Rare Plant Surveys for the Michigan Department of Transportation: M-96 #208435 and I-194 #210024 in Battle Creek, Calhoun County, MI

Prepared By:
Amanda K. Klain and P.J. Higman
Michigan Natural Features Inventory
Michigan State University Extension
P.O. Box 13036
Lansing, MI 48901-3036

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Cover: Beebalm (*Monarda fistulosa*) and spiderwort (*Tradescantia ohiensis*) in the right-of-way. Photo by Amanda Klain.

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Abstract

Foot surveys for rare plant species were conducted in portions of the ROW (rights-of-way) of M-96 and I-194 in Calhoun County which is proposed for a complete bridge replacement at their intersection. A six-acre patch of woodland along the interstate that is owned and maintained by MDOT was included in the surveys. The surveys revealed a high level of disturbance, and many invasive species were common throughout much of the project area. Only one area displayed a somewhat diverse and stable native plant community with prairie and old field successional species and habitat. None of the target species for this project were found within the project perimeters, however, a new county record of a hybrid between non-native white poplar and native bigtooth aspen was documented. Dense occurrences of highly invasive Oriental bitter-sweet (*Celastrus orbiculatus*), tree-of-heaven (*Ailanthus altissima*), and black swallow-wort (*Vincetoxicum nigrum*), were found throughout much of the project area and dense patches of Japanese and giant knotweed (*Fallopia japonica, F. sachalinensis*) were documented along Burnham Rd. at the northern extent of the project.

Introduction

This report is a summary of rare plant surveys conducted along portions of M-96 and I-194 where they intersect just south of Battle Creek in Calhoun County. These are two small projects adjacent to each other with contiguous habitat, so they are combined in this report (Figs. 1, 2). Project #208435 is less than a ½-mile stretch along M-96 from just east to just west of the I-194 interchange. Project #210024 is a mile-long stretch along I-194 from the M-96 interchange across the Kalamazoo River, and north to Burnham Street, including the MDOT-owned patch of woods west of the highway and south of Burnham Street. Both project areas include all the interchanges.

Surveys are required prior to reconstruction and rehabilitation of these portions of the highway to ensure regulatory compliance for the state and federal endangered species acts. These projects consist of complete bridge replacements on M-96 and I-194.

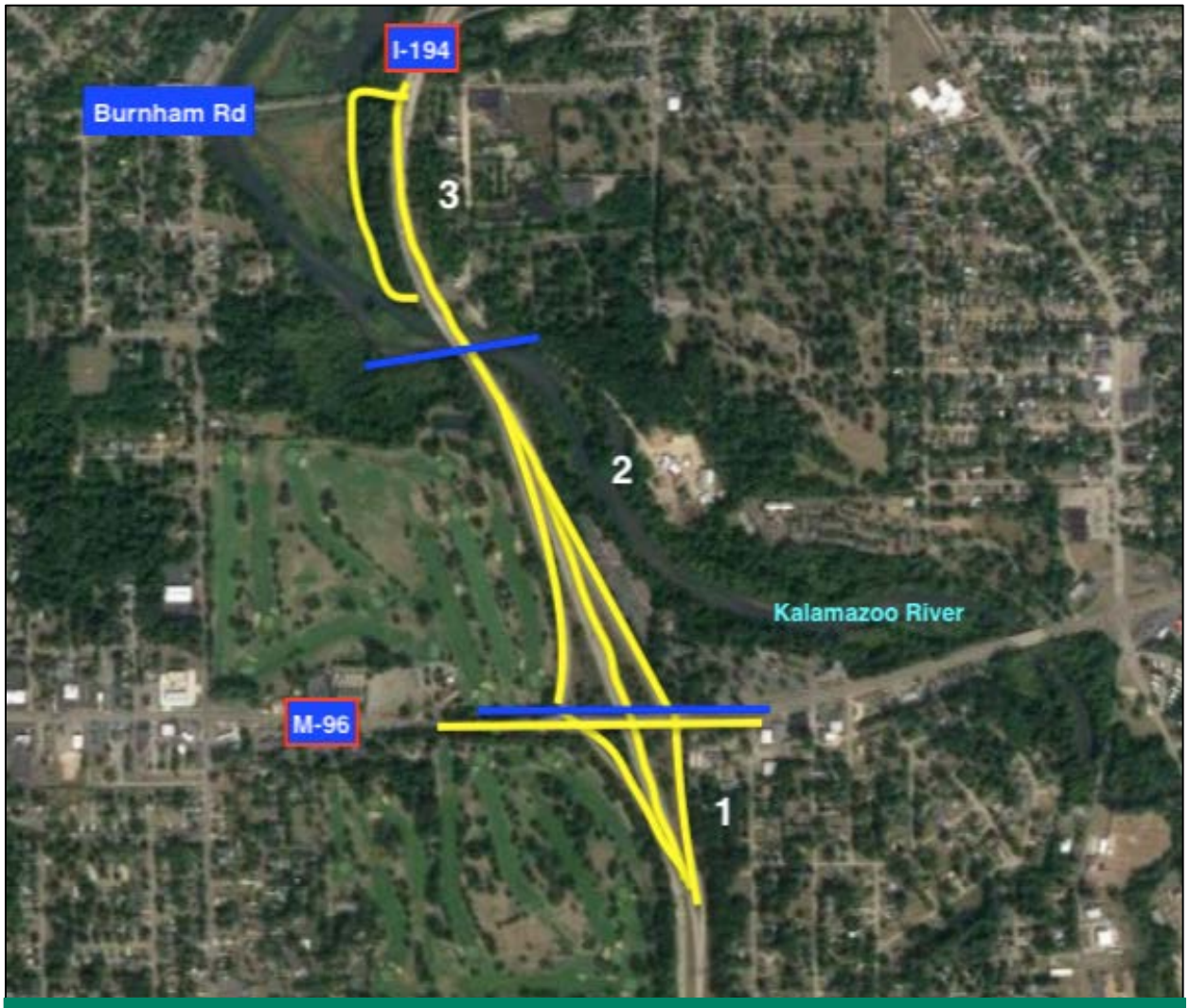

Figure 1. Project 208435 location and survey segments along M-96 and I-194.

Methods

A review of the Michigan Natural Heritage database was conducted to identify species listed as Threatened, Endangered, or Special Concern[1] that have been previously documented within a two-mile radius of the project area. Three species were identified as survey targets and surveys were conducted to coincide with their optimal detection periods (Table 1). Since the optimal survey periods for the three species overlapped and the survey area was small, surveys were conducted during one visit on July 9, 2021, which allowed sufficient coverage to capture them all.

Table 1. Survey targets, their status, and optimal survey periods.

Scientific Name	Common Name	Status	Best Survey Period
Amorpha canescens	lead-plant	SC	June - August
Filipendula rubra	Queen-of-the-prairie	T	late-June - September
Silphium perfoliatum	cup plant	T	July - October

T: state threatened; SC: state special concern

The projects were divided into four segments for survey including three segments of the I-194 project as shown in Figure 1, and the entire I-96 project area as shown in Figure 2. The third segment of the I-194 included the wooded rectangle on the northwest side of I-194 at the north extent.

Figure 2. Segment 4 includes the entire M-96 project area (210024), as shown in red.

[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 status is a NatureServe designation.

Foot surveys were conducted by meander survey in each of the four segments. Surveys focused on suitable habitat for target species, however, the surveyor aimed to capture all microhabitats and associated species along the corridors in case other rarities were present, but not yet documented. General habitat conditions, dominant plant species, and populations of rare species and notable invasive plant species were recorded. Notable invasive plants include those for which management by MDOT can likely make a significant impact by containing their spread along the M-96 and I-194 corridor and intersection. Rare plant and notable invasive species populations were marked with GPS points using an Android phone and Samsung tablet. Associated data for rare plant occurrences were entered into Survey 123 for upload to the MNFI natural heritage database, Biotics.

Results

Overview

The vegetation was similar in both project areas, consisting mostly of disturbed weedy open grasslands and woodlands. The open grasslands are largely dominated by non-native grasses with a mixture of both native and non-native forbs. The woodlands were also highly invaded. The interchanges contain mowed areas, an isolated wet ditch, and open successional communities. None of the target species were found within the project area, however a county record for the hybrid between the non-native white poplar and big tooth aspen was documented. Brief summaries of the vegetation of each section are included below.

Descriptions of Survey Segments

Segment 1: Interchange areas and rights-of-way south of M-96

This segment contains dry-mesic forest with bitternut hickory, white pine (*Pinus strobus*), Scotch pine (*P. sylvestris*), and red oak (*Quercus rubra*) at the fence line, and a dense invasive shrub and vine layer with Morrow's honeysuckle (*Lonicera morrowii*), common buckthorn (*Rhamnus cathartica*), Oriental bittersweet (*Celastrus orbiculatus*), and black swallow-wort (*Vincetoxicum nigrum*). Fragrant sumac (*Rhus aromatica*) is common along the slopes down to the highway (Fig. 3) and the canopy is replaced by a mixture of native prairie species and non-native grasses (Fig. 4). Native prairie species include common and whorled milkweed (*Asclepias syriaca, A. verticillata*), ebony spleenwort (*Asplenium platyneuron*), flowering spurge (*Euphorbia corollata*), bee balm (*Monarda fistulosa*), black-eyed Susan (*Rudbeckia hirta*), spiderwort (*Tradescantia ohiensis*), and tower mustard (*Turritis glabra*). These are interspersed with non-native smooth brome grass (*Bromus inermis*) and Kentucky bluegrass (Poa pratensis). The interchange areas are particularly disturbed near the bridge where non-native grasses dominate.

The east interchange also has a wet ditch that had standing water at the time of the survey. Cottonwood (*Populus deltoides*), willow (*Salix sp.*), and black locust (*Robinia pseudoacacia*) were concentrated around the ditch, along with Siberian elm *(Ulmus pumila),* autumn olive *(Elaeagnus umbellata*), honeysuckle (*Lonicera* sp.) narrow-leaved cat-tail (*Typha angustifolia*) Interestingly, a new county record of a hybrid between non-native white poplar and native big tooth aspen (*Populus alba* × *P. grandidentata* [*P.* ×*rouleauana*]) was documented here.

Figure 3. Sloped aspect along the I-94 on-ramp at the M-96 interchange in Segment 1.

Figure 4. Prairie openings in Segment 1.

The least disturbed open grassland areas were on the east side, which, although marginal, provided potentially suitable habitat for lead-plant and cup plant. Neither were observed there during surveys. The wet ditch provided the only potentially suitable habitat for queen-of-the-prairie, but it was not found either.

Segment 2: Interchange and ROW's north of M-96 to the Kalamazoo River

This segment contains similar but more disturbed vegetation than in Segment 1 (Fig. 5). The woodland edge has a higher density and preponderance of non-native invasive species throughout, including the highly invasive tree-of-heaven (*Ailanthus altissima*; Figs. 6, 7), glossy buckthorn (*Frangula alnus*), oriental bittersweet, and black swallow-wort. The suite of native prairie plants in the open grassland areas in this segment is less diverse. Both east and west sides of the river are similarly highly disturbed with many invasive species.

Figure 5. Disturbed vegetation at the bridge along I-194.

Figure 6. Tree-of-heaven along I-194.

Figure 7. Leaves of tree-of-heaven.

Segment 3: **North side of the Kalamazoo River to Burnham St. and the northwest woods.**

The east side of the interstate is dominated by black walnut trees on a moderately sloping hillside (Fig. 8). The west side is steeply sloped with impenetrable masses of vegetation which is un-walkable (Fig. 9). The northwest section of woods has a canopy of mostly cottonwood (*Populus deltoides*), catalpa (*Catalpa speciosa*), and black locust and is otherwise completely degraded botanically and physically. Branches and downed trees are everywhere, amongst garbage, dense masses of oriental bittersweet, and thickets of privet (*Ligustrum sp.*). Ground vegetation is sparse with dame's rocket (*Hesperis matronalis*) and garlic mustard (*Alliaria petiolata*); however, a lone patch of native wild ginger (*Asarum canadense*) was observed. A large patch of Japanese and giant knotweed (*Fallopia japonica*, *F. sachalinensis*) was found along Burnham Street at the northern extent of the patch of woods and was mapped.

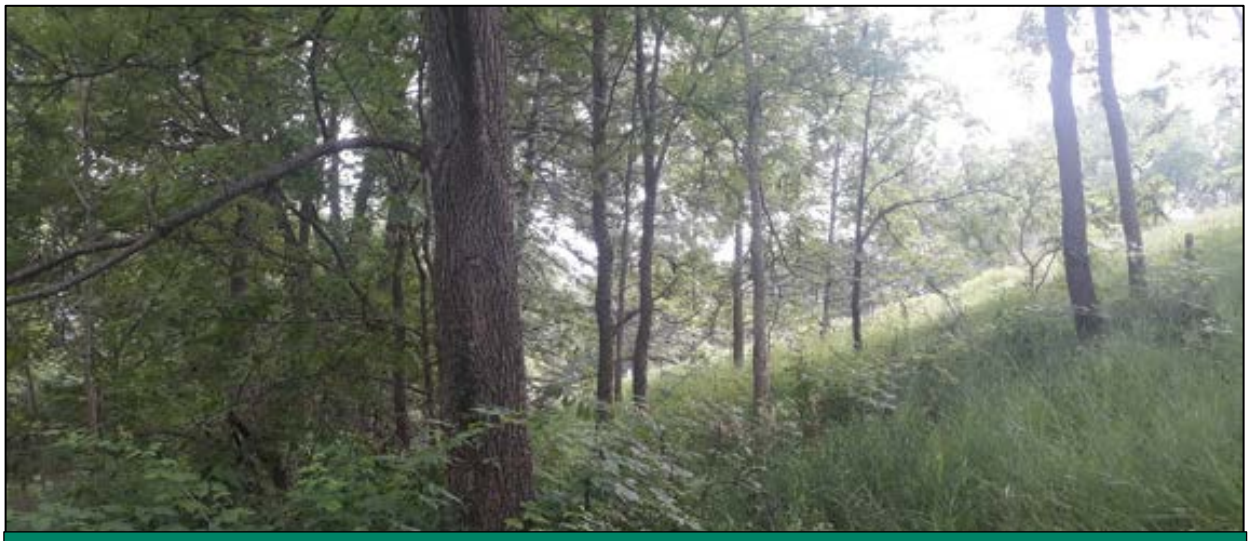

Figure 8. Black walnut along the slope in Segment 3.

Figure 9. Dense masses of invasive species in the northwest woods in Segment 3.

Segment 4: M-96-the entire east-west length and corners of the on/off-ramps.

The entire survey area of this segment is unsuitable habitat for all target species. The right-of-way consists of heavily disturbed woodland edges (Fig. 10), as well as commercial and residential areas that are regularly mowed (Fig. 11) The dominant tree species are mostly native and include butternut hickory (*Carya cordiformis*), red oak, American elm (*Ulmus americana*), and box elder (*Acer negundo*), but a high density of invasive plants dominate the understory, including Siberian elm, Morrow's honeysuckle, common buckthorn, Oriental bittersweet, and black swallow-wort. Common in the ground layer are garlic mustard, Japanese hedge parsley (*Torilis japonica*), smooth brome grass, catnip (*Nepeta cataria*), orchard grass (*Dactylis glomerata*), and reed canary grass (*Phalaris arundinacea*).

Figure 10. Disturbed woodland edge of M-96.

Figure 11. Edge of commercial zone on M-96.

Figure 12. Unsuitable habitat at east M-96.

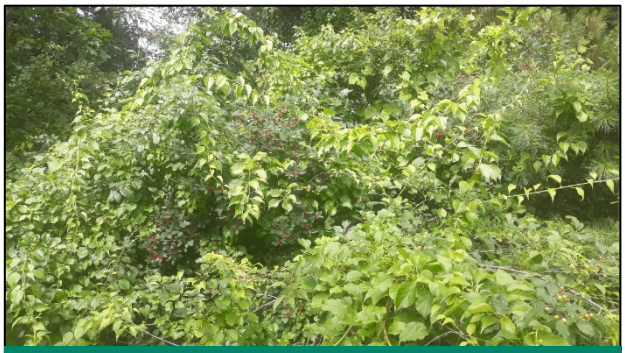

Figure 13. Dense invasive shrubs along M-96.

Discussion

The highest quality area occurs along the southeast side of interstate I-194 where there is habitat for native prairie species, and care should be taken to limit the disturbance in this area. The moderately infested areas in the rest of the project area provide a ready source of propagules and disturbance from road construction is likely to facilitate their spread into the higher quality areas.

Several highly invasive species that have serious ecological impacts and are difficult to control were found in high densities in the project area. Except for Japanese and giant knotweed (Fig. 14), they were not mapped specifically due to their extent and abundance. These species are currently not as widespread in northern Michigan, and consideration of a comprehensive strategy to contain these species and limit their northward spread is recommended. The occurrences of these species in the project area are described below.

Oriental bittersweet (*Celastrus* orbiculatus) was found at the outer corners of M-96 and I-94, and throughout the M-96 and along I-94 corridors, including the on-ramps and the northwest woods. In some areas it is growing from the shrub zone into full sun and running towards the highway.

Dense occurrences of black swallowwort (*Vincetoxicum nigrum*) were found running from the southwest corner of intersection of I-194 and M-96 to the on-ramp of southbound I-94, in many parts of the interchange roads and triangles, and along the M-96 bridge over I-94.

Tree of Heaven (*Ailanthus altissima*) occurs in various densities in the areas north of M-96 bridge, on both the east and west sides of I-194, and in the interchange triangles as well as the outer edges of the on/off-ramps. Both mature trees and saplings were present. This species is often mixed in with native black walnut and sumac, which have similar pinnately compound leaves, and care should be taken to distinguish these during treatment to avoid non-target impacts.

Japanese and giant knotweed (*Fallopia japonica*, *F. sachalinensis*) were documented in dense patches along both sides along Burnham Rd, just west of the I-94 bridge and treatment is recommended.

Acknowledgements

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Literature Cited

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