sweet-clover	non-native	forb
Phleum pratense	timothy	non-native	grass

Plantago lanceolata	narrow-leaved plantain	non-native	forb
Plantago major	common plantain	non-native	forb
Plantago rugelii	red-stalked plantain	native	forb
Poa pratensis	Kentucky bluegrass	non-native	grass
Securigera varia	crown vetch	non-native	vine
Setaria sp.	foxtail	non-native	grass
Solanum carolinense	horse-nettle	non-native	forb
Solidago canadensis	Canada goldenrod	native	forb
Torilis japonica	hedge-parsley	non-native	forb
Toxicodendron radicans	poison-ivy	native	vine
Tragopogon dubius	goat's beard	non-native	forb
Trifolium pratense	red clover	non-native	forb
Trifolium repens	white clover	non-native	forb
Verbascum thapsus	mullein	non-native	forb
Vitis riparia	riverbank grape	native	vine

Four sections of the project area with potentially suitable habitat were identified, corresponding to the four sections 6A-6D, that MDOT recommended for survey. These were all surveyed during the early season, and only 6B and 6D, were determined to have suitable habitat for rare species. These two areas were surveyed twice more, during mid- and late-season surveys. Section 6B contains a diverse complex of floodplain forest, southern hardwood swamp, and mesic southern forest. Section 6D contains southern hardwood swamp and mesic southern forest habitat where prairie trillium (*Trillium recurvatum*) was documented.

Descriptions of plant communities by survey section



Figure 2. Map of Section 6A, with survey area in yellow.

Section 6A: Roadsides, creek, and median between Schulz Dr. and Britain Ave.

The northernmost survey area is located north of Schulz Drive and south of Britain Avenue in Benton Harbor (Fig. 2). An unnamed creek crossing, a 100-foot buffer east and west of the roads or until reaching the right of way fence, and the wooded median between the two roads, were surveyed.

The canopy of the forest includes red and sugar maple (*Acer rubrum, A. saccharum*), red oak (*Quercus rubra*), eastern cottonwood (*Populus deltoides*), bass-wood (*Tilia americana*), black cherry (*Prunus serotina*), American elm (*Ulmus americana*), sassafras (*Sassafras albidum*), and hickory (*Carya* spp.). The shrub and vine layer is dominated by a mix of native and non-native species (Fig. 3). Native species include hackberry (*Celtis occidentalis*), pawpaw (*Asimina triloba*), ash (*Fraxinus* spp.), box elder (*Acer negundo*), dogwood (*Cornus* sp.), spicebush (*Lindera benzoin*), redbud (*Cersis canadensis*), elderberry (*Sambucus* sp.), black raspberry (*Rubus occidentalis*), wild grape (*Vitis riparia*), Virginia creeper (*Parthonicissus quinquefolia*). Invasive species include non-native honeysuckles (*Lonicera maackii, L. tatarica and L. japonica*), multiflora rose (*Rosa multiflora*), winged wahoo (*Euonymus alatus*), mock-orange (*Philadelphus* spp.), English ivy (*Hedera helix*), periwinkle (*Vinca minor*), and oriental bittersweet (*Celastrus orbiculatus*).



Figure 3. Wooded habitat within Section 6A.

The herbaceous layer is dominated by invasive species, including significantly large and dense patches of Japanese knotweed (*Fallopia japonica*) along roadsides and clearings (Fig. 4), dame's rocket (*Hesperis matronalis*), lily-of-the-valley (*Convallaria majalis*), garlic mustard in forest edges, reed canary grass (*Phalaris arundinacea*), bittersweet nightshade (*Solanum dulcamara*), and purple loosestrife (*Lythrum salicaria*) along the creek and in wetter areas.

There are small areas that are higher quality, with native herbaceous species including poisonivy (*Toxicodendron radicans*), skunk cabbage (*Symplocarpus foetidus*), jewelweed (*Impatiens* spp.), blue flag iris (*Iris virginica*), may-apple (*Podophyllum peltatum*), golden ragwort (*Packera aurea*), jack-in-the-pulpit (*Arisaema triphyllum*), sensitive fern (*Onoclea sensibilis*), stinging nettle (*Urtica dioica*), black snakeroot (*Sanicula* spp.), and wood anemone (*Anemone quinquefolia*).

Non-native trees along roadsides and clearings include several large invasive tree-of-heaven (*Ailanthus altissima*), as well as Siberian elm (*Ulmus pumila*), black locust (*Robinia pseudoacacia*), and white mulberry (*Morus alba*). Mowed areas adjacent to the road and under utility rights-of-way consist predominantly of roadside weeds (Fig. 5, Table 2).

This segment is a complex of mesic southern forest and southern hardwood swamp which is suitable habitat for many of the targeted rare woodland species. However, it is highly degraded by invasive species and no rare species were found.



Figure 4. Dense Japanese knotweed infestation on forest edges in Section 6A.



Figure 5. Mowed roadside adjacent to forested habitat in Section 6A.

Section 6B: Ox Creek floodplain and bridge underpass



Figure 6. Map of Section 6B, with survey area in yellow.

Section 6B includes the Ox Creek crossing which spans the area directly underneath the bridge plus a 100-150 foot buffer on both sides, as shown in Figure 6. The entire section was surveyed on foot during the initial early season visit. The creek floodplain and northern woodlands were surveyed during mid and late season visits because of the large project footprint and the diversity of wetland species in the area.



Figure 7. Non-native phragmites (Phragmites australis) under the bridge in Section 6B.

The habitat surrounding Ox Creek is a mix of non-forested wetlands resembling southern wet meadow, and pockets of inundated shrub swamp, southern hardwood swamp, and southern shrub-carr. These habitats have been degraded by human disturbance, including dumping and invasive species-not only invasive plants but also emerald ash borer and Dutch elm disease. This has resulted in the loss of ash (*Fraxinus* spp.) and elm (Ulmus spp.) in the canopy as evidenced by the multiple large standing snags and remaining saplings of these species. The dominant invasive species in this area

are reed canary grass and non-native phragmites (*Phragmites australis*; Fig. 7). There is also a dense infestation of moneywort (*Lysimachia nummularia*) throughout the floodplain.



Figure 8. Large population of Lizard's tail (Saururus cernuus) in Section 6B.

Despite the large and dense stands of invasives, this area does contain a variety of native wetland species. Dominant tree species are red maple, sugar maple, sassafras, and American elm. Shrubs include ash (*Fraxinus* spp.), buttonbush (*Cephalanthus occidentalis*), swamp rose (*Rosa palustris*), dogwoods (*Cornus sericea, C. foemina*), black current (*Ribes americanum*), musclewood (*Carpinus caroliniana*), nannyberry (*Viburnum lentago*), and hawthorn (*Crataegus* spp.).

Herbaceous species include arrow-arum (*Peltandra virginica*), skunk cabbage, jewelweed, marsh marigold (*Caltha palustris*), Joe-pye weed (*Eutrochium maculatum*), blue flag iris, lizard's tail (*Saururus cernuus*; Fig. 8), beggars-ticks (*Bidens connata*), swamp milkweed (*Asclepias incarnata*), and clearweed (*Pilea pumila*), as well as several sedges (*Carex grayi, C. lacustris, C. stipata*), and grasses, cut grass (*Leersia oryzopsis*), and fowl manna grass (*Glyceria striata*).

Areas above the floodplain are similar to mesic

southern forest habitat. The tree canopy contains red oak, white oak (*Quercus alba*), basswood, sugar maple, American elm, hackberry, and black cherry. Notable is an old-growth red oak tree that has fallen across the slope and is several feet high on its side.

Scattered shrubs include witch-hazel (*Hamamelis virginiana*), catalpa (*Catalpa speciosa*), pawpaw, and spicebush; and herbaceous species include snakeroot (*Sanicula* spp.), may-apple, golden ragwort, wild ginger (*Asarum canadense*), and wild geranium (*Geranium maculatum*). Invasive plants in this area include honeysuckles (*Lonicera* spp.), lily-of-the-valley, orange daylily (*Hemerocallis fulva*), and tree-of-heaven.

Surrounding these natural areas are significant areas of weedy and invasive species. The flat upland on the northwest side is mowed with brush piled in the middle and is dominated by species such as black locust, box elder, mulberry (*Morus alba*), black raspberry, grape, honeysuckles (*Lonicera* spp.), garlic mustard, and typical roadside weeds (Table 2). There is a wire fence near the street. The southern boundary west of the bridge is a mowed area bordered by a wall of Japanese knotweed (*Fallopia japonica*; Fig. 9).

There is also significant trash in this section including a historic dump site along the southwest boundary and tires and other debris in Ox Creek and the adjacent floodplain (Fig. 10).

Similar to Segment 6A, this segment has been moderately degraded, and no rare species were found.



Figure 9. Dense infestation of Japanese knotweed (Fallopia japonica) in Section 6B.



Figure 10. Tires dumped in Ox Creek in Section 6B.

Section 6C: I-94 interchange



Figure 11. Map of Section 6C, with survey area in yellow.

Section 6C includes the cloverleaf I-94 and M-139 interchange at the southern end of the project area (Fig. 11). The entire project area was surveyed on foot during the initial visit. This area was highlighted for survey because these interchange loops will be used for staging and a concrete batch plant, which will likely impact the entire area.

The habitat within the two interchange circles contains several large white oaks and red pine (*Pinus resinosa;* Fig. 12.) but is otherwise dominated by autumn-olive (*Elaeagnus umbellata*), roadside weeds, and disturbance-loving native species

such as staghorn sumac (*Rhus typhina*), common milkweed (*Asclepias syriaca*), and whorled milkweed (*A. verticillata*).



Figure 12.. Large pines and oaks within cloverleaf in Section 6C.



Figure 13. Non-native phragmites (Phragmites australis) and other roadside weeds in the southwest corner of Segment 6C

The triangular section in the southwest corner (Fig. 11) contains a small wetland dominated by non-native phragmites, cat-tails, and roadside weeds (Fig. 13). The southern portion does contain many native species such as ash (*Fraxinus* spp.), American elm, elderberry (*Sambucus canadensis*), dogwood (*Cornus* spp.), boneset (*Eupatorium perfoliatum*), ironweed (*Vernonia missurica*), New England aster (*Symphyotrichum novae-angliae*), and blue vervain (*Verbena hastata*). There is a fence running lengthwise through the middle of this unit, serving as a mowing break. Upland areas of the unit are dominated by non-native honeysuckles and roadside weeds. This area is highly disturbed and managed through mowing. No suitable habitat for rare plant species occurs in this section.



Section 6D: M-139 rightof-way north of Diller Road.

Section 6D consists of 100' width on both sides of M-139 north of Diller Rd. This area was highlighted for survey as it contains visible forest and wetland landcover that could provide suitable habitat for rare woodland species (Fig. 14). Each side of M-139 is described separately below.

Figure 14. Map of Section 6D, with survey area in yellow.

Forest to the west of M-139/I-94 Emergency

The area west of the road contains good-quality mesic hardwood forest with pockets of seasonally flooded hardwood swamp. Dominant canopy species including red maple, basswood, bur oak (*Quercus macrocarpa*), and eastern cottonwood. Shrubs include spicebush, ash (*Fraxinus* spp.), and bladdernut (*Staphylea trilob*a).

The ground layer is dominated by wild ginger, moonseed (*Menispermum canadense*), and poison ivy, along with sedges, sensitive fern, and early meadow-rue (*Thalictrum dioicum*) (Fig. 15). Abundant state threatened prairie trillium was also documented here (Fig 16). Invasive plants within the prairie trillium population include Non-native honeysuckles (*Lonicera* spp.), garlic mustard, and periwinkle (*Vinca major*). The southern end includes a small buttonbush swamp.



Figure 15. Typical understory species in vernal pool on west side of Section 6D.



Figure 16. Prairie trillium (Trillium recurvatum) in Section 6D.

Forest to the east of M-139/I-94 Emergency

The east side of M-139/I-94 contains a large drain and adjacent right-of-way dominated by reed canary grass (Fig. 17) with scattered native species including, wood-sage (*Teucrium canadense*), gray's sedge, ironweed, and blue vervain. The woods to the north of the drain rightof-way is a lower quality forest with significant disturbance and invasive species, yet a large, scattered population of prairie trillium persists (Fig. 18). Spicebush, wild ginger, scouring rush (*Equisetum hyemale*), non-native honeysuckles (*Lonicera* spp.), autumn-olive, are abundant.



Figure 17. Vegetation along right-of-way on east side of *M*-139 in Section 6D.



Figure 18. Map of prairie trillium (Trillium recurvatum) was found in Section 6D along M-139 between the St. Joseph River to the south and I-94 interchange to the north.

Figure 18 shows the distribution of prairie trillium in Section 6D on both sides of M139/I-94 Emergency, north of Diller Road. The population appears to be healthy to the west of M-139. Over 1000 individual stems were counted in the right-of-way and the apparent vigor of the individuals (Fig. 16) was rated as good, with 40-50% of stems fruiting.



In contrast, prairie trillium is much more dispersed and less robust on the east side of M-139 (Fig. 19). In some areas as few as 5% of plants were flowering. An attempt was made to count individual stems starting from the southern end of the area. However, with so many stems located in dense groundcover (Fig. 20), they could not be practically counted, so points were taken frequently along the path walked from south to north (Fig. 18).

Both areas where prairie trillium was found contain invasive plant species, including aggressive invasive shrubs like non-native honeysuckles (Lonicera spp.) and autumn-olive (primarily on the east side), and a limited amount of garlic mustard. The trillium appears

Figure 19. Prairie trillium (Trillium recurvatum) in sunnier areas on the east side of M-139.

to be doing poorly in dense honeysuckle compared to less invaded areas. There is also evidence of deer browsing in these areas, which is a serious threat to trillium species, as they preferentially eat native species such as trillium. Invasive species control is essential if the prairie trillium populations are to be preserved.



Figure 20. Habitat where trillium is located on east side of M-139.

Discussion

The highest quality areas are the floodplain forests and mesic southern forests within Sections 6B and 6D. Aside from these areas, the right-of-way is highly infested with invasive species, especially shrubs and roadside weeds. Emphasis should be placed on decontamination of vehicles when moving to un-infested sites.

Treatment of invasive species within higher quality habitat is recommended. Although widespread invasive species are noted throughout the project area, the infestations of garlic mustard, Japanese knotweed, and Non-native honeysuckles in high-quality areas are a threat to native species that occur there, including the rare trilliums. Shapefiles for Japanese knotweed have been submitted to the Midwest Invasive Species Information Network (MISIN) and provided to MDOT. In addition, it is recommended that the large diameter oaks in the northwest interchange circle in Section 6C.

The significant population of state threatened *Trillium recurvatum* documented in Section D is vulnerable to anticipated road work. As construction is expected to include full road reconstruction in some places, care must be taken to keep the canopy intact to maintain suitable habitat conditions for prairie trillium, which does not do well under increased light (Fig. 19). Additionally, disturbance in a closed-canopy forest is known to assist the spread of invasive plant species.

Ensuring that this location is not disturbed during road work and treatment of invasive species at this location will be necessary to ensure population health and sustainability. Alternatively, trillium plants could be transplanted to a suitable site elsewhere. Prairie trillium prefers rich woodlands with limestone-derived soils in floodplain forests, moist ravines, and mesic forests.

References

MNFI. Michigan Natural Heritage Database, Lansing, MI. [Accessed November 2022.]

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