Rare Plant Species Surveys for the Michigan Department of Transportation: US-131 Rocky River to M-216, St. Joseph and Kalamazoo Counties.

MDOT project No. 200115







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Cover: Clockwise from top left: State Threatened prairie coreopsis (*Coreopsis palmata*); pasture rose (*Rosa carolina*), State Special Concern leadplant (*Amorpha canescens*); Prairie remnant adjacent to US-131.

All photos in this report, unless otherwise stated in captions, were taken by Danielle Smith

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Abstract

The corridor of MDOT Project 200115 was surveyed for rare plant species during the summer of 2022 to assess the potential impact of planned road work. The 13-mile corridor was initially surveyed by vehicle, and suitable habitat was then surveyed by foot. Several high-quality wetlands, waterway crossings, and prairie habitat were documented within five sections. A population of state special concern Engelmann's spike-rush (*Eleocharis engelmannii*) was found in an emergent pond within an agricultural field in Section 2. State special concern leadplant (*Amorpha canescens*) and state threatened prairie coreopsis (*Coreopsis palmata*) were found in high-quality prairie remnant habitat in Section 4. The populations of all three species were relatively small and threatened by construction impacts and infestations of multiple invasive species. Every effort must be taken to ensure the rare species and high-quality habitats found within the project area are not disturbed and the spread of invasive species is minimized.

Introduction



Figure 1. Map of the project area. The MDOT corridor is shown in yellow, and the survey extends 500 feet beyond the yellow boundary at both the north and south ends.

This report provides a summary of the rare plant surveys conducted for Michigan Department of Transportation (MDOT) Project #200115 by Michigan Natural Features Inventory (MNFI) botanists in 2022. This project area stretches from southern Kalamazoo County to northern St. Joseph County and comprises approximately 13 miles of US-131 right-of-way (ROW). The site begins about two miles north of Schoolcraft, MI and concludes at Rocky River north of Three Rivers, MI.

Surveys are required prior to road work to ensure compliance with state and federal regulations pertaining to rare plant species. Several construction activities are planned for the project area and include drainage improvements, ditch cleanouts, tree removal, median removals with left turn lane replacements, guardrail and culvert upgrades, and curb replacements.

Methods

A review of the Michigan Natural Heritage Database (MNFI 2023) was conducted to identify species listed as threatened, endangered, or special concern¹ that have been previously documented within a two-mile radius of the project area. A total of 24 species met these criteria (Table 1). Of these species, 9 are listed as Special Concern, 12 are Threatened, and 3 are Endangered.

lable 1. Documented occurrences of rare plant species within 2 miles of the project area.			
Latin name	Common name	State status*	Target season
Agalinis gattingeri	Gattinger's gerardia	E	late summer – mid autumn
Amorpha canescens	leadplant	SC	early – late summer
Astragalus canadensis	Canadian milk vetch	Т	mid – late summer
Astragalus neglectus	Cooper's milk vetch	SC	mid – late summer
Baptisia lactea	white or prairie false indigo	SC	mid – late summer
Berula erecta	cut-leaved water parsnip	Т	early – late summer
Besseya bullii	kitten-tails	E	late spring – early summer
Boechera missouriensis	Missouri rock-cress	SC	unknown
Brickellia eupatorioides	false boneset	SC	mid-summer – mid autumn
Coreopsis palmata	prairie coreopsis	Т	early summer – early autumn
Cypripedium candidum	white lady slipper	Т	mid spring – early summer
Eleocharis engelmannii	Engelmann's spike rush	SC	late summer – early autumn
Eryngium yuccifolium	rattlesnake-master	Т	mid-summer – early autumn
Lechea minor	least pinweed	Т	late summer – early autumn
Linum virginianum	Virginia flax	Т	early – mid-summer
Lipocarpha micrantha	dwarf-bulrush	SC	late summer – mid autumn
Panax quinquefolius	ginseng	Т	early summer – mid autumn
Platanthera ciliaris	orange-fringed orchid	Е	mid – late summer
Silphium integrifolium	rosinweed	Т	mid-summer – early autumn
Silphium perfoliatum	cup plant	Т	mid-summer – mid autumn
Smilax herbacea	smooth carrion-flower	SC	early summer – early autumn
Viburnum prunifolium	black haw	SC	mid-summer – early autumn
Viola pedatifida	prairie birdfoot violet	Т	late spring – early summer
Zizania aquatica	wild rice	Т	mid-summer – mid autumn
*E: state endangered; T; state threatened; SC: state special concern;			

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.

Seventeen of these rare species can be found in prairie and savanna communities, nine can be found in forested communities, and seven can be found in wetland communities. As such, these natural community types were the targets for field surveys. Suitable habitat for any rare species was also surveyed in case other rare species might occur in the project area.

The project area was initially assessed utilizing aerial imagery interpretation and vehicle surveys. Suitable habitat was then surveyed on foot. Areas containing high-quality habitat, notable features, and rare species were grouped into five sections and are referenced in Figure 1. Rare plant occurrences were recorded using Survey 123 for upload into the Michigan Natural Heritage Database. Isolated, high-impact invasive species were documented using the Midwest Invasive Species Information Network (MISIN) phone application (MISIN 2022). Shapefiles of rare species data and high priority invasive species were provided to MDOT.

Aerial photos with the project area boundaries and all previously documented rare species within the two-mile radius were developed using Field Maps. These were georeferenced and loaded onto a Samsung tablet for use in the field. This enabled surveyors to view their location and occurrences of natural features while surveying.

Site visits were planned around the ideal detection window for each species, typically during flowering and fruiting periods (Table 1). Three surveys were conducted in 2022, including early, mid, and late season visitations. Early surveys were conducted on May 31st through June 3rd, mid-season surveys on July 11th-12th, and late season surveys on August 30. The project area was revisited on September 14th to confirm the presence of Engelmann's spike-rush (*Eleocharis engelmannii*) at Section 2 and to gather additional representative photos

Results

Most of the project area consisted of residential, commercial, and urban development, with open stretches of weedy grasses and forbs directly adjacent to US-131 that are typically maintained through mowing. These areas lack suitable habitat for rare species and were not surveyed on foot (Fig. 2).

Many common, weedy species were encountered throughout the project area in the dry, mowed rights-of-way and are referenced as roadside weeds throughout the rest of the report (Table 2). Some of the more dominant species growing along roadsides include smooth brome (*Bromus inermis*), Kentucky bluegrass (*Poa pratensis*), orchard grass (*Dactylis* glomerata), Virginia creeper (*Parthenocissus quinquefolia*), and tall goldenrod (*Solidago altissima*).



Figure 2. Unsuitable habitat present in the project area: a) urban development and b) mowed shoulder adjacent to an agricultural field.

Disturbed hardwood forests that initially appeared to be suitable for rare species during aerial imagery assessment and vehicle surveys were later ruled out by foot surveys and excluded from Sections (Fig. 3). Disturbed hardwoods were typically dominated by red maple (*Acer rubrum*), black walnut (*Juglans nigra*), black cherry (*Prunus serotina*), white avens (*Geum canadense*), Virginia creeper (*Parthenocissus quinquefolia*), dame's rocket (*Hesperis matronalis*), oriental bittersweet (*Celastrus orbiculatus*), and other invasive and weedy species.

Numerous aggressive invasive species were also present throughout the corridor and are listed in Table 3 and shown in Figure 4. A population of Japanese knotweed (*Fallopia japonica*) was noted for its discrete, treatable size. It was mapped in MISIN and shapefiles were sent to MDOT. Dame's rocket (*Hesperis matronalis*), Canada thistle (*Cirsium arvense*), bouncing bet (*Saponaria* officinalis), cat-tail (*Typha* spp.), oriental bittersweet (*Celastrus orbiculatus*), and reed canary grass (*Phalaris arundinacea*) were particularly prolific and are unlikely to be successfully treated within the project area.



The five sections with suitable habitat contain various emergent, forested, shrub, lacustrine, and

Figure 3. Disturbed hardwood forest found throughout the project area.

riverine wetland community types (Sections 1-3 and 5), and one long section harbors remnants of dry-mesic prairie of varying quality (Section 4). These are described further in the following sections.



Figure 4. Invasive species found within the project area: a) a cat-tail patch found in a roadside ditch, b) Japanese knotweed found on the road shoulder, and d) disturbed hardwood forest dominated by dame's rocket.

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
Cirsium vulgare	bull thistle	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
Elymus repens	quack grass	non-native	grass
Erechtites hieraciifolius	fireweed	native	forb
Erigeron philadelphicus	common fleabane	native	forb
Hesperis matronalis	dame's rocket	Non-native	forb
Hypericum perforatum	St. John's wort	non-native	forb
Lolium arundinaceum	tall fescue	non-native	grass
Leucanthemum vulgare	ox-eye daisy	non-native	forb
Medicago lupulina	black medic	non-native	forb
Melilotus albus	white sweet-clover	non-native	forb
Oxalis stricta	yellow wood-sorrel	Native	forb
Parthenocissus quinquefolia	Virginia creeper	native	vine
Phleum pratense	Timothy	non-native	grass
Plantago lanceolata	narrow-leaved plantain	non-native	forb
Plantago major	common plantain	non-native	forb

Poa pratensis	Kentucky bluegrass	non-native	grass
Rubus flagellaris	northern dewberry	Native	shrub
Saponaria officinalis	bouncing bet	non-native	forb
Securigera varia	crown vetch	non-native	vine
Setaria sp.	foxtail	non-native	grass
Solidago altissima	tall goldenrod	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

Table 3. Invasive plant species found within the project area.			
Latin name	Common name	Habit	
Alliaria petiolata	garlic mustard	forb	
Arctium minus	burdock	forb	
Berberis thunbergii	Japanese barberry	shrub	
Celastrus orbiculatus	oriental bittersweet	vine	
Centaurea stoebe	spotted knapweed	forb	
Chelidonium majus	celandine	forb	
Cirsium arvense	Canada thistle	forb	
Cirsium vulgare	bull thistle	forb	
Conium maculatum	poison-hemlock	forb	
Cotinus coggygria	smoke-tree	shrub	
Dipsacus fullonum	wild teasel	forb	
Dipsacus laciniatus	cut-leaf teasel	forb	
Elaeagnus umbellata	autumn olive	shrub	
Euphorbia virgata	Leafy spurge	forb	
Fallopia japonica	Japanese knotweed	forb	
Hesperis matronalis	dame's rocket	forb	
Lonicera morrowii	Morrow's honeysuckle	shrub	
Lythrum salicaria	purple loosestrife	forb	
Melilotus albus	white sweet-clover	forb	
Phalaris arundinacea	reed canary grass	grass	
Phragmites australis subsp. australis	reed	grass	
Robinia pseudoacacia	black locust	tree	
Rosa multiflora	multiflora rose	shrub	
Saponaria officinalis	bouncing bet	forb	
Securigera varia	crown-vetch	forb	
Solanum dulcamara	bittersweet nightshade	vine	
Torilis japonica	hedge-parsley	forb	

<i>Typha</i> spp.	cat-tail	forb
Verbascum thapsus	common mullein	forb
Vinca minor	periwinkle	shrub

Section 1



Figure 5. Map of Section 1.

Section 1 consists of high-quality southern shrub-carr containing pockets of sedge meadow and emergent wetland (Fig. 5). These wetlands are part of a watershed system associated with Little Sugarloaf Lake located northwest of the project area. Surrounding the southern shrub-carr is disturbed wet-mesic hardwood forest grading to maintained upland weedy habitat adjacent to the road. No rare species were found this section.

The canopy of the wet-mesic forested habitat is dominated by cottonwood (*Populus deltoides*), black walnut *Juglans nigra*, and boxelder (*Acer negundo*) (Fig. 6a). The shrub layer is

dominated by gray dogwood (*Cornus foemina*), spicebush (*Lindera benzoin*), and hackberry (*Celtis occidentalis*) saplings. The herbaceous layer is lush, but not very diverse, and is dominated by dame's rocket, white avens (*Geum canadense*), enchanter's-nightshade (*Circaea canadensis*), virgin's bower (*Clematis virginiana*), and Virginia creeper. Other invasive species present in Section 1 include multiflora rose (*Rosa multiflora*), Morrow's honey-suckle (*Lonicera morrowii*), and reed canary grass.

On the west side of US-131, the southern shrub-carr is dominated by shrubs such as poison sumac (*Toxicodendron vernix*), winterberry (*llex verticillata*), nannyberry (*Viburnum lentago*), and gray dogwood. The herbaceous layer is dominated by reed canary grass, lake sedge (*Carex lacustris*), and royal fern (*Osmunda regalis*). Other associate species include black ash (*Fraxinus nigra*), golden ragwort (*Packera aurea*), skunk cabbage (*Symplocarpus foetidus*), tufted loosestrife (*Lysimachia thyrsiflora*), Canada bluejoint (*Calamagrostis canadense*), and water horsetail (*Equisetum fluviatile*).

On the east side of US-131, the southern shrub-carr is less inundated than the west side and lacks winterberry as a dominant species. The herbaceous component is also more diverse, boasting similar dominant species to the west side, but also including false nettle (*Boehmeria cylindrica*), spotted touch-me-not (*Impatiens capensis*), aster species (*Symphyotrichum lanceolatum*, *S. puniceum*, *S. novae-angliae*), and goldenrod species (*Solidago gigantea*, *S.*

rugosa, *S. patula*). Other species present include purple meadow-rue (*Thalictrum dasycarpum*), fowl manna grass (*Glyceria striata*), and awl-fruited sedge (*Carex stipata*) (Fig 6b).



Figure 6. a) Disturbed wet-mesic hardwood forest on the west side of US-131 and b) southern shrub-carr on the east side of US-131.

Section 2



Figure 7. Map of Section 2.

Section 2 (Fig 7) hosts a small, emergent wetland (Fig. 8b) located within an agricultural (ag) field that is associated with a culvert (Fig. 8a). Water levels fluctuated slightly throughout the field season with highest levels present earlier in the summer. The wetland is dominated by Engelmann's spike-rush, spike-rush (Eleocharis obtusa), softstem bulrush (Schoenoplectus tabernaemontani), and stiff arrowhead (Sagittaria rigida) (Fig 8c). Plants on the margin between the inundated wetland and the ag field include cursed crowfoot (Ranunculus sceleratus), bigseed smartweed (*Persicaria pensylvanica*), nodding smartweed (Persicaria lapathifolia), common groundsel (Senecio vulgaris),

false pimpernel (*Lindernia dubia*), barnyard grass (*Echinochloa crusgalli*), and reed canary grass.



Figure 8. a) Culvert and associated vegetation, b) emergent wetland dominated by Eleocharis spp, including Engelmann's spike-rush and c) vegetation associated with Engelmann's spike-rush.

A presumed extirpated population of state special concern Engelmann's spike-rush, last seen in the late1990s, was rediscovered within this emergent wetland. Plants appeared healthy, and most individuals were flowering in July and successfully fruiting in August and September. Although accurate numbers were impossible to determine in the field, it is estimated that there are over 1,000 individuals present within the project area ROW.

Section 3



Figure 9. Map of Section 3.

Section 3 contains a large wetland mosaic associated with two main bodies of water: Spring Creek and Cotherman Lake (Fig. 9). Within this wetland complex are inundated shrub swamps, forested wetlands, and emergent wetlands. No rare species were found in this section, but several pockets of high-quality habitat were present.

Spring Creek runs west to east under US-131 (Fig. 10). Submergent vegetation includes tapegrass (*Vallisneria americana*) and pondweeds (*Potamogeton* spp.). Emergent vegetation growing on silt and sand deposits in the stream channel includes bur reeds (*Sparganium* spp.) and watercress (*Nasturtium officinale*). The banks are dominated by tussock sedge (*Carex stricta*), Eurasian grasses, and Virginia creeper. There is also multiflora rose, cat-tail, reed canary grass, and reed (*Phragmites australis* subsp. *australis*) present along the stream banks.



Figure 10. a) East side of Spring Creek and b) west side of Spring Creek.

South of Spring Creek is Cotherman Lake and a surrounding forested swamp complex. The lake is encompassed by a fence and could not be accessed, but several species could still be identified along the shoreline, including red maple (*Acer rubrum*), cottonwood, American Elm (*Ulmus americana*), black willow (*Salix nigra*), buttonbush (*Cephalanthus occidentalis*), winterberry, elderberry (*Sambucus canadensis*), and yellow pond-lily (*Nuphar advena*) (Fig. 11).



Figure 11. View of Cotherman Lake through the surrounding fence.

There are two emergent wetlands within Section 3. One wetland north of Spring Creek is uniform and co-dominated by sensitive fern (*Onoclea sensibilis*), sweet-flag (*Acorus calamus*), and common beaked sedge (*Carex utriculata*) (Fig 12a). The other wetland is south of Spring Creek and is an inundated pond consisting of sporadic button bush, whorled loosestrife (*Decodon verticillatus*) cat-tail, and reed canary grass.



Figure 12. a) An emergent wetland north of Spring Creek and b) a forested wetland complex with a pocket of inundated shrub swamp.

The interconnected wetland complex on the west side of US-131 consists of wet-mesic hardwood forest grading to forested wetland with pockets of inundated shrub swamp. The inundated shrub swamp is nearly completely dominated by buttonbush, but some other associate species include elderberry, highbush blueberry (*Vaccinium corymbosum*), poison sumac, arrow-arum (*Peltandra virginica*), common bladderwort (*Utricularia vulgaris*), royal fern, cinnamon fern (*Osmundastrum cinnamomeum*), and fringed sedge (*Carex crinita*) (Fig 12b).

Section 4



Figure 13. Map of Section 4.

Section 4 consists of a long, contiguous stretch of prairie remnant that runs between the east side of US-131 and the adjacent railroad ROW (Fig. 13). These prairies are dominated by Eurasian grass species (Table 2), northern dewberry, and flowering spurge (Euphorbia corollata). There are inclusions of native grass species in higher quality regions of the prairie remnant that include big bluestem (Andropogon gerardii), little bluestem (Schizachyrium scoparium), and cordgrass (Spartina pectinata). Other prairie species present throughout the remnant include milkweed species (Asclepias syriaca, A. amplexicaulis, A. tuberosa, A. viridiflora, A. verticillata), round-headed bush-clover (Lespedeza capitata), tick-trefoil species (Desmodium illinoense, D. sessilifolium), common spiderwort (*Tradescantia ohiensis*), and wild-bergamot (Monarda fistulosa) (Fig 14).



Figure 15. Dry-mesic prairie remnant on the east side of US-131.



Figure 15. Locations of leadplant and prairie coreopsis.

Two rare species were found in Section 4 – the state special concern leadplant (*Amorpha canescens*) and the state threatened prairie coreopsis (*Coreopsis palmata*) (Fig. 16). Each species was found in a discrete population within 1300 feet of each other, just south of Marcellus Rd (Fig. 15). Both populations were very small (< 200 ft²) but appeared relatively healthy. Both the prairie coreopsis and leadplant were flowering during the mid-season survey in July and began to set fruit before the late-season survey in August. During the late-season survey, both the prairie coreopsis and leadplant had been mowed over, but regrowth was observed during the September revisit.



Figure 16. Representative photos of a) leadplant and b) prairie coreopsis.

Section 5



Figure 17. Map of Section 5.

Section 5 consists of the Rocky River crossing (Fig 17). There were some submergent vegetation including pondweeds (*Potamogeton* spp.) and tape-grass (*Vallisneria americana*), and sparse vegetation directly by the bridge growing amongst limestone riprap, including poisonhemlock (*Conium maculatum*), spotted touchme-not, purple loosestrife (*Lythrum* salicaria), Canada thistle, and reed canary grass (Fig 18a). Past the riprap, the bank was vegetated with species such as swamp rose (*Rosa palustris*), blue vervain (*Verbena hastata*), common milkweed (*Asclepias syriaca*), riverbank grape, reed canary grass, and Morrow's

honeysuckle (Fig. 18b). No rare species were found, and no high-quality habitat that would support rare species was present within this Section.



Figure 18. a) Rocky River bridge crossing with riprap and b) vegetation present along the bank of Rocky River.

Discussion

Every effort should be taken to protect and preserve the Engelmann's spike-rush, leadplant and prairie coreopsis populations found in the project area. Maintaining the integrity of several highquality habitats, including the southern shrub-carr in Section 1, the various wetland communities in Section 3, and the dry-mesic prairie remnant in Section 4 should be prioritized as well. While no rare species were found in many of these habitats, they could serve as a refugia either for natural spread or transplants of rare species in the future.

Engelmann's spike-rush typically occurs in moist, open, and usually sandy ground and in areas with a fluctuating water table (MNFI 2022). Any activity that would disrupt the current hydrological regime should be avoided. In addition, the precise number of Engelmann's spike-rush is unknown and mitigation efforts would be particularly challenging. However, most of the wetland that contains the population of Engelmann's spike-rush does extend outside of the MDOT ROW, therefore some individuals growing in this part of the wetland could be protected and utilized as a seed source if mitigation is required.

The leadplant prairie coreopsis, and the prairie habitat in which they thrive, rely on some level of disturbance that controls the intrusion of trees and shrubs (MNFI 2022). Woody vegetation should be controlled through mowing, herbicide treatments, or burning. These two populations are small enough to be vulnerable to extirpation and therefore all disturbance outside of maintenance should be avoided. If work in the vicinity of the leadplant and sand coreopsis is unavoidable, both populations should be transplanted to a suitable location.

Several invasive species of concern were found within the project area. Japanese knotweed is of immediate concern as it is an aggressive spreader and is currently contained within small, discrete area. It is recommended that this population be treated before construction begins. Other invasives like Canada thistle, bouncing bet, cattail, oriental bittersweet, and reed canary grass are more widespread throughout the project area and therefore more difficult to treat, but could be better controlled with the assistance of landowners. Regular decontamination procedures should be followed during construction to avoid the further spread of invasive species that could threaten rare species populations and high-quality natural communities.

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