Threatened and Endangered Plant Species Surveys for the Michigan Department of Transportation: I-94 at New Buffalo

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Prepared For:
Michigan Department of Transportation

12/01/2019

MNFI Report No. 2019-34

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Suggested Citation:

Bassett, T.J., A.K. Klain and P.J. Higman. 2019. Threatened and Endangered Plant Species Surveys for the Michigan Department of Transportation: I-94 at New Buffalo. Michigan Natural Features Inventory, Report No. 2019-34, Lansing, MI.

Cover: Lakeplain wet-mesic prairie near I-94 New Buffalo Welcome Center

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Introduction and Methods

We conducted fence to fence surveys along both sides of approximately 2.5 miles of the I-94 right-of-way (ROW) from the New Buffalo Welcome Center to north of the New Buffalo Weigh Station, including the entire weigh station and 500-foot buffers at both ends of the survey area. These surveys were conducted to insure compliance related with MDOT Project 200532, involving replacement of the existing culvert along Squaw Creek which will include roadway reconstruction, shoulder reconstruction, partial weigh station ramp reconstruction, maintenance of traffic (including crossovers) and realignment of Squaw Creek on the northwest side of the freeway by the weigh station.

A total of 11 vascular plant species, listed as Threatened (T), Endangered (E), or Special Concern (SC) by the Endangered Species Act of the State of Michigan (Part 365 of PA 451, 1994 Michigan Natural Resources and Environmental Protection Act), were identified during the Environmental Review process and targeted during these surveys (Table 1). No Federally-listed species were targeted. Surveys were timed to coincide with sufficient to optimal survey periods for these species, and occurred in spring (6 June), mid-summer (31 July and 2 August 2019), and late summer (26 September 2019). These surveys specifically targeted the following species: prairie trillium (*Trillium recurvatum*, T) and Jacob's ladder (*Polemonium reptans*, T) during spring surveys; panic grass (*Dichanthelium polyanthes*, E), annual hedge hyssop (*Gratiola virginiana*, T*)*, orange-grass (*Hypericum gentianoides*, SC), rose-pink (*Sabatia angularis*, T), and cranefly orchid (*Tipularia discolor*, E) during mid-summer surveys; and three-awned grass (*Aristida longespica*, T), hollow-stemmed Joe-Pye-weed (*Eutrochium fistulosum*, T), northern clubmoss (*Lycopodiella subappressa*, SC) and downy sunflower (*Helianthus mollis*, T) during late summer surveys.

Surveys were conducted by meander survey along each side of the road, focusing on suitable habitat within the 20-ft (6- m) ROW along I-94 for the target species. At the weigh station, the vehicle was parked, and the surveyor meandered the entire station and 500-foot buffer and returned to the vehicle. When rare plant occurrences were found, they were marked with GPS points using a Samsung tablet and MNFI rare plant forms and documentation were recorded. Shapefiles are attached to this report in a separate file, "MDOT_I-94_New Buffalo_EOs.zip".

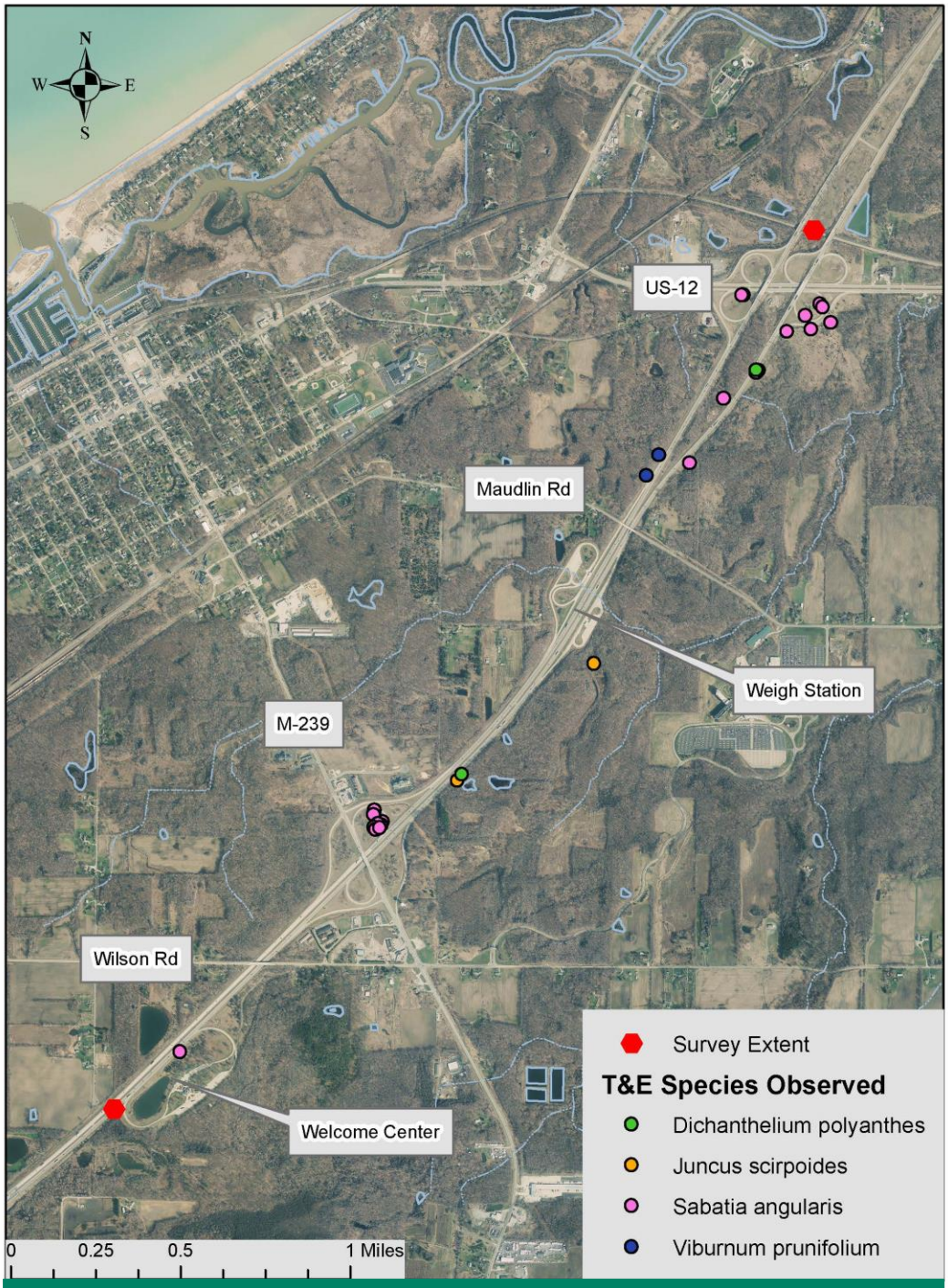

Figure 1. Survey extent and location of T&E plant species observations

Table 1. Species targeted and additional listed species observed during surveys.
*T: state threatened; E: state endangered; SC: state special concern

Species	Common Name	Target Species?	State Status*	Federal Status	Target Season
Aristida longespica	Three-awned grass	Yes	T	NA	Late Summer
Dichanthelium polyanthes	Panic grass	Yes	E	NA	Early Summer
Eutrochium fistulosum	Hollow-stemmed Joe-Pye weed	Yes	T	NA	Late Summer
Gratiola virginiana	Annual hedge hyssop	Yes	T	NA	Early Summer
Helianthus mollis	Downy sunflower	Yes	T	NA	Late Summer
Hypericum gentianioides	Orange-grass	Yes	SC	NA	Early Summer
Lycopodiella subappressa	Northern clubmoss	Yes	SC	NA	Late Summer
Polemonium reptans	Jacob's ladder	Yes	T	NA	Spring
Sabatia angularis	Rose-pink	Yes	T	NA	Early Summer
Tipularia discolor	Cranefly orchid	Yes	E	NA	Early Summer
Trillium recurvatum	Prairie trillium	Yes	T	NA	Spring
Juncus scirpoides	Scirpus-like rush	No	T	NA	NA
Viburnum prunifolium	Black haw	No	SC	NA	NA

Table 2. Species observed and documented during the surveys

Species	Common Name	Location	Individuals at each location
Dichanthelium polyanthes	Panic grass	Weigh Station SW US-12/I-94 SW	4 observed ~15 in 5 X 5m area
Sabatia angularis	Rose-pink	Welcome Center MI-239 cloverleaf US-12 cloverleaf US-12/I/94 SW	7 in a ~2 X 1m area 360+ in several clusters 350+ in clusters 2-300; several on adjacent private property
Juncus scirpoides	Scirpus-like rush	Weigh Station SW Weigh Station	Several in a 30 X 30m area Several in a 5 X 5m area
Viburnum prunifolium	Black haw	Maudlin Rd NE	100+ over 120 m of ROW

Results

Observations of target species

Panic grass (*Dichanthelium polyanthes*) (2 observations)
We documented two observations of panic grass during the surveys (Table 2, Figure 1). Both occurred on the eastbound portion of the ROW. Observation one ("Weigh Station SW") occurred on 31 July 2019; observation two ("US-12/I-94 SW") occurred on 2 August 2019. Observation one ("Weigh Station SW") was approximately 780 meters west of the weigh station, directly within the "Environmentally Sensitive Area" marked in that location (Figure 2). Four individuals were observed, all in late seed (Figure 3). Associates included deer-tongue grass (*Dichanthelium clandestinum*) (dominant species), Canada bluegrass (*Poa compressa*), grass-leaved goldenrod (*Euthamia graminifolia*), tall goldenrod (*Solidago altissima*), dewberry (*Rubus flagellaris*), and rough goldenrod (*Solidago rugosa*).

Figure 2. Panic grass "Weigh Station SW" location

Figure 3. Panic grass "Weigh Station SW" in seed

Figure 4. Panic grass "US-12/I-94 SW"

Observation two ("US-12/I-94 SW") was located approximately 430 meters west of US-12. Approximately 15 individuals were observed in a 5m X 5m area, all in late seed (Figure 4). Associates included Canada goldenroad (*Solidago canadensis*), two-flowered rush (*Juncus biflorus*), long-hairy rosette grass (*Dichanthelium implicatum*), Indian grass (*Sorghastrum nutans*), autumn olive (*Elaeagnus umbellata*), green ash (*Fraxinus pensylvanica*), *rough goldenrod*, broom sedge (*Andropogon virginicus*), Eastern red-cedar (*Juniperus virginiana*), and deer-tongue grass.

Rose-pink (*Sabatia angularis*) (4 observations)
We documented four observations of rose-pink during the surveys (Table 2, Figure 1). Observations one ("Welcome Center") and two ("M-239 cloverleaf") occurred on 31 July 2019; observations three ("US-12 cloverleaf") and four ("US-12/I-94 SW") occurred on 2 August 2019. Both on/off ramp cloverleafs supported large populations and together comprise the majority of individuals observed during the surveys.

Observation one ("Welcome Center") occurred directly underneath the Welcome Center sign in a degraded lakeplain wet-mesic prairie community along the eastbound lane of I-94, about 600 meters west of M-239 (Figure 5). Seven individuals were observed here in a roughly 2 X 1 m area. Associates included Indian grass, black-eyed Susan (*Rudbeckia hirta*), broad-leaved panic grass (*Dichanthelium latifolium*), redtop (*Agrostis gigantea*), rough goldenrod, two-flowered rush, and beak-rush (*Rhynchospora capitellata*). This observation may be threatened by common reed (*Phragmites australis* subspp. *australis*).

Observation two ("M-239 cloverleaf") was distributed throughout the cloverleaf associated with the westbound off-ramp (Figures 6-9). At least 360 individuals were observed, in several clusters. Associates include Seneca snakeroot (*Polygala senega*), two-flowered rush, beak-rush, Missouri ironweed (*Vernonia missurica*), small yellow flax (*Linum medium*), rough goldenrod, round-fruited panic grass (*Dichanthelium sphaerocarpon*), early goldenrod (*Solidago juncea*), and broad-leaved panic grass. This observation may be threatened by common reed.

Figure 5. Lakeplain wet-mesic prairie under "Welcome Center" sign with rose-pink shown in detail in inset

Figure 6. Cloverleaf at M-239, with scattered individuals of rose-pink

Figure 7. Rose-pink within M-239 cloverleaf

Figure 8. Close-up of rose-pink at M-239 cloverleaf

Figure 9. Surrounding habitat for rose-pink at M-239 cloverleaf

Observation three and four may be contiguous but are treated as separate here as they occur on opposite sides of I-94. Observation three ("US-12 cloverleaf") occurred within the cloverleaf associated with the westbound I-94 off-ramp. It is comprised of at least 300 individuals in clusters throughout the cloverleaf. Associates included Missouri ironweed, black-eyed Susan, *Festuca* sp. (a horticultural sheep fescue, dominant), long-hairy rosette grass, annual fleabane (*Erigeron annuus*), redtop, early goldenrod, tall thimbleweed (*Anemone virginiana*), Torrey's bulrsh (*Juncus torreyi*), yarrow (*Achillea millefolium*), Canada goldenrod, calico aster

Figure 10. Rose-pink in US-12/I-94 eastbound on/off ramp

Figure 11. White form of rose-pink in US-12/I-94 eastbound on/off ramp

Figure 12. Close-up of rose-pink in US-12/I-94 eastbound on/off ramp

Figure 13. Private property to east of rose-pink Observation 4 ("US-12/I-94 SW"), showing bare soil and abundant Eastern red-cedar

(*Symphyotrichum lateriflorum*), New England aster (*Symphyotrichum novae-angliae*), meadow sedge (*Carex granularis*), and heal-all (*Prunella vulgaris*).

Observation four ("US-12/I-94 SW") occurred within the eastbound on- and off-ramps and to the west and southwest of the ramps, along westbound I-94 to within about 130 meters of Maudlin Road. This population was estimated at several hundred individuals. The associates were consistent with observations one, two, and three. Several individuals occurred to the east of the ROW in an adjacent private property. This property was characterized by a high proportion of bare soil, presumably due to soil scraping and subsequent erosion, and a high density of Eastern red-cedar.

Observations of non-target species

Scirpus-like rush (*Juncus scirpoides*) (2 observations)

We documented two observations of scirpus-like rush during the surveys (Table 2, Figure 1). Observation one ("Weigh Station SW") occurred southwest of the eastbound weigh station, approximately 800 meters west of the weigh station, directly west of the "Environmentally Sensitive Area" marked in that location. Several individuals were scattered throughout an area of at least 30 X 30 m (Figure 14). Associates included slender mountain-mint (*Pycnanthemum tenuifolium*) (co-dominant), colic-root (*Aletris farinosa*), grass-leaved goldenrod, beak-rush, rough goldenrod (co-dominant), black-eyed Susan, broom sedge, old-field cinquefoil (*Potentilla simplex*), round-fruited panic grass (*Dichanthelium sphaerocarpon*), pendulous bulrush (*Scirpus pendulus*), and marsh fern (*Thelypteris palustris*) (co-dominant). A large stand of common reed and cattails (*Typha* sp.) to the west may threaten this population.

Figure 14. Lakeplain wet-mesic prairie community, with population of scirpus-like rush (close-up shown in inset)

Observation two ("Weigh Station") occurred directly to the southeast behind the eastbound weigh station at and beyond the margin (i.e., fence) of the ROW. Associates included stiff yellow flax (*Linum striatum*), hardhack (*Spiraea tomentosa*), bushy aster (*Symphyotrichum dumosum*),

rough goldenrod, small fringed gentian (*Gentianopsis crinita*), slender mountain-mint, and beak-rush. This observation occurred partly in the shade of shrubs, highbush blueberry (*Vaccinium corymbosum*) and shining sumac (*Rhus copallina*). Several individuals occurred within a roughly 5m X 5m area. A much larger expanse of suitable habitat for scirpus-like rush, and perhaps other target species, was visible to the east beyond the fence on lands owned and managed by the Pokagon Band of Potawatomi Indians.

Black haw (*Viburnum prunifolium*) (1 observation)

We documented one observation of black haw during the surveys (Table 2, Figure 1). We observed black haw in a wooded area adjacent to eastbound I-94, between 250 and 370 meters east of Maudlin Road. This population consisted of at least 100 individuals over 120 meters of ROW, occurring in an area with a high water table, but on drier microsites within a hummocky dry-mesic southern forest. The canopy had a cover of approximately 90%, was dominated by red oak (*Quercus rubra*), and included several large individuals of white oak (*Q. alba*), shagbark hickory (*Carya ovata*), red maple (*Acer rubrum*), American beech (*Fagus grandifolia*), and sassafras (*Sassafras albidum*). The subcanopy was dominated by witch-hazel (*Hamamelis virginiana*), red maple (*Acer rubrum*), maple-leaved viburnum (*Viburnum acerifolium*), serviceberry (*Amelanchier* sp.), spicebush (*Lindera benzoin*) and leatherwood (*Dirca palustris*). The ground-layer associates included spinulose woodfern (*Dryopteris carthusiana*), Virginia creeper (*Parthenocissus quinquefolia*), poison-ivy (*Toxicodendron radicans*), spreading sedge (*Carex laxiculmis*), swamp dewberry (*Rubus hispidus*), Pennsylvania sedge (*Carex pensylvanica*), New York fern (*Thelypteris noveboracensis*), and Christmas fern (*Polystichum acrostichoides*).

Discussion

With the exception of black haw, observed T&E species occur in lakeplain wet-mesic prairie, and possible coastal plain marsh, natural communities. Lakeplain wet-mesic prairies occur within clay (and sometimes sand) glacial lakeplains, while coastal plain marshes occur in shallow sandy lakebeds in the same landscapes. Due to the uniqueness of these similar communities, they are home to a large number of rare plant species. Together, 45 plant species, or approximately 10% of Michigan's Threatened, Endangered, and Special Concern flora, are associated with these communities. Historically, these and similar communities relied on regular fire and fluctuating water tables to reduce shrub and tree encroachment and maintain 'open' conditions with high light availability. Within the ROW, mowing is a viable substitute, where hydrology has been modified and regular fire is absent. While herbicides are an efficient method for reducing woody encroachment in ROWs, they have a high probability of negatively impacting T&E species and should be applied with extreme caution or avoided, especially in areas known to support T&E species.

Some portions of the ROW supported degraded examples of these communities containing representative species and structure. Exemplary areas of these communities include the surroundings of the Welcome Center (see rose-pink above; Figure 5, 15), several of the cloverleafs (see rose-pink, above), behind the eastbound weigh station (see scirpus-like rush, above), and one small patch along the eastbound ROW between the weigh station and M-239 (see panic grass and scirpus-like rush, above). The surroundings of the Welcome Center supported a large area of lakeplain wet-mesic prairie with some associated upland oak barrens or prairie habitat (Figures 15, 16).

Other portions either supported forest communities, or showed signs of more extreme anthropogenic degradation, and have limited potential to support target species. Exceptions include prairie trillium, Jacob's ladder, and cranefly orchid, for which limited suitable moist forested habitat existed on site. These species were not observed during the surveys. Wetter non-forested areas were often dominated by cattails and common reed, a consequence of polluted runoff and prior direct anthropogenic disturbances with the ROW (Figure 17). Suitable habitat for the target and observed species in areas outside the mown ROW is limited by shrub and tree encroachment, particularly those areas behind the weigh stations (Figure 18). Several patches with potential to support target species were recently disturbed by tracked vehicles, in the course of conducting highway and culvert improvements (Figures 19, 20). These disturbances occurred prior to MNFI botanists conducting T&E plant surveys, limiting our ability to potentially detect target species in all portions of the ROW.

Figure 15. Field across the entry road to Welcome Center, with upland prairie or oak barrens in foreground, dominated by Indian grass, and lakeplain wet-mesic prairie in background, dominated by beak-rush

Figure 16. Small patch of upland prairie along westbound I-94, directly across from Welcome Center, with prairie dock (*Silphium terebinthinaceum*), yellow coneflower (*Ratibida pinnata*), and Indian grass

Figure 17. Dense patch of cattails, typical vegetation in disturbed right-of-way

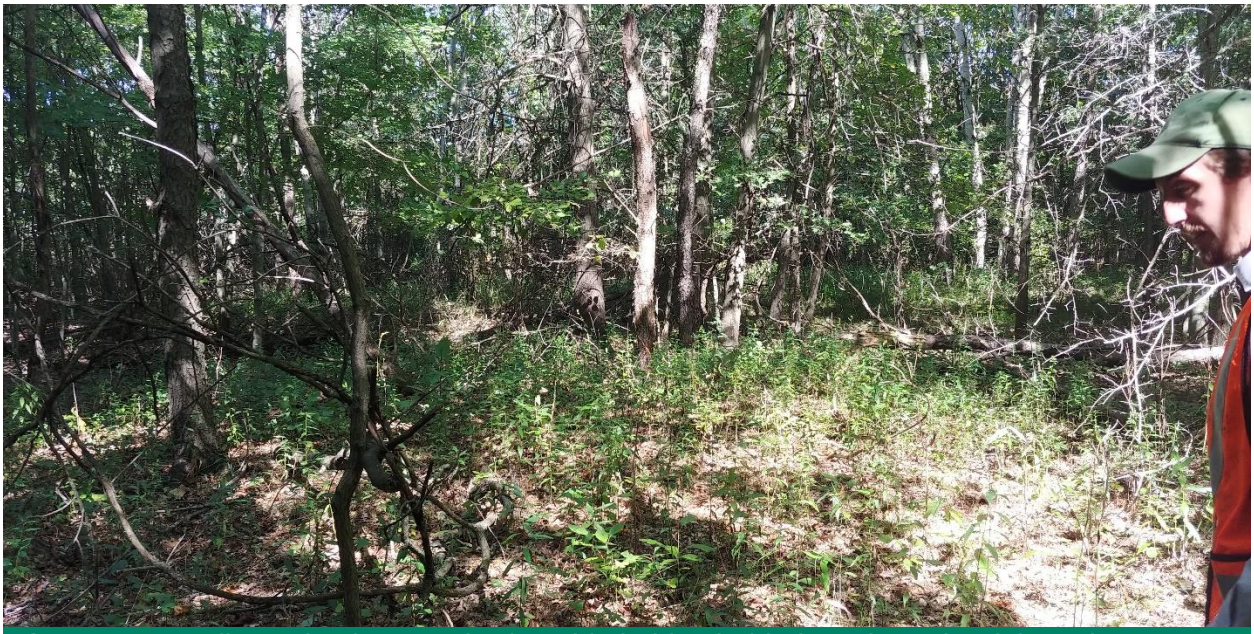

Figure 18. Small opening in recently closed-in habitat behind eastbound weigh station

Figure 19. Ground disturbed by tracked vehicles along eastbound lane of I-94, west of the weigh station

Figure 20. Ground disturbed by tracked vehicles along westbound lane of I-94, east of M-239

Acknowledgements

We thank David Schuen at MDOT for project funding and coordination. Zack Pitman assisted with field work. Ashley Adkins, Brian Klatt, and Nancy Toben provided administrative assistance.