

Rare Plant Surveys for the Michigan Department of Transportation: US-23 in Ann Arbor. Project #200841, Washtenaw County, Michigan



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Cover: State Special Concern nut-sedge (*Carex squarrosa*). Photo by Amanda K. Klain.

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Abstract

Foot surveys for rare plant species were conducted in the rights-of-way (ROW) of a seven-mile-long stretch along US-23 in Ann Arbor, Washtenaw County which is proposed for road construction. The surveys revealed that the ROW is generally of a disturbed, low-quality nature, with a high preponderance of non-native invasive shrubs and disturbed woodlands along the fence, as well as isolated openings containing some old-field and prairie species. Single, isolated occurrences of Japanese knotweed (*Fallopia japonica*), smoke tree (*Cotinus coggygria*), and spreading cotoneaster (*Cotoneaster divaricatus*) are recommended for treatment. None of the target species for this project were found, although a Special Concern species nut-sedge (*Carex squarrosa*) was documented just south of the I-94 interchange in a wet ditch. It is recommended to avoid disturbance in the vicinity of this occurrence, or if this is not feasible, to transplant it to a suitable location with appropriate and sufficient habitat to sustain it.

Introduction

This report is a summary of rare plant surveys conducted along portions of US-23 in Ann Arbor, Washtenaw County. Project #200841 is an approximately seven mile stretch from just south of the I-94 interchange, north to just south of the M-14 interchange, including both north and south bound lanes and the southwest and northeast ramps at the Washtenaw Avenue interchange. 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. This project consists of a full topcoat with drainage work and tree cutting.

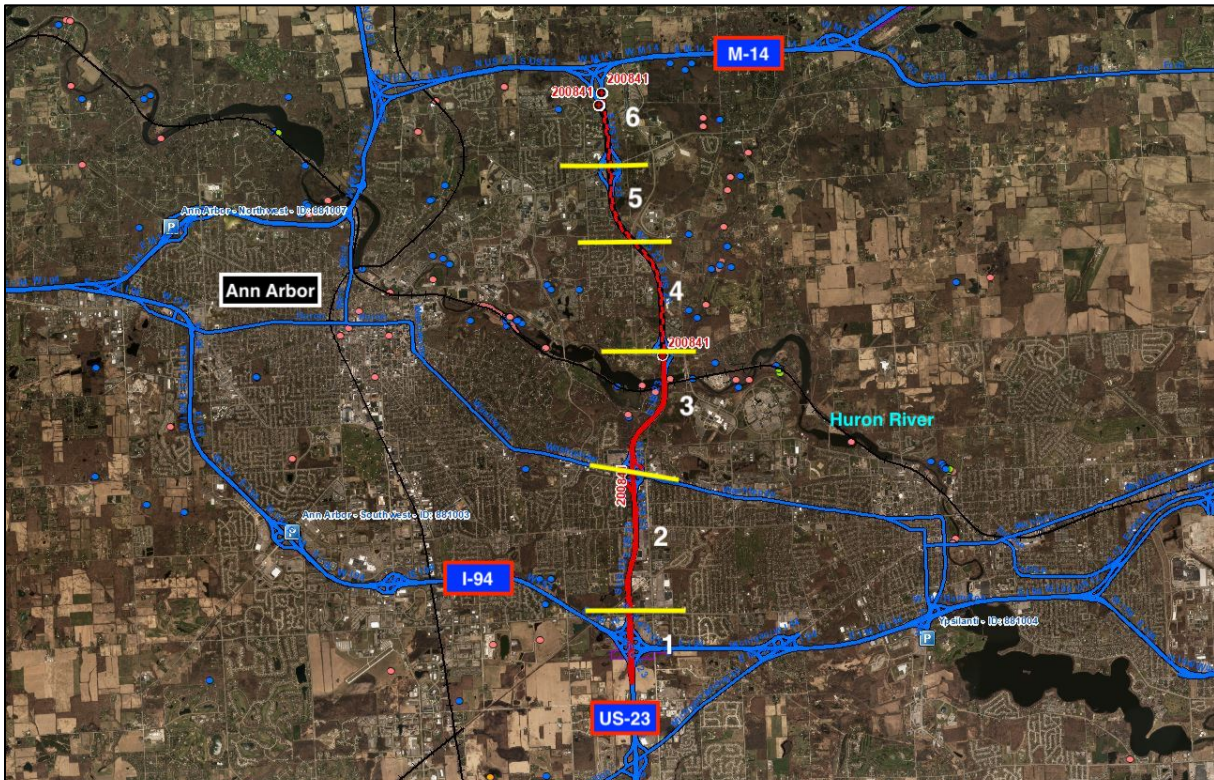


Figure 1. Map of the US-23 project area showing survey segments and previously documented rare species occurrences.

Methods

A review of the Michigan Natural Heritage database 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 shown in Figure 1. Twenty-four species were identified as survey targets and were sorted according to optimal survey periods when they are most easily detected (Tables 1-3). Early season surveys were conducted on June 7-9 and 11, 2021, mid-season surveys were conducted on July 21, 22, 24, and late-season surveys were conducted

¹ Threatened and Endangered status are codified under Part 365 of PA 451, 1994 Michigan Natural Resources and Environmental Protection Act. Special Concern status is a NatureServe designation.

on September 24 and October 7, 2021. Two natural communities, wet sand prairie (S-2, imperiled)² and wet prairie (S-1, critically impaired)² were also identified within the two-mile radius and surveys near these sites were intensified.

The survey area was divided into six segments and foot surveys were conducted by meander survey along all segments. Surveys focused on suitable habitat for the target species, however, the surveyor aimed to survey all microhabitats and note all species along the corridor in case other rarities were present, but not yet documented.

Table 1. Early-season survey targets, their status, and optimal survey windows.

Scientific Name	Common Name	Listing Status	Best Survey Period
<i>Agrimonia rostellata</i>	beaked agrimony	Threatened	May-July
<i>Carex trichocarpa</i>	hairy-fruited sedge	Special Concern	end of May-June
<i>Cypripedium candidum</i>	white lady-slipper	Threatened	end of May-end of June
<i>Euonymus atropurpureus</i>	wahoo	Special Concern	May-September
<i>Hydrastis canadensis</i>	goldenseal	Threatened	mid-April-mid-September
<i>Jeffersonia diphylla</i>	twin-leaf	Special Concern	April-May
<i>Polemonium reptans</i>	Jacob's ladder	Threatened	May-early June
<i>Valeriana edulis</i>	edible valerian	Threatened	May-June

Table 2. Mid-season survey targets, their status, and optimal survey windows.

Scientific Name	Common Name	Listing Status	Best Survey Period
<i>Asclepias purpurascens</i>	purple milkweed	Threatened	late June-August
<i>Asclepias sullivantii</i>	Sullivant's milkweed	Threatened	July-August
<i>Corispermum americanum</i>	American bugseed	Special Concern	late August-mid October
<i>Dichanthelium leibergii</i>	Leiberg's panic grass	Threatened	June-August
<i>Endodeca serpentaria</i>	Virginia snakeroot	Threatened	July-August
<i>Geum virginianum</i>	pale avens	Special Concern	June-July
<i>Panax quinquefolia</i>	ginseng	Threatened	June-October
<i>Potentilla canadensis</i>	Canada cinquefoil	Special Concern	end of May-September
<i>Silphium laciniatum</i>	compass plant	Threatened	July-August

Table 3. Late-season survey targets, their status, and optimal survey windows.

Scientific Name	Common Name	Listing Status	Best Survey Period
<i>Conioselinum chinense</i>	hemlock-parsley	Special Concern	August-mid October
<i>Gentiana alba</i>	white gentian	Endangered	end of August-September
<i>Gentianella quinquefolia</i>	stiff gentian	Threatened	September-October
<i>Justicia americana</i>	water willow	Threatened	August-September
<i>Sanguisorba canadensis</i>	Canadian burnet	Endangered	August-September
<i>Spiranthes ovalis</i>	lesser ladies'-tresses	Threatened	end of September-November
<i>Symphyotrichum praealtum</i>	willow aster	Special Concern	August-September

² State ranks are designations determined by NatureServe based upon the size, context, and quality of known occurrences of natural communities in the state. These range from critically imperiled (S1) to secure (S5).

General habitat conditions, dominant plant species, and populations of rare and notable plant invasive species in all segments of both project areas were recorded. Notable plant invasive species include all non-native, invasive plants for which management by MDOT can likely make a significant impact by containing their spread along the US-23 corridor. When rare plant occurrences and notable invasive species populations were found, they 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

None of the target species were found, however, the nut-sedge *Carex squarrosa*, a species of Special Concern in the state, was observed in Segment 1, along the US-23 ROW just south of the I-94 interchange, behind a stand of narrow-leaved cat-tail (*Typha angustifolia*) (Figs. 5, 7).

The general habitat along the right-of-way is comprised of disturbed woodlands with a dense shrub layer of mostly non-native invasive species (Fig. 2), at times opening to an herbaceous zone with a mixture of native and non-native forbs and grasses. A wet ditch zone dominated by invasive reed (*Phragmites australis* subsp. *australis*) and narrow-leaved cat-tail occur along much of the corridor, adjacent to the mowed areas along the freeway shoulder (Fig. 3). Invasive common buckthorn (*Rhamnus cathartica*), autumn olive (*Elaeagnus umbellata*), and Eurasian honeysuckles (*Lonicera* spp.) dominate the shrub layer and non-native species such as teasel (*Dipsacus fullonum*, *D. laciniatus*; Fig. 4), tall oat grass (*Arrhenatherum elatius*), smooth brome grass (*Bromus inermis*), red fescue (*Festuca rubra*), squirrel-tail grass (*Hordeum jubatum*), fescues (*Lolium arundinaceum*, *L. perenne*), reed canary grass (*Phalaris arundinacea*), and Kentucky bluegrass (*Poa pratensis*), dominate the herbaceous, open areas. There are also some urbanized areas that lack suitable habitat for the target species.

Some isolated, small pockets (10-30 ft wide) of old-field successional habitat, prairie, and dry-mesic forest are scattered along the ROW (Fig. 5), however; these are too small and fragmented to support the target species for this project area. Excessive garbage (construction debris, plastic, tires) along the ROW was very common, especially in the ditches and culverts within the first 10' of the ROW.

While invasive species are widespread in the corridor, three occurrences were specifically mapped because they were isolated and treatable. These include Japanese knotweed, smoke tree, and spreading cotoneaster.

The following section provides a brief description of each segment surveyed.



Figure 2. Dense, non-native shrub zones dominate throughout the corridor.



Figure 3. Wet ditch dominated by invasive phragmites and narrow-leaved cat-tail in Segment 2.



Figure 4. Dense teasel infestations are common in the project area.

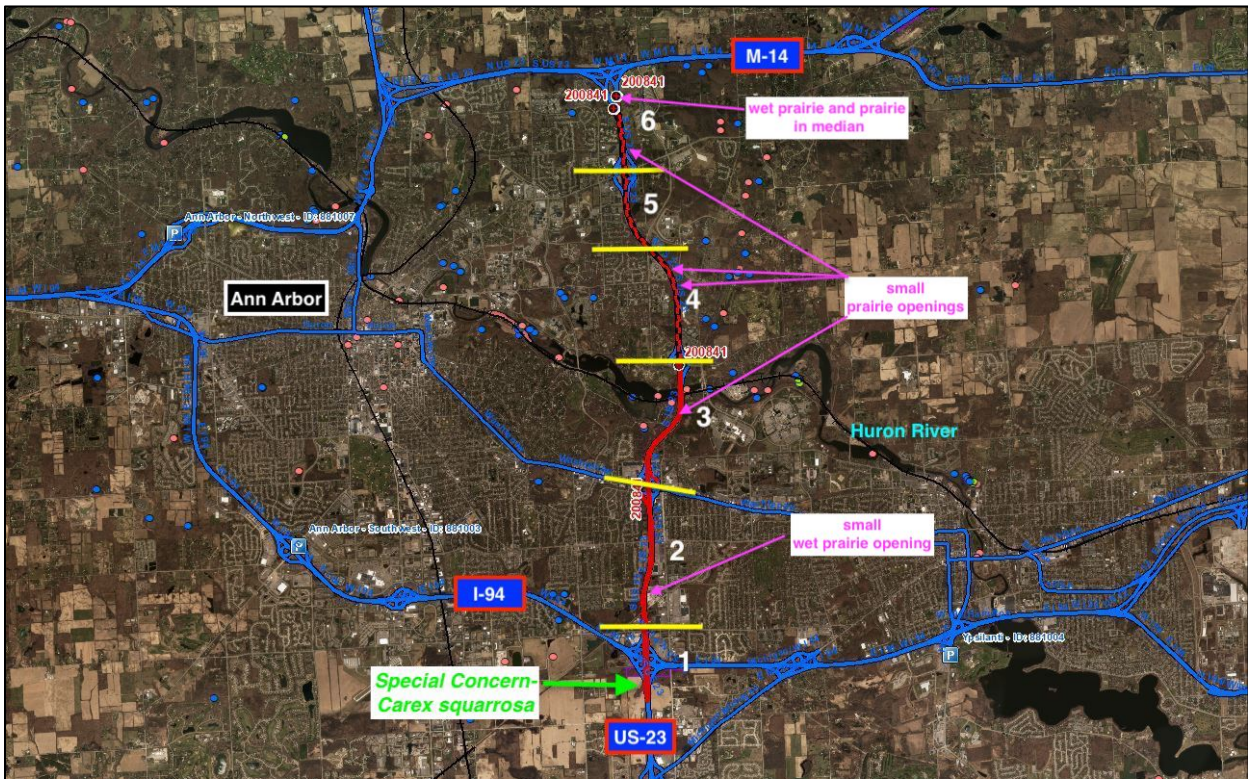


Figure 5. Openings (in pink) with some native prairie plants are scattered along the corridor.



Figure 6. Native swamp milkweed mixed in with narrow-leaved cat-tail in a wet ditch in Segment 2.

Descriptions of Survey Segments

Segment 1: Southern extent of project area to Ellsworth Rd.

This segment has a dense shrub layer at the ROW fence with wet ditches and open seeps in some areas. The shrub layer consists of native gray dogwood (*Cornus foemina*) and invasive autumn olive, glossy buckthorn (*Frangula alnus*), Amur's honeysuckle (*Lonicera maackii*), and common buckthorn. Some of the wet ditches are dominated by invasive phragmites and narrow-leaved cat-tail, while others are more diverse, including swamp milkweed (*Asclepias incarnata*), dogbane (*Apocynum cannabinum*), goldenrods (*Solidago canadensis*, *S. altissima*, *S. gigantea*), asters, including New England aster (*Symphotrichum* spp., *S. novae-angliae*), and rushes (*Juncus* spp.) (Fig. 7). Purple loosestrife (*Lythrum salicaria*) is present but not dominant. The ROW along the I-94 interchange is mowed and therefore unsuitable habitat for target species. State special concern *Carex squarrosa* was found in this segment however, it occurred in marginal habitat and is prone to population decline or mortality over time (Fig. 5, 7). Despite its status as a species of Special Concern, *Carex squarrosa* has been documented more frequently in the past 30 years thus becoming more common than previously thought³. The sedge was observed in a wet ditch microhabitat, sandwiched between a swath of narrow-leaved cat-tail and a common buckthorn thicket along the ROW fence. It is recommended to either transplant the occurrence to a suitable location or avoid disturbance to the immediate area.

³ Michigan Flora: <https://michiganflora.net/species.aspx?id=1053>



Figure 7. State special concern *Carex squarrosa* in a wet ditch along the I-94 right-of-way.

Segment 2: Ellsworth Rd. to Washtenaw Ave. including the southwest interchange.

This segment is surrounded by a heavily urbanized area and has a densely vegetated ROW that acts as a buffer between the highway and the surrounding businesses and residences. A dense shrub zone is present, as well as some isolated pockets with mature native hardwood species including bitternut hickory (*Carya glabra*), black cherry (*Prunus serotina*), and white and red oak (*Quercus alba*, *Q. rubra*). Native ground cover species in these pockets include hog-peanut (*Amphicarpaea bracteata*), long-awned wood grass (*Brachyeletrum erectum*), Pennsylvania sedge (*Carex pensylvanica*), cleavers (*Galium aparine*) and wild geranium (*Geranium maculatum*). These pockets are isolated fragments within heavily disturbed areas. An isolated occurrence of Japanese knotweed was mapped in this segment.

Segment 3: Washtenaw Avenue including the northwest interchange to Geddes Rd.

Although this segment is less urbanized, it displays much of the same disturbed woodlands and dense shrub and grass zones found in other segments (Fig. 8, 9). On the eastern side of the freeway there are a couple of very small openings with some nice prairie species including butterfly, whorled and green milkweed (*Asclepias tuberosa*, *A. verticillata*, *A. viridiflora*), low bindweed (*Calystegia spithamea*), and showy goldenrod (*Solidago speciosa*). Figs. 9, 10).



Figure 8. Grass and shrub zones in Segment 3.

The habitat in Segment 3 alternates between small areas (10-30 feet) of old successional field communities with some prairie species, and wet ditch zones. The non-native shrub and grass species typical of the project area occur on both sides of the bridge over the Huron River (Fig. 12). In addition, the adventive shrub, false indigo (*Amorpha fruticosa*), was found growing around and under the bridge. The many culverts in this segment and throughout the project area are similarly weedy (Fig. 13).



Figure 9. Common vegetation along the Washtenaw Ave. Interchange ramp in Segment 3.



Figure 10. Green milkweed in openings in Segment 3.



Figure 11. Low bindweed in openings in Segment 3.



Figure 12. Teasel and goldenrods at the Huron River bridge.



Figure 13. The many culverts throughout the project area are highly disturbed and weedy.

Segment 4: Geddes Rd. to Earhart Rd.

This segment is dominated by impenetrable masses of buckthorn, autumn olive, and honeysuckle along the ROW fence but also includes some native box elder (*Acer negundo*), black walnut (*Juglans nigra*), and white oak in the canopy, with invasive Scotch pine (*Pinus sylvestris*) and Siberian elm (*Ulmus pumila*) mixed in. Invaded wet ditches, teasel infestations, and excessive garbage are common. There is a small sandy opening with *Carex lasiocarpa*, poverty grass (*Danthonia spicata*), whorled milkwort (*Polygala verticillata*), blue-eyed grass (*Sisyrinchium angustifolium*), and gray goldenrod (*Solidago nemoralis*). In addition, a large patch of non-native sparrow vetch (*Vicia tetrasperma*), an uncommon Eurasian escapee, was observed here. This vetch is easily detected by its very narrow leaflets.

Segment 5: Earhart Rd to Plymouth Rd.

The dominant vegetation here includes dense shrub zones, teasel infestations, and ditch zones, like other segments of the corridor. There are some larger pockets of old-field successional communities with big blue stem (*Andropogon gerardii*), wild strawberry (*Fragaria virginiana*), red cedar (*Juniperus virginiana*), asters, goldenrods, and dogbane.

Segment 6: Plymouth Rd to northern project extent, just south of M-14 interchange.

This segment includes the 400-foot wide median at the northern extent with early successional old-field vegetation (Fig.14) and a wet prairie component (Fig. 15). Whorled milkweed, small pussytoes (*Antennaria howellii*), ironweed (*Vernonia missurica*), sunflower (*Helianthus* sp.), low bindweed, rushes, sedges (*Carex granularis*, *C. lasiocarpa*, *C. spp.*), and switch grass (*Panicum virgatum*) were all present in the wet prairie area.



Figure 14. Old field vegetation in Segment 6.



Figure 15. Ironweed in the wet prairie area of the median in Segment 6.

A stand of a non-native, garden plant, Missouri evening primrose (*Oenothera macrocarpa*), was found in flower (Figure 16). Its flowers are very large and showy and hard to miss. This is the first reported occurrence of this species as a garden escape and it is believed to have been either seeded or planted, as was the coneflower (*Echinacea* sp.) growing with it.



Figure 16. Missouri evening primrose – a new garden escape in Segment 6.

Spreading cotoneaster (*Cotoneaster divaricatus*) was found along the western portion of the northern extent of the project area (Fig. 17). This is a frequently cultivated Oriental shrub that was first collected in Michigan in 1987, when it was described as naturalized and spreading. Several female smoke trees (*Cotinus coggryria*) and a dense patch of seedlings were also found in the median and along the western right-of-way in a brush-hogged area.



Figure 17. Spreading cotoneaster established along the northern extent of the project area.

Discussion

The highest quality areas are the small, isolated old-field successional and prairie communities scattered throughout the project area, and in the median of the northern extent of the project area in Segment 6. Care should be taken to limit the disturbance throughout the corridor so that current habitat and native species components are maintained. Aside from these small openings, the ROW is highly infested with invasive species, especially shrubs and teasel. Emphasis should be placed on decontamination of vehicles when moving to uninfested sites.

Spreading cotoneaster and smoke tree were mapped in Segment 6 and an occurrence of Japanese knotweed was mapped in Segment 2 (Fig. 18). Treatment of these occurrences is recommended. Unlike the widespread invasive species noted throughout the project area, these are isolated and more easily managed now while their occurrences are limited.

The only rare species documented was state Special Concern *Carex squarrosa* where it is growing in a wet ditch. Transplantation to a suitable site elsewhere or ensuring that this location is not disturbed during road work is recommended.

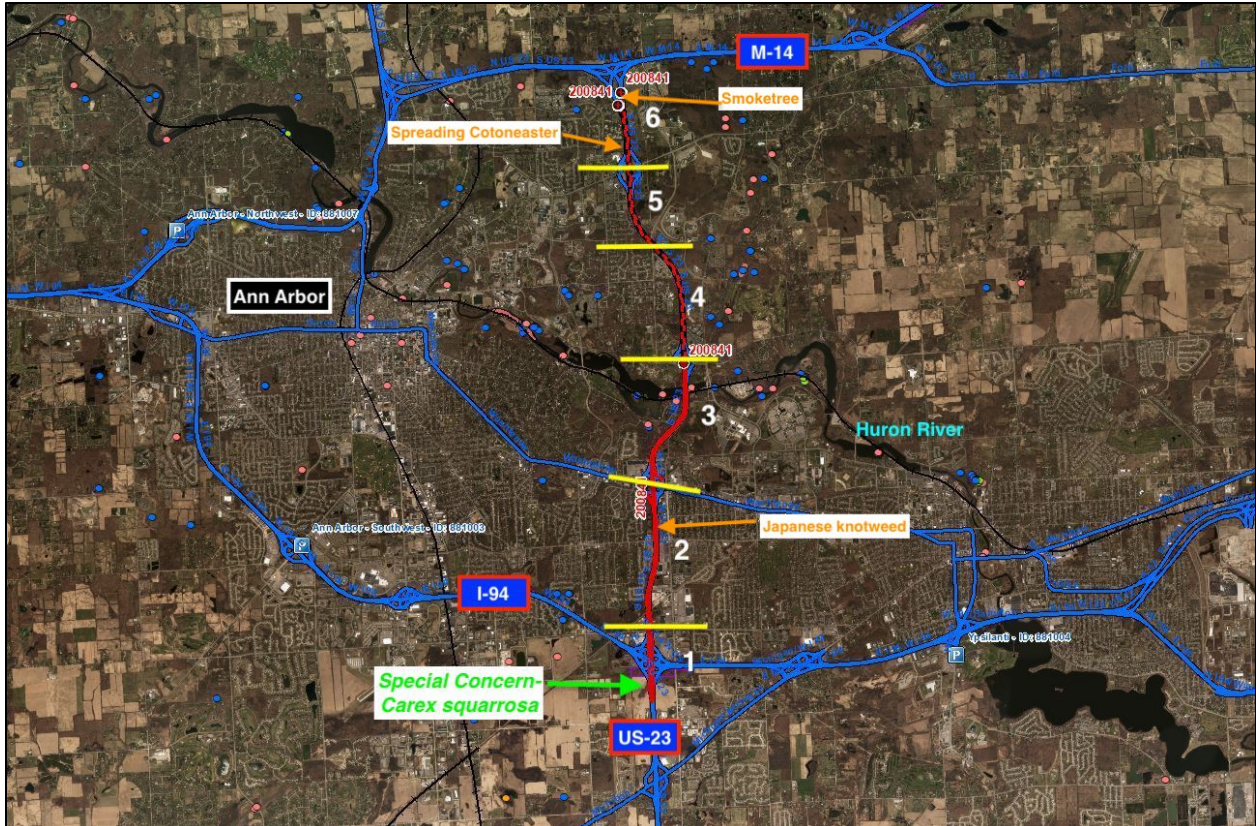


Figure 18. Invasive species recommended for treatment in the project area.

Acknowledgements

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1. Michigan Flora On-line: <https://michiganflora.net/>