Rare Plant Species Surveys for the Michigan Department of Transportation: I-96 in Oakland County, Report #124103

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Cover: Common vegetation along I-96 right-of-way in Oakland County. Photo by Amanda K. Klain.

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Abstract

Meander surveys for rare plant species were conducted in the right-of-way (ROW) of I-96 from its junction with Kensington Road to Halsted Road. The surveys revealed that the ROW is highly disturbed and dominated by old-field, early successional plant species and dense stands of mixed native and non-native shrubs interspersed with ditches generally dominated by non-native grasses and cat-tails. Invasive species were prevalent throughout the project area including the particularly high-impact Oriental bittersweet (*Celastrus orbiculatus*). This area is highly commercialized with many segments containing unsuitable habitat. None of the target rare species identified for this project were found along the I-96 flex route area proposed for expansion. Although no rare species were found, there are a few higher quality areas that should be considered during construction to avoid negative impacts to these habitats.

Introduction

This report provides a summary of rare plant surveys conducted along the I-96 east and westbound ROW in Oakland County. Project 124103 starts approximately 0.5 miles west of Kent Lake and continues eastward through the M-5 interchange and northeast approximately 0.25 miles east of Halsted Road (Fig. 1). Surveys are required to ensure regulatory compliance with the state and federal endangered species acts, prior to expansion of the flex-route system along I-96.

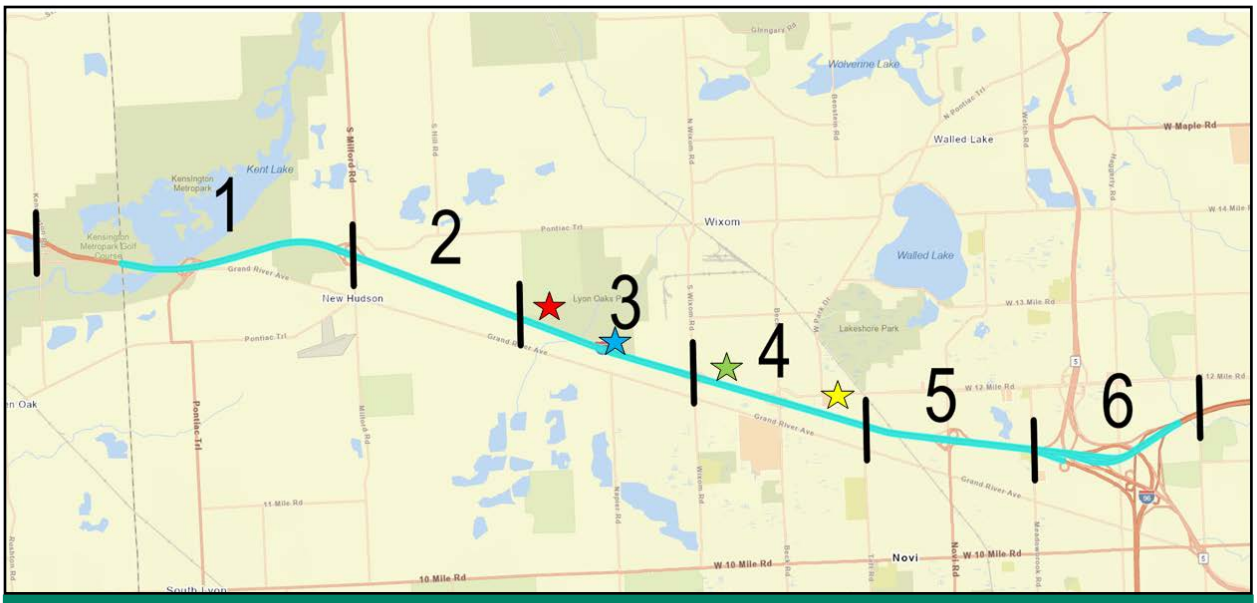

Figure 1. Project area along I-96 in Oakland County highlighted in turquoise. Pockets of higher-quality natural communities are denoted by stars. Red: Dry southern forest, Blue: Southern hardwood swamp, Green: Southern hardwood swamp, Yellow: Mesic southern forest.

Methods

A review of the Michigan Natural Heritage database was conducted to identify species listed as federal or state endangered or threatened, or state special concern, with potential to occur in the survey areas outlined in black in Figure 1. Three early flowering species and two late-flowering species were identified as survey targets for this project area (Tables 1, 2).

Table 1: Species targeted during early-season surveys, their status, and best survey period.

Scientific name	Common name	Listing Status		Survey Period
		State	Federal	
Cypripedium candidum	white lady slipper	T	*	late May – Mid June
Hydrastis canadensis	goldenseal	T	*	late April – Early August
Nelumbo lutea	American lotus	T	*	early June – Late October

Notes: SC – Special Concern; T – Threatened; E – Endangered; X – Extirpated; * - Not Listed

Table 2: Species targeted during late-season surveys, their status, and best survey period.

Scientific name	Common name	Listing Status		Survey Period
		State	Federal	
Fraxinus profunda	pumpkin ash	T	*	August - September
Gentiana alba	white gentian	E	*	late August – mid September

Notes: SC – Special Concern; T – Threatened; E – Endangered; X – Extirpated; * - Not Listed

Aerial maps with the project locations and previously mapped element occurrences within a two-mile radius of the project area were georeferenced and loaded onto a Samsung tablet and iPhone XR with the Field Maps application for use in the field. The surveyors were able to view their location on the map as they were moving through the project area. These photos and aerial imagery on Google Maps were reviewed to delineate stretches of the ROW that clearly lack suitable habitat (commercial, residential, developed, mowed, maintained, or cropped areas), and areas with apparently suitable habitat for the target species. Based upon this initial assessment, meander surveys were conducted throughout the ROW on both the north and south sides of I-96, with more detailed surveys in areas with the most suitable habitat.

General habitat conditions, dominant plant species, and populations of rare plant species and notable invasive species were recorded in six Segments of I-96, demarcated by road-crossings (Fig. 1). Notable invasive species include those for which management by MDOT can make a significant impact by containing their spread along the I-96 corridor. If a notable invasive species was found that did not occur commonly throughout the project area, it was marked with a GPS point using a Samsung tablet, Samsung phone or iPhone. Rare plant occurrences were also mapped as GPS points and sent to MDOT and MNFI after each survey period, and later entered into the Michigan Natural Heritage Database, Biotics.

Results

Overview

Since the project area is in a highly urbanized area, the ROW and surrounding natural areas are generally highly disturbed. The most common plant assemblage throughout the project area is early successional, or old field plant communities. These occur in three distinct zones (Fig. 2): (1) a mowed area adjacent to the highway, (2) an herbaceous zone dominated by non-native grasses and a diversity of native and non-native forbs, and (3) thickets of native and non-native shrubs along the inner edge of the ROW. Dominance of the herbaceous species varies throughout the project area. In the shrub zone, the invasive common buckthorn (*Rhamnus cathartica*) is especially prevalent and creates dense thickets that are generally unsuitable habitat for the target species (Fig. 3). This zone also has a variety of trees dispersed throughout.

Figure 2. Three distinct zones observed throughout project area in the right-of-way.

Wet ditches, mostly dominated by invasive cat-tails (*Typha angustifolia*), invasive reed (*Phragmites australis* subsp. *australis*) and other non-native grasses, occur frequently within the three zones noted above (Fig. 4). The area is also highly developed with many commercial areas and portions of the ROW that are completely mowed (Fig. 5). These areas provide no suitable habitat for the target species.

Invasive species are abundant throughout the project area and many portions of the ROW are unsuitable for the target species. The most common invasive species observed during surveys are listed in Table 3. Because these are mostly abundant and widespread, they were not specifically mapped with GPS.

Several areas that are not completely dominated by highly disturbed, early successional communities or commercial areas, were identified with potentially suitable habitat for the target species. These occur in Segments 1, 3, and 4 (Fig. 1). However, none of the target species were found in these segments or elsewhere throughout the project area. The remainder of this section highlights these higher quality areas.

Although, not a comprehensive, three-season survey of the project area, Appendix 1 presents a list of plant species recorded during surveys.

Figure 3. A thicket of buckthorn in the shrub zone.

Figure 4. Wet ditch dominated by invasive reed.

Figure 5. Commercial area and mowed right-of-way along I-96.

Table 3. Common non-native species observed along I-96.

Scientific Name	Common Name	Segment(s) Present
Bromus inermis	smooth brome	All
Celastrus orbiculatus	Oriental bittersweet	All
Centaurea stoebe	spotted knapweed	All
Cirsium arvense	Canada thistle	All
Dipsacus fullonum	wild teasel	All
Dipsacus laciniatus	cut-leaf teasel	All
Elaeagnus angustifolia	Russian-olive	All
Elaeagnus umbellata	autumn-olive	All
Lolium arundinaceum	tall fescue	All
Lonicera maackii	amur honeysuckle	All
Lonicera morrowii	morrow honeysuckle	All
Lotus corniculatus	birdfoot trefoil	All
Melilotus officinalis	yellow sweet-clover	All
Phalaris arundinacea	reed canary grass	All

Phragmites australis subsp. australis	invasive reed	All
Pinus sylvestris	Scotch pine	All
Pyrus calleryana	Callery pear	All
Rhamnus cathartica	common buckthorn	All
Robinia pseudoacacia	black locust	All
Securigera varia	crown vetch	All
Typha angustifolia	narrow-leaved cat-tail	All

Segment 1: Kensington Road to Milford Road

The northside of this segment contains sections with steep slopes up to the fence line which are dominated by mature red oak (*Quercus rubra*), pignut and shagbark hickory (*Carya ovata, C. glabra*), American elm (*Ulmus americana*), black locust (*Robinia pseudoacacia*) and thornless honey locust (*Gleditsia triacanthos*) (Fig. 6). Dominant shrubs and ground cover species in the woodlands at the top of the slopes include poison ivy (*Toxicodendron radicans*), amur honeysuckle (*Lonicera maackii*), cleavers (*Galium aparine*), and many non-native grasses including tall fescue (*Lolium arundinaceum*), tall oatgrass (*Arrhenatherum elatius*), and smooth brome (*Bromus inermis*). Invasive Oriental bittersweet is extremely common throughout this segment in the woodlands (Fig. 7).

Figure 6. Steep slope with wooded fence line in Segment 1.

Figure 7. Invasive Oriental bittersweet in Segment 1.

A small, wetland prairie opening (Fig. 8) with native species such as culver's root (*Veronicastrum virginicum*), swamp milkweed (*Asclepias incarnata*), tickseed (*Bidens* spp.), and bugleweed (*Lycopus* sp.) also occurs in this segment. It is highly disturbed and is being invaded by reed canary grass (*Phalaris arundinacea*) and invasive reed.

This opening was surveyed for white lady-slipper (*Cypripedium candidum*), but it was not observed and is unlikely to persist in this environment due to the highly disturbed surroundings and isolated nature of this small pocket of habitat.

Figure 8. Disturbed wetland prairie opening in Segment 1.

Segment 3: Old Plank Road to Wixom Road

The northside of this segment contains Lyon Oaks County Park which has isolated patches of dry southern forest (Fig. 1, red star) with red oak dominant in the canopy and hickory in the subcanopy (Fig. 9). Native groundcover species include early meadowrue (*Thalictrum dioicum*), enchanter's nightshade (*Circaea canadensis*), bedstraw (*Galium boreale*), wood anemone (*Anemone quinquefolia*), common trillium (*Trillium grandiflorum*), and various sedges (*Carex* spp.).

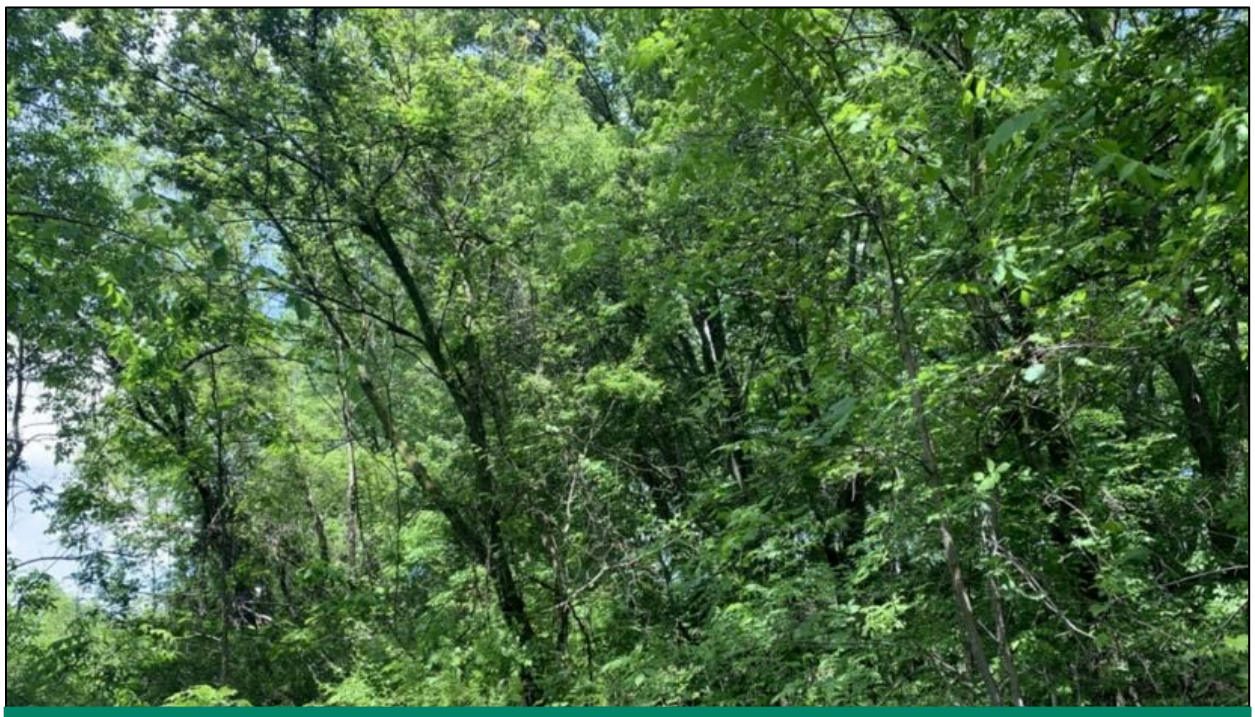

Figure 9. Dry southern forest in Segment 3.

There are also isolated patches of southern hardwood swamp (Fig. 1, blue star) with silver maple (*Acer saccharinum*), basswood (*Tilia americana*), red oak in the canopy, and prickly ash (*Zanthoxylum americanum*), bladdernut (*Staphylea trifolia*; Fig. 10), and meadowsweet (*Spiraea*

alba) in the understory. Bellwort (*Uvularia grandiflora*), wild geranium (*Geranium maculatum*), jack in the pulpit (*Arisaema triphyllum*), blue stem goldenrod (*Solidago caesia*), zigzag goldenrod (*S. flexicaulis*), sharp-lobed hepatica (*Hepatica acutiloba*; Fig. 11), Pennsylvania sedge (*Carex pensylvanica*), and other sedges (*Carex* spp.) are common in the ground layer.

These forests provide potential habitat for goldenseal (*Hydrastis canadensis)* and pumpkin ash (*Fraxinus profunda)* and were surveyed during both early- and late-season surveys, however neither were observed.

Segment 4: Wixom Road to Taft Road

The northside of this segment contains a patch of southern hardwood swamp with a canopy of silver maple, red oak, bur oak (*Q. macrocarpa)*, swamp white oak (*Q. bicolor*), green ash (*Fraxinus pennsylvanica*), and basswood (Fig.1, green star). A large dense stand of bladdernut is in the understory along with meadowsweet and prickly ash.

Further east is a section of mesic southern forest (Fig. 1, yellow star) dominated by sugar maple *(Acer saccharum)* and American beech (*Fagus grandiflora*) between Beck Road and Taft Road (Fig. 12). Native forbs are present in the understory including large swaths of blue cohosh (*Caulophyllum thalictroides*; Fig. 13), along with bellwort, common trillium, Jack in the pulpit, bloodroot (*Sanguinaria canadensis*), and baneberry (*Actaea* sp.). This ground layer is also dense with seedlings and small saplings of sugar maple.

These forests provide potential habitat for goldenseal and pumpkin ash and were surveyed thoroughly during both early and late-season, however neither were found.

Figure 10. Lowland with bladdernut in Segment 3.

Figure 11. Sharp-lobed hepatica in Segment 3.

Figure 12. Mesic southern forest in Segment 4.

Figure 13. Blue cohosh in Segment 4.

Discussion

Small patches of potentially suitable habitat for goldenseal and pumpkin ash were found in segments 3 and 4, however, no occurrences of these or any of the target species were found. Care should be taken during road work to ensure that disturbances do not facilitate the spread of invasive species into these higher quality areas (Fig. 1). Since the project area is in a highly urbanized area, the ROW and surrounding natural areas are generally highly disturbed, therefore the construction will most likely not have any significant impacts to the ecological quality of the area. Given the abundance and density of high-impact invasive species such as Oriental bittersweet and common reed, it is recommended that consideration be given to identifying strategies to minimize their spread beyond the project area.

Acknowledgements

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Appendices

Appendix 1. Plant species documented in the I-96 project area.

Scientific Name	Common Name	C	W	Native/Adventive (Non-native) Physiognomy
Acer negundo	box-elder	0	0	Nt Tree
Acer platanoides	Norway maple	*	5	Ad Tree
Acer saccharinum	silver maple	2	-3	Nt Tree
Acer saccharum	sugar maple	5	3	Nt Tree
Anemone quinquefolia	wood anemone	5	3	Nt P-Forb
Apocynum cannabinum	Indian-hemp	3	0	Nt P-Forb
Arisaema triphyllum	Jack-in-the-pulpit	5	0	Nt P-Forb
Arrhenatherum elatius	tall oatgrass	*	3	Ad P-Grass
Asclepias incarnata	Swamp milkweed	6	-5	Nt P-Forb
Asclepias syriaca	common milkweed	1	5	Nt P-Forb
Asclepias tuberosa	butterfly weed	5	5	Nt P-Forb
Asclepias verticillata	whorled milkweed	1	5	Nt P-Forb
Bromus inermis	smooth brome	*	5	Ad P-Grass
Carex pensylvanica	sedge	4	5	Nt P-Sedge
Carya glabra	pignut hickory	5	3	Nt Tree
Carya ovata	shagbark hickory	5	3	Nt Tree
Celastrus orbiculatus	Oriental bittersweet	*	5	Ad W-Vine
Centaurea stoebe	spotted knapweed	*	5	Ad B-Forb
Circaea canadensis	enchanter's-nightshade	2	3	Nt P-Forb
Cirsium arvense	Canada thistle	*	3	Ad P-Forb
Cirsium vulgare	bull thistle	*	3	Ad B-Forb
Cornus foemina	gray dogwood	1	0	Nt Shrub
Dactylis glomerata	orchard grass	*	3	Ad P-Grass
Daucus carota	Queen-Anne's lace	*	5	Ad B-Forb
Dipsacus fullonum	wild teasel	*	3	Ad P-Forb
Dipsacus laciniatus	cut-leaf teasel	*	3	Ad B-Forb

Elaeagnus angustifolia	Russian-olive	*	3	Ad Tree
Elaeagnus umbellate	autumn-olive	*	3	Ad Shrub
Eragrostis spectabilis	purple love grass	3	5	Nt P-Grass
Erigeron philadelphicus	common fleabane	2	0	Nt P-Forb
Euphorbia corollata	flowering spurge	4	5	Nt P-Forb
Euthamia graminifolia	grass-leaved goldenrod	3	0	Nt P-Forb
Fagus grandiflora	American beech	6	3	Nt Tree
Fraxinus pennsylvanica	green ash	2	-3	Nt Tree
Galium aparine	cleavers	0	3	Nt A-Forb
Galium boreale	northern bedstraw	3	0	Nt P-Forb
Geranium maculatum	wild geranium	4	3	Nt P-Forb
Gleditsia triacanthos	honey locust	8	0	Nt Tree
Hepatica acutiloba	sharp-lobed hepatica	8	5	Nt P-Forb
Hordeum jubatum	squirrel-tail grass	*	0	Ad P-Grass
Hypericum perforatum	common St. John's-wort	*	5	Ad P-Forb
Juniperus virginiana	red-cedar	3	3	Nt Tree
Koeleria macrantha	June grass	9	5	Nt P-Grass
Leucanthemum vulgare	ox-eye daisy	*	5	Ad P-Forb
Linaria vulgaris	butter-and-eggs	*	5	Ad P-Forb
Lolium arundinaceum	tall fescue	*	3	Ad P-Grass
Lonicera maackii	amur honeysuckle	*	5	Ad Shrub
Lonicera morrowii	morrow honeysuckle	*	3	Ad Shrub
Lotus corniculatus	birdfoot trefoil	*	3	Ad P-Forb
Melilotus albus	white sweet-clover	*	3	Ad B-Forb
Melilotus officinalis	yellow sweet-clover	*	3	Ad B-Forb
Monarda fistulosa	wild-bergamot	2	3	Nt P-Forb
Morus alba	white mulberry	*	3	Ad Tree
Oenothera biennis	common evening-primrose	2	3	Nt B-Forb
Phalaris arundinacea	reed canary grass	0	-3	Nt P-Grass
Phleum pratense	timothy	*	3	Ad P-Grass
Phragmites australis subsp. *australis*	invasive reed	*	-3	Ad P-Grass
Picea abies	Norway spruce	*	5	Ad Tree
Pinus resinosa	red pine	6	3	Nt Tree
Pinus sylvestris	Scotch pine	*	3	Ad Tree
Plantago lanceolata	narrow-leaved plantain	*	3	Ad P-Forb
Populus deltoides	cottonwood	1	0	Nt Tree
Pyrus calleryana	Callery pear	*	5	Ad Tree
Quercus bicolor	swamp white oak	8	-3	Nt Tree

Quercus macrocarpa	bur oak	5	3	Nt Tree
Quercus rubra	red oak	5	3	Nt Tree
Ranunculus sceleratus	cursed crowfoot	1	-5	Nt A-Forb
Rhamnus cathartica	common buckthorn	*	0	Ad Tree
Rhus typhina	staghorn sumac	2	3	Nt Shrub
Robinia pseudoacacia	black locust	*	3	Ad Tree
Rosa multiflora	multiflora rose	*	3	Ad W-Vine
Rubus occidentalis	black raspberry	1	5	Nt Shrub
Rudbeckia hirta	black-eyed Susan	1	3	Nt P-Forb
Sanguinaria canadensis	bloodroot	5	3	Nt P-Forb
Schizachyrium scoparium	little bluestem	5	3	Nt P-Grass
Securigera varia	crown vetch	*	5	Ad P-Forb
Setaria pumila	yellow foxtail	*	0	Ad A-Grass
Solidago caesia	bluestem goldenrod	6	3	Nt P-Forb
Solidago canadensis	Canada goldenrod	1	3	Nt P-Forb
Solidago flexicaulis	zigzag goldenrod	6	3	Nt P-Forb
Spiraea alba	meadowsweet	4	-3	Nt Shrub
Staphylea trifolia	bladdernut	9	0	Nt Shrub
Symphyotrichum novae-angliae	New England aster	3	-3	Nt P-Forb
Syringa vulgaris	common lilac	*	5	Ad Shrub
Thuja occidentalis	white-cedar	4	-3	Nt Tree
Tilia americana	basswood	5	3	Nt Tree
Thalictrum dioicum	early meadow-rue	6	3	Nt P-Forb
Toxicodendron radicans	poison-ivy	2	0	Nt W-Vine
Trillium grandiflorum	common trillium	5	3	Nt P-Forb
Typha angustifolia	narrow-leaved cat-tail	*	-5	Ad P-Forb
Ulmus americana	American elm	1	-3	Nt Tree
Uvularia grandiflora	bellwort	5	5	Nt P-Forb
Verbascum thapsus	mullein	*	5	Ad B-Forb
Veronicastrum virginicum	Culver's-root	8	0	Nt P-Forb
Viburnum lantana	wayfaring tree	*	5	Ad Shrub
Vitis riparia	river-bank grape	3	0	Nt W-Vine
Zanthoxylum americanum	prickly-ash	3	3	Nt Shrub

Notes: C: Coefficient of Conservatism (0-10 for native species, with increasing fidelity to circa 1800 natural communities; non-native species are not assigned coefficients of conservatism); W: Wetland coefficient (-5 to 5 for all species, with decreasing fidelity to wetlands; W= -5 indicates obligate wetland species and W= 5 indicates obligate upland species); Nt: native; Ad: non-native.