3932

# Identification and Control of Invasive Plant Species

## 2000 Annual Report

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## PURPOSE & SCOPE

The purpose of this research was to: (1) identify all vascular plant species present in the North Woodlot of the Fernald Environmental Management Project, (2) assess which species were non-indigenous and to evaluate their threat via relative abundance, (3) conduct a literature search for control methods, and (4) implement a 3-year experimental study on species control.

The design of this research called for a four-year timeline with two major phases. Phase-I (Objectives 1 and 2) was conducted in 1998 and 1999 and was directed primarily at the identification and evaluation of invasive species along with site reconnaissance and assessment of vegetation-environment relations. The final report for Phase-I was provided in the 1999 Annual Report. Phase-II was initiated in the spring of 1999 and planned to run through the end of the field season of 2001. Thus, most of the effort during 2000 consisted of monitoring the Amur honeysuckle control experiment established in 1999 and is thus the primary focus of this report.

## METHODS, PROGRESS, and RESULTS

The experimental study of Amur honeysuckle removal was designed to investigate how the native understory of hardwood species might best be restored. Here we review the rationale, design, and implementation of this experiment and present our results from the 1999 and 2000 field seasons.

Amur honeysuckle is one of the most problematic invasive species in southwestern Ohio. This species has come to dominate the understory and midstory of many hardwood stands both locally at FEMP, and regionally. Numerous studies have shown that this plant can reduce the natural germination, recruitment, and growth of native trees and herbs (Luken 1990, Nyboer 1992, Luken and Goessling 1995, Luken and Thieret 1996, Hutchinson and Vankat 1997). The net result is an overall reduction in biodiversity, both locally and regionally, as well as disruption to a variety of ecosystem functions (Luken and Mattimiro 1991, Luken et. al. 1997).

There were three specific goals of this experiment: (1) to evaluate the efficacy of methods to control Amur honeysuckle (2) to compare the survival and growth of six species of native tree seedlings planted in plots where honeysuckle was subjected to different eradication measures, and (3) to evaluate the effectiveness of plastic browse tubes to control deer herbivory on planted 1-year tree seedlings.

This experiment was established as a completely randomized block design (Sokal and Rohlf 1995). This is the most appropriate design when dealing with heterogeneous forest conditions. Eight, 5.5 × 13.5 m blocks were established throughout two stands on the eastern side of the North Woodlot. Each block was then fenced with two strands of barbwire below 1 m to exclude cattle but not deer. Each block was sub-divided in to three equal sized plots and treatments were randomly assigned to each plot. The treatments consisted of an experimental "control" (no manipulation of honeysuckle), and two eradication treatments, "cut" (honeysuckle was cut at ground level and removed from the plots, then stumps were painted with herbicide), and "injection" (honeysuckle was killed in plots via herbicide injection, but left standing *in situ*). In each treatment plot, ten seedlings of the following six species of native trees were planted: Chinquapin oak (*Quercus muehlenbergii*), black walnut (*Juglans nigra*), black cherry (*Prunus serotina*), green ash (*Fraxinus pennsylvanica*), flowering dogwood (*Cornus florida*), and redbud (*Cercis canadensis*). All six species are known from the flora of the Northern Woodlot (see appendix for species list); therefore, these species were appropriate selections for restoration efforts at FEMP. Deer browse tubes were added to half of the seedlings in each plot. As per FEMP regulations, the maintenance crew applied the cut and injection treatments to the appropriate plots (March 24, 1999) and planted the seedlings (March 24, 1999 to March 30, 1999). The crew also staked and applied the browse tubes to the tree seedlings (March 31, 1999 to April 13, 1999).

To determine if honeysuckle was equally abundant in all plots prior to treatment application, we constructed a regression model from plants harvested on site. Basal diameter was able to explain a significant portion of the variance in biomass (N=32 plants, $R^2 = 0.99$). Thus, basal diameter measurements were collected for all honeysuckle plants in all treatment plots. Subsequently, an analysis of variance indicated that there was an equivalent biomass of honeysuckle in all blocks and all treatment plots ($P > 0.10$). Thus, we were able to confirm at the beginning of the experiment that there were no pretreatment differences in honeysuckle biomass that needed to be considered prior to implementation of the design.

Within blocks, all honeysuckle plants were tagged to facilitate subsequent monitoring of treatment efficacy and evaluation of any new honeysuckle recruits (untagged) in to the blocks. All tree seedlings were also provided with a numbered aluminum tag to monitor individual survival, growth, and recruitment. Initial height and diameter of all tree seedlings were measured at the beginning of the experiment to determine if seedlings were homogenous in size distributions across all blocks and plots. The size (height and diameter) of tree seedlings was not found to differ significantly ($P > 0.10$) among blocks or plots.

A number of microenvironmental factors were also analyzed to understand the variation among blocks and conditions affecting the tree seedlings in treatment plots. Soils were assessed for moisture, nitrate nitrogen, and pH (in both 1999 and 2000). All soil analyses were conducted at the Forest Ecology Laboratory at Ohio University using the methods of McCarthy (1997).

Soil moisture (Fig. 1D) was examined three times during the growing season of 1999 (May 30, June 25, and August 21, 1999) and twice during 2000 (July 29 and August 29). Percent soil moisture was determined gravimetrically. Some blocks were found to be significantly ($P < 0.05$) wetter than others in 1999. This same pattern held true in 2000. As expected, there was a significant ($P < 0.05$) year effect in the model because considerably more moisture was available in the growing season of 2000. There was no year × block interaction for moisture indicating that drier blocks are drier, regardless of year.

Nitrate nitrogen (Fig. 1B) was sampled using Rexyn-300 resin enclosed in nylon mesh bags buried in the A-horizon for 30 days. Nitrate was then extracted from the resin using 2M KCl and analyzed for nitrate concentration using a cadmium reduction protocol (McCarthy 1997). Like moisture, there was a significant ($P < 0.05$) year effect and block effect, but no significant interaction. Again, this suggests that nitrogen levels vary from year to year (likely associated with the below average moisture availability in the growing season of 1999 and lower soil biological activity) and from block to block, but that this pattern is consistent over time (i.e., blocks low in nitrate one year are also low in nitrate the next). Thus, the relative relationships of soil fertility among blocks seem relatively stable.

The pH (Figure 1C) was determined by using a corning pH meter in a 1:1 soil and water solution. Likewise, pH exhibited a significant ($P < 0.001$) block and year ($P < 0.001$) effect, but no interaction. Understory light conditions (Figure 1A) were measured indirectly using hemispherical photography. Canopy images were captured on 35 mm film (July 30, 1999, and July 27, 2000) using a hemispherical fisheye lens (8mm), digitized, and evaluated using the GLIC software of Canham (1988). This is one of the few methods that adequately describes both direct and indirect solar radiation available at ground level. A full description of the protocol can be found in Robison and McCarthy (1999). There was no difference in canopy coverage from year to year (as expected), but the same pattern of block effect was observed in 2000 as seen in 1999.

Overall, we found that the microenvironment differed among blocks and between years. The block pattern was well established in 1999. Blocks 1-5 are environmentally different than 6-8 (each set is in separate but adjacent stands with slightly different soil types, history, and presence of an upslope seep in the latter). The moisture conditions during much of the 1999 growing season were quite low (NOAA 2000) and Palmer

Drought Severity Indices regularly fell below –3.0. The growing season of 2000 was much more typical with PDSI values within the range of |1|. Thus, we expected a change in conditions between the two years and this was borne out. Interestingly, despite the drought of 1999, there were no significant year × block interactions. From this, we can conclude that there is little value in continuing microenvironmental monitoring during 2001 and propose that this segment be dropped with attention turned towards honeysuckle monitoring and seedling survival and growth assessment.

Mortality of honeysuckle in the two treatment plots was found to be 99 percent at the end of the 1999 growing season. At the end of the 2000 growing season, 98% of the stems remained dead in the injection treatment and 94% in the cut and paint treatment (due to resprouting). This is slightly different from appearances in the field, because misapplied injection treatments were not counted (i.e., when there was obvious operator error because the stem was too narrow to be injected or the capsule did not make solid contact and glanced along the edge it was not counted). Misapplied injections are largely restricted to just the smallest diameter stems (< ¾ inch). Still, given that there was no significant ($P > 0.10$) difference between the two eradication methods in either 1999 or 2000, and given the expediency and cost effectiveness of the injection method, this remains as the most economical means of controlling honeysuckle, particularly for large plants. Small plants will still require a cut and herbicide approach.

In addition to the initial measurements, the 1,440 experimental seedlings were monitored at two times during the 1999 (May 27-28, 1999 and October 10-11, 1999) and 2000 (May 21-22, 2000 and September 23-24) growing seasons to assess survivorship. We examined each seedling, determined whether it was alive or dead (via a top-kill designation) and noted mode of mortality, if relevant. By the end of the first growing season, seedling mortality was ca. 50%. Only an additional 7% of seedlings died during 2000 (Figure 2A). This is likely explained by the differences in moisture availability from one year to the next and the stability of established seedlings.

As in 1999, we also noted differential survival among blocks, treatments, species, and tubed seedlings in 2000 (Figure 2); in fact, the patterns reported in the 1999 Annual Report remain virtually unchanged (i.e., the survivorship response remains consistent across treatment combinations). The differences among blocks (Figure 2B) can be attributed to environmental heterogeneity (Figure 1). Survival trajectories remained indistinguishable for all species (Figure 2C); i.e., the relative ranking in survival is the same. Survival remains highest in the two treatment categories relative to the un-manipulated control (Figure 2D) and survival remains slightly greater in the un-tubed treatments, especially for redbud, dogwood, black walnut, and black cherry.

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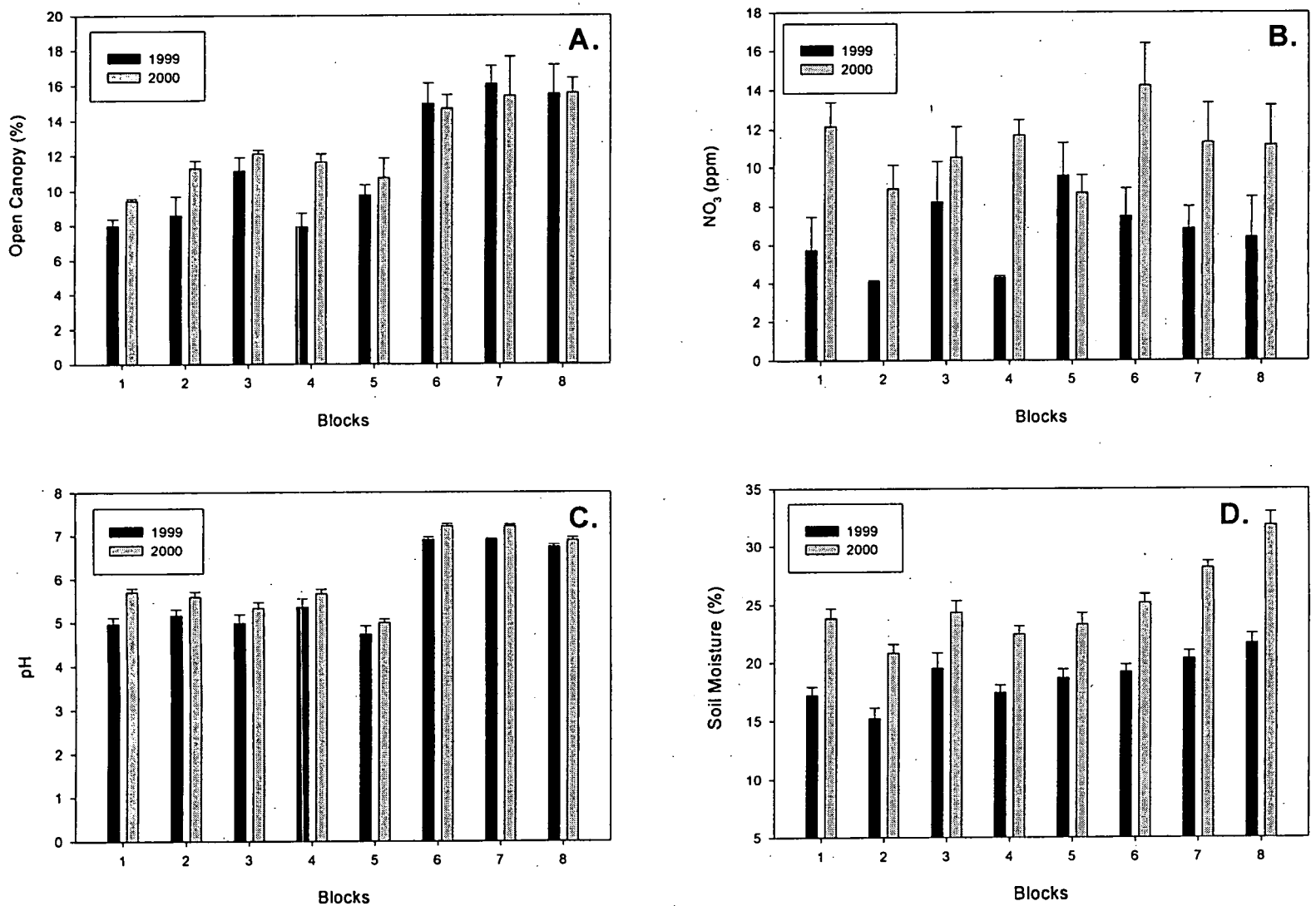


Figure 1. Mean (± SE) of measured microenvironmental variables on the 8 experimental blocks in the North Woodlot of FEMP for 1999 and 2000.



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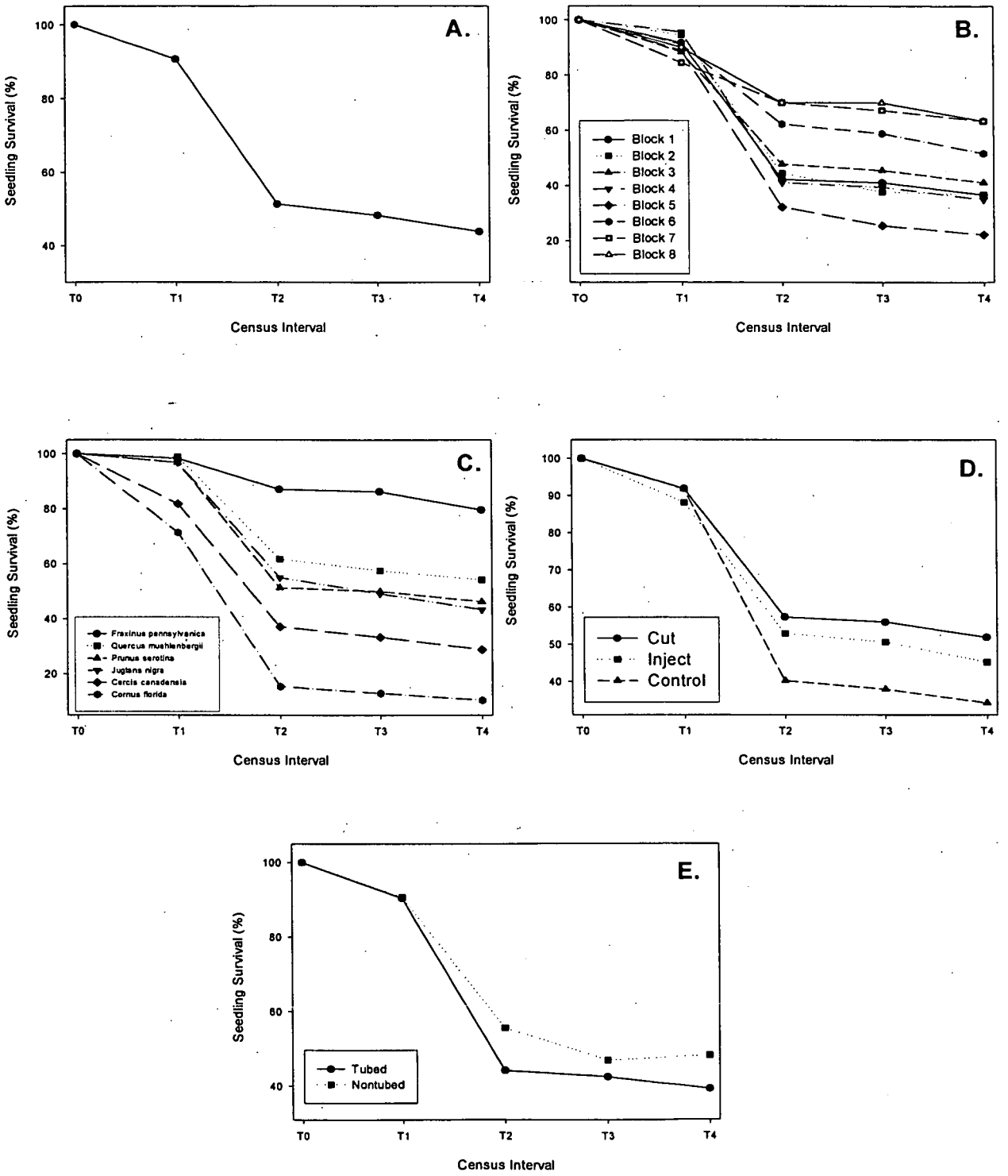


Figure 2. Cumulative survival (%) by treatment category. Census intervals are: T0 (time of planting), T1 and T2 are spring and summer 1999, respectively; T3 and T4 are spring and summer 2000, respectively.

# APPENDIX A

# TAXA LIST

| Taxa | Abundance Score[1] | Habitats Present[2] D | MM | OF | FT | FO | FEMP Identification | Indigenous/ Non-indigenous[3] |
|---|---|---|---|---|---|---|---|---|
| **FERN AND FERN ALLIES** | | | | | | | | |
| **Aspleniaceae** | | | | | | | | |
| *Asplenium platyneuron* (L.) Oakes | 2 | | | + | | | FEMP 111 MR | IND |
| *Dryopteris carthusiana* (Villars) H. P. Fuchs. | 1 | | | | + | | FEMP 337 MR | IND |
| **Ophioglossaceae** | | | | | | | | |
| *Botrychium biternatum* (Savigny) Underw. | 1 | | | | + | | FEMP 400 MR | |
| *Ophioglossum vulgatum* var. *pseudopodum* (S. F. Blake) Farw. | 1 | | | | + | | FEMP 340 MR | IND |
| **GYMNOSPERMS** | | | | | | | | |
| **Cupressaceae** | | | | | | | | |
| *Juniperus virginiana* var. *virginiana* L. | 4 | | | + | + | | FEMP 046 MR | IND |
| **ANGIOSPERMS** | | | | | | | | |
| **Aceraceae** | | | | | | | | |
| *Acer negundo* var. *negundo* L. | 5 | | | + | + | + | FEMP 028 MR | IND |
| *Acer nigrum* Michx. f. | 5 | | | | + | + | FEMP 171 MR | IND |
| *Acer rubrum* L. | 2 | | + | + | | | FEMP 176 MR | IND |
| *Acer saccharinum* L. | 4 | | + | + | + | + | FEMP 108 MR | IND |
| *Acer saccharum* Marshall | 4 | | | | + | + | FEMP 026 MR | IND |
| **Amaranthaceae** | | | | | | | | |
| *Amaranthus arenicola* I. M. Johnst. | 1 | + | | | | | FEMP 301 MR | NON-IND |
| *Amaranthus spinosus* L. | 2 | | | + | | | FEMP 221 MR | NON-IND |
| **Anacardiaceae** | | | | | | | | |
| *Rhus glabra* L. | 2 | | | | + | | FEMP 167 MR | IND |
| *Rhus typhina* L. | 2 | | | | + | | FEMP 174 MR | IND |
| *Toxicodendron radicans* (L.) Kuntze | 5 | + | + | + | + | + | FEMP 336 MR | IND |
| **Annonaceae** | | | | | | | | |
| *Asimina triloba* (L.)Dunal | 1 | | | | | + | FEMP 380 MR | IND |

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| Taxa | Abundance Score[1] | Habitats Present[2] D | MM | OF | FT | FO | FEMP Identification | Indigenous/ Non-indigenous[3] |
|---|---|---|---|---|---|---|---|---|
| **Apiaceae** | | | | | | | | |
| *Aethusa cynapium* L. | 2 | | | | + | | FEMP 153 MR | NON-IND |
| *Chaerophyllum procumbens* (L.) Crantz. | 2 | | + | + | | + | FEMP 025 MR | IND |
| *Conium maculatum* L. | 2 | + | | + | | | FEMP 139 MR | NON-IND |
| *Cryptotaenia canadensis* (L.) DC | 1 | | | | | + | FEMP 095 MR | IND |
| *Daucus carota* L. | 4 | | + | + | | | FEMP 212 MR | NON-IND |
| *Hydrocotyle americana* L. | 3 | | + | | + | | FEMP 312 MR | IND |
| *Osmorhiza claytonii* (Michx.) C. B. Clarke | 1 | | | | | + | FEMP 034 MR | IND |
| *Pastinaca sativa* L. | 3 | | + | + | | | FEMP 088 MR | NON-IND |
| *Sanicula canadensis* L. | 1 | | | | | + | FEMP 330 MR | IND |
| *Sanicula gregaria* E. Bickn. | 1 | | | | | + | FEMP 334 MR | IND |
| *Torilis japonica* (Houtt.) DC | 1 | | + | + | | | FEMP 218 MR | NON-IND |
| *Zizia aurea* (L.) Koch | 2 | | + | | | + | FEMP 360 MR | IND |
| **Apocynaceae** | | | | | | | | |
| *Apocynum cannabinum* L. | 3 | | | + | | | FEMP 238 MR | IND |
| **Aristolochiaceae** | | | | | | | | |
| *Asarum canadense* L. | 1 | | | | | + | FEMP 039 MR | IND |
| **Asclepiadaceae** | | | | | | | | |
| *Asclepias incarnata* var. *incartata* L. | 2 | | | + | | | FEMP 276 MR | IND |
| *Asclepias syriaca* L. | 2 | | + | + | | | FEMP 288 MR | IND |
| *Asclepias tuberosa* var. *interior* (Woodson) Shinners | 2 | | | + | | | FEMP 186 MR | IND |
| **Asteraceae** | | | | | | | | |
| *Achillea millefolium* L. | 3 | + | | + | + | | FEMP 006 MR | NON-IND |
| *Ambrosia artemisiifolia* L. | 4 | | | + | + | | FEMP 246 MR | IND |
| *Ambrosia trifida* var. *trifida* L. | 1 | | | + | | | FEMP 258 MR | IND |
| *Arctium minus* Schk. | 3 | | | + | + | | FEMP 313 MR | NON-IND |
| *Arctium tomentosum* Miller | 4 | + | | + | | | FEMP 242 MR | NON-IND |
| *Artemisia annua* L. | 2 | + | | | | | FEMP 387 MR | NON-IND |
| *Aster novae-angliae* L. | 3 | | + | + | | | FEMP 271 MR | IND |
| *Aster patens* var. *phlogifolius* (Muhl.) Nees. | 2 | | | + | | | FEMP 275 MR | IND |
| *Aster paternus* Cronq. | 4 | | + | + | | | FEMP 290 MR | IND |
| *Aster pilosus* var. *pilosus* Willd. | 4 | | | + | + | | FEMP 277 MR | IND |
| *Aster racemosus* Elliott | 2 | | | + | + | | FEMP 232 MR | IND |



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| Taxa | Abundance Score[1] | Habitats Present[2] D | MM | OF | FT | FO | FEMP Identification | Indigenous/ Non-indigenous[3] |
|---|---|---|---|---|---|---|---|---|
| *Bidens discoidea* (T. & G.) Britton | 2 | | | + | | | FEMP 273 MR | IND |
| *Bidens frondosa* L. | 3 | + | | + | + | | FEMP 274 MR | IND |
| *Carduus nutans* L. | 2 | | | + | | | FEMP 136 MR | NON-IND |
| *Cichorium intybus* L. | 3 | + | + | + | | | FEMP 209 MR | NON-IND |
| *Cirsium discolor* (Muhl.) Sprengel | 3 | + | | + | | | FEMP 239 MR | IND |
| *Cirsium muticum* Michx. | 2 | | + | | | | FEMP 287 MR | IND |
| *Conyza canadensis* var. *canadensis*(L.) Cronq. | 3 | | | + | | | FEMP 235 MR | IND |
| *Eclipta prostrata* (L.) L. | 1 | + | | | + | | FEMP 267 MR | NON-IND |
| *Erigeron philadelphicus* L. | 3 | + | + | + | + | | FEMP 084 MR | IND |
| *Erigeron pulchellus* var. *pulchellus* Michx. | 1 | | | + | + | | FEMP 054 MR | IND |
| *Eupatorium altissimum* L. | 1 | | | + | | | FEMP 317 MR | IND |
| *Eupatorium perfoliatum* var. *perfoliatum* L. | 2 | | | + | | | FEMP 269 MR | IND |
| *Eupatorium rugosum* var. *rugosum* Houttuyn | 5 | + | + | + | + | + | FEMP 253 MR | IND |
| *Eupatorium serotinum* Michx. | 2 | | | + | + | | FEMP 230 MR | IND |
| *Euthamia graminifolia* var. *graminifolia* (L.) Nutt. | 4 | | + | + | | | FEMP 233 MR | IND |
| *Helianthus tuberosus* L. | 2 | + | | + | | | FEMP 319 MR | IND |
| *Lactuca saligna* L. | 1 | + | | | | | FEMP 248 MR | NON-IND |
| *Lactuca serriola* var. *integrata* Gren. & Gordon | 2 | | | + | | | FEMP 292 MR | NON-IND |
| *Rudbeckia triloba* var. *triloba* L. | 3 | | + | | + | | FEMP 263 MR | IND |
| *Senecio obovatus* Muhl. | 1 | | | | | + | FEMP 031 MR | IND |
| *Senecio glabellus* Poir. | 1 | | + | + | | | FEMP 058 MR | IND |
| *Solidago juncea* Aiton | 4 | | | + | | | FEMP 237 MR | IND |
| *Solidago canadensis* var. *canadensis* L. | 5 | | | + | | | FEMP 281 MR | IND |
| *Solidago canadensis* var. *scabra* T. & G. | 5 | | | + | | | FEMP 282 MR | IND |
| *Sonchus arvensis* var. *glabrescens* (Guenther) Grab. & Wimmer | 1 | + | | + | | | FEMP 143 MR | NON-IND |
| *Sonchus asper* (L.) Hill | 1 | + | | | | | FEMP 359 MR | NON-IND |
| *Taraxacum officinale* Weber ex Wiggers | 3 | + | | + | | + | FEMP 002 MR | NON-IND |
| *Tragopogon pratensis* L. | 1 | + | | | | | FEMP 199 MR | NON-IND |
| *Vernonia gigantea* var. *gigantea* (Walter) Trel. | 5 | | | + | + | | FEMP 241 MR | IND |
| *Verbesina alternifolia* (L.) Britton | 2 | | | + | + | | FEMP 318 MR | IND |
| *Verbesina helianthoides* Michx. | 2 | | | + | + | | FEMP 257 MR | IND |
| *Xanthium strumarium* var. *glabratum* (DC) Cronq. | 4 | + | + | + | | | FEMP 272 MR | IND |
| **Balsaminaceae** | | | | | | | | |
| *Impatiens capensis* Meerb. | 2 | | | | + | + | FEMP 166 MR | IND |
| *Impatiens pallida* Nutt. | 2 | + | | | + | | FEMP 208 MR | IND |

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39332

| Taxa | Abundance Score[1] | Habitats Present[2] D | MM | OF | FT | FO | FEMP Identification | Indigenous/ Non-indigenous[3] |
|---|---|---|---|---|---|---|---|---|
| **Berberidaceae** | | | | | | | | |
| *Podophyllum peltatum* L. | 2 | + | | | | + | FEMP 024 MR | IND |
| **Betulaceae** | | | | | | | | |
| *Carpinus caroliniana* var. *caroliniana* Walter | 1 | | | | | + | FEMP 040 MR | IND |
| **Bignoniaceae** | | | | | | | | |
| *Campsis radicans* (L.) Seemann | 2 | + | | | + | | FEMP 215 MR | IND |
| **Boraginaceae** | | | | | | | | |
| *Hackelia virginiana* (L.) I. M. Johnston | 1 | | | + | + | | FEMP 259 MR | IND |
| **Brassicaceae** | | | | | | | | |
| *Alliaria petiolata* (Bieb.) Cavara & Grande | 4 | | + | | + | + | FEMP 020 MR | NON-IND |
| *Barbarea vulgaris* R. Br. | 4 | + | + | + | + | | FEMP 045 MR | NON-IND |
| *Brassica nigra* L. | 1 | + | | | | | FEMP 353 MR | NON-IND |
| *Capsella bursa-pastoris* (L.) Medikus | 2 | | + | | | | FEMP 338 MR | NON-IND |
| *Cardamine concatenata* (Michx.) O. Schwarz | 2 | | | | | + | FEMP 339 MR | IND |
| *Cardamine hirsuta* L. | 2 | | | | + | | FEMP 335 MR | NON-IND |
| *Draba verna* L. | 3 | | + | | | | FEMP 060 MR | NON-IND |
| *Hesperis matronalis* L. | 2 | + | | | | | FEMP 356 MR | NON-IND |
| *Iodanthus pinnatifidis* (Michx.) Steudel | 1 | | | + | | | FEMP 094 MR | IND |
| *Lepidium campestre* (L.) R. Br. | 3 | | + | + | | | FEMP 011 MR | NON-IND |
| *Lepidium virginicum* var. *virginicum* L. | 1 | | | + | | | FEMP 144 MR | IND |
| *Rorippa palustris* var. *fernaldiana* (Butters & Abbe) Stuckey | 1 | | | + | | | FEMP 348 MR | IND |
| *Rorippa sylvestris* (L.) Besser | 1 | | | + | | | FEMP 137 MR | NON-IND |
| *Sisymbrium officinale* (L.) Scop. | 1 | | | + | | | FEMP 141 MR | NON-IND |
| *Thlaspi arvense* L. | 1 | | | + | | | FEMP 138 MR | NON-IND |
| **Caesalpiniaceae** | | | | | | | | |
| *Cercis canadensis* var. *canadensis* L. | 1 | | | | + | | FEMP 310 MR | IND |
| *Gleditsia triacanthos* L. | 3 | | | + | + | + | FEMP 123 MR | IND |
| *Gymnocladus dioica* (L.) K. Koch | 2 | | | | + | + | FEMP 041 MR | IND |

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| Taxa | Abundance Score[1] | Habitats Present[2] D | MM | OF | FT | FO | FEMP Identification | Indigenous/ Non-indigenous[3] |
|---|---|---|---|---|---|---|---|---|
| **Campanulaceae** | | | | | | | | |
| *Campanula americana* L. | 2 | + | | | | + | FEMP 345 MR | IND |
| *Lobelia inflata* L. | 3 | | + | | + | | FEMP 264 MR | IND |
| *Lobelia siphilitica* var. *siphilitica* L. | 3 | + | + | | | | FEMP 262 MR | IND |
| **Caprifoliaceae** | | | | | | | | |
| *Lonicera japonica* Thunb. | 4 | | + | + | + | + | FEMP 048 MR | NON-IND |
| *Lonicera maackii* (Rupr.) Maxim. | 5 | | | + | + | | FEMP 017 MR | NON-IND |
| *Sambucus canadensis* var. *canadensis* L. | 2 | | | | + | | FEMP 216 MR | IND |
| *Viburnum prunifolium* L. | 1 | | | | + | | FEMP 013 MR | IND |
| **Caryophyllaceae** | | | | | | | | |
| *Cerastium vulgatum* L. | 4 | | + | + | + | + | FEMP 008 MR | NON-IND |
| *Dianthus armeria*L. | 2 | | + | + | | | FEMP 087 MR | NON-IND |
| *Saponaria officinalis* L. | 1 | | | | | + | FEMP 293 MR | NON-IND |
| *Silene latifolia* Poiret | 2 | + | + | | | | FEMP 358 MR | NON-IND |
| *Stellaria media* (L.) Villars. | 5 | | + | | + | + | FEMP 009 MR | NON-IND |
| **Chenopodiaceae** | | | | | | | | |
| *Chenopodium album* L. | 1 | + | | | | | FEMP 303 MR | NON-IND |
| **Clusiaceae** | | | | | | | | |
| *Hypericum prolificum* L. | 1 | | | + | | | FEMP 350 MR | IND |
| *Hypericum punctatum* Lam. | 1 | | | + | | | FEMP 349 MR | IND |
| **Commelinaceae** | | | | | | | | |
| *Commelina communis* L. | 3 | | + | + | + | | FEMP 260 MR | NON-IND |
| **Convolvulaceae** | | | | | | | | |
| *Calystegia sepium* (L.) R. Br. | 3 | + | | + | | | FEMP 201 MR | IND |
| *Ipomoea hederacea* Jacq. | 1 | + | | | | | FEMP 352 MR | NON-IND |
| *Ipomoea lacunosa* L. | 1 | | | + | | | FEMP 244 MR | IND |
| *Ipomoea pandurata* (L.) G. Meyer | 1 | | | + | | | FEMP 236 MR | IND |
| **Cornaceae** | | | | | | | | |
| *Cornus drummondii* C. A. Meyer | 4 | | | + | + | | FEMP 107 MR | IND |
| *Cornus racemosa* Lam. | 2 | | | + | + | | FEMP 270 MR | IND |

000014

| Taxa | Abundance Score[1] | Habitats Present[2] D | MM | OF | FT | FO | FEMP Identification | Indigenous/ Non-indigenous[3] |
|---|---|---|---|---|---|---|---|---|
| **Cucurbitaceae** | | | | | | | | |
| *Cucurbita* sp. (L.) | 1 | + | | | | | FEMP 389 MR | NON-IND |
| *Sicyos angulatus* L. | 1 | + | | | | | FEMP 355 MR | IND |
| **Cyperaceae** | | | | | | | | |
| *Carex albursina* Sheldon | 1 | | | | | + | FEMP 177 MR | IND |
| *Carex blanda* Dewey | 1 | | | | | + | FEMP 093 MR | IND |
| *Carex cephalophora* var. *cephalophora* Muhl. | 1 | | + | + | | | FEMP 134 MR | IND |
| *Carex cristatella* Britton | 2 | | + | | | | FEMP 101 MR | IND |
| *Carex davisii* Schwein. & Torr. | 1 | | + | + | | | FEMP 329 MR | IND |
| *Carex frankii* Kunth. | 2 | | + | | | | FEMP 321 MR | IND |
| *Carex granularis* Muhl. | 1 | | + | + | | | FEMP 326 MR | IND |
| *Carex hystericina* Muhl. | 1 | | | | + | | FEMP 159 MR | IND |
| *Carex joorii* L. Bailey | 2 | | | + | | | FEMP 075 MR | IND |
| *Carex scoparia* Schk. | 2 | | + | + | | | FEMP 320 MR | IND |
| *Carex shortiana* Dewey | 2 | | + | + | | | FEMP 089 MR | IND |
| *Carex tribuloides* Wahlenb. | 1 | | + | + | | | FEMP 328 MR | IND |
| *Carex vulpinoidea* var. *vulpinoidea* Michx. | 3 | | + | + | | | FEMP 073 MR | IND |
| *Cyperus lancastriensis* Porter | 2 | | + | | | | FEMP 217 MR | IND |
| *Cyperus strigosus* L. | 2 | | + | + | | | FEMP 213 MR | IND |
| *Eleocharis ovata* (Roth) Roemer & Schultes | 2 | | + | | | | FEMP 016 MR | IND |
| *Scirpus atrovirens* var. *atrovirens* Willd. | 2 | | + | + | | | FEMP 181 MR | IND |
| *Scripus lineatus* Michx. | 2 | | + | + | | | FEMP 071 MR | IND |
| **Dioscoreaceae** | | | | | | | | |
| *Dioscorea villosa* L. | 2 | | + | | + | | FEMP 315 MR | IND |
| **Dipsacaceae** | | | | | | | | |
| *Dipsacus sylvestris* Hudson | 2 | + | | + | | | FEMP 210 MR | NON-IND |
| **Elaeagnaceae** | | | | | | | | |
| *Elaeagnus angustifolia L.* | 2 | | + | + | + | | FEMP 047 MR | NON-IND |
| *Elaeagnus multiflora* Thunb. | 1 | | | | + | | FEMP 283 MR | NON-IND |
| **Euphorbiaceae** | | | | | | | | |
| *Acalypha rhomboidea* Raf. | 3 | | | | + | | FEMP 286 MR | IND |
| *Euphorbia dentata* Michx. | 1 | + | | | | | FEMP 297 MR | IND |

000015

3932

| Taxa | Abundance Score[1] | Habitats Present[2] D | MM | OF | FT | FO | FEMP Identification | Indigenous/ Non-indigenous[3] |
|---|---|---|---|---|---|---|---|---|
| *Euphorbia maculata* L. | 1 | + | | | | | FEMP 256 MR | IND |
| *Euphorbia nutans* Lagasca | 1 | | | | + | | FEMP 323 MR | IND |
| **Fabaceae** | | | | | | | | |
| *Amorpha fruticosa* L. | 1 | | | | + | | FEMP 255 MR | IND |
| *Desmodium paniculatum* (L.) DC | 2 | | | + | + | | FEMP 219 MR | IND |
| *Lespedeza violacea* (L.) Pers. | 3 | | | + | | | FEMP 247 MR | IND |
| *Medicago lupulina* L. | 1 | | + | | | | FEMP 327 MR | NON-IND |
| *Melilotus abla* Medikus | 1 | + | | | | | FEMP 361 MR | NON-IND |
| *Melilotus officinalis* (L.) Pallas | 2 | | | + | | | FEMP 133 MR | NON-IND |
| *Robinia pseudoacacia* L. | 2 | | | | + | | FEMP 131 MR | IND |
| *Trifolium campestre* Schreber | 2 | | + | + | | | FEMP 063 MR | NON-IND |
| *Trifolium dubium* Sibth. | 3 | | + | | | | FEMP 065 MR | NON-IND |
| *Trifolium hybridum* L. | 2 | | + | + | | | FEMP 085 MR | NON-IND |
| *Trifolium pratense* L. | 3 | | + | + | | | FEMP 064 MR | NON-IND |
| *Trifolium repens* L. | 4 | | + | + | | | FEMP 067 MR | NON-IND |
| **Fagaceae** | | | | | | | | |
| *Quercus alba* L. | 3 | | | | + | + | FEMP 162 MR | IND |
| *Quercus bicolor* Willd. | 4 | | | | + | + | FEMP 173 MR | IND |
| *Querucs* x *bushii* Sarg. | 1 | | | + | | | FEMP 351 MR | IND |
| *Quercus imbricaria* Michx. | 3 | | | + | + | + | FEMP 117 MR | IND |
| *Quercus muehlenbergii* Engelm. | 4 | | | | + | + | FEMP 118 MR | IND |
| *Quercus rubra* L. | 3 | | | | + | + | FEMP 170 MR | IND |
| *Quercus* x *runcinata* (A. DC) Engelm. | 1 | | | + | | | FEMP 304 MR | IND |
| *Quercus shumardii* Buckley | 3 | | | | + | + | FEMP 126 MR | IND |
| **Fumariaceae** | | | | | | | | |
| *Corydalis flavula* (Raf.) DC | 2 | | | | + | + | FEMP 042 MR | IND |
| *Dicentra cucullaria* (L.) Bernh. | 2 | | | | | + | FEMP 038 MR | IND |
| **Hippocastanaceae** | | | | | | | | |
| *Aesculus glabra* var. *glabra* Willd. | 2 | | | | + | + | FEMP 022 MR | IND |
| **Hydrophyllaceae** | | | | | | | | |
| *Phacelia purshii* Buckley | 2 | | + | | + | | FEMP 081 MR | IND |



000016

3632

| Taxa | Abundance Score[1] | Habitats Present[2] D | MM | OF | FT | FO | FEMP Identification | Indigenous/ Non-indigenous[3] |
|---|---|---|---|---|---|---|---|---|
| **Iridaceae** | | | | | | | | |
| *Sisyrinchium angustifolium* Miller | 1 | | + | | | | FEMP 103 MR | IND |
| **Juglandaceae** | | | | | | | | |
| *Carya cordiformis* (Wangenh.) K. Koch | 3 | | | | + | + | FEMP 179 MR | IND |
| *Carya glabra* (Miller) Sweet | 2 | | | | + | + | FEMP 152 MR | IND |
| *Carya laciniosa* (Michx. f.) Nutt. | 5 | | | | + | + | FEMP 148 MR | IND |
| *Carya ovata* (Miller) K. Koch | 1 | | | | + | | FEMP 314 MR | IND |
| *Juglans nigra* L. | 5 | | | | + | + | FEMP 130 MR | IND |
| **Juncaceae** | | | | | | | | |
| *Juncus tenuis* var. *tenuis* Willd. | 5 | + | + | + | | | FEMP 083 MR | IND |
| **Lamiaceae** | | | | | | | | |
| *Agastache nepetoides* (L.) Kuntze | 1 | + | | | | | FEMP 185 MR | IND |
| *Glechoma hederacea* L. | 4 | + | + | + | + | + | FEMP 004 MR | NON-IND |
| *Lamium purpureum* L. | 4 | + | + | | | + | FEMP 005 MR | NON-IND |
| *Mentha arvensis* var. *canadensis* (L.) Kuntze | 3 | | | + | + | | FEMP 265 MR | IND |
| *Mentha* x *piperita* L. | 1 | | | + | | | FEMP 222 MR | NON-IND |
| *Nepeta cataria* L. | 1 | + | | | | | FEMP 346 MR | NON-IND |
| *Prunella vulgaris* var. *vulgaris* L. | 3 | | + | + | + | | FEMP 211 MR | NON-IND |
| *Teucrium canadense* var. *virginicum* (L.) Eaton | 1 | + | | | | | FEMP 354 MR | IND |
| **Lemnaceae** | | | | | | | | |
| *Lemna minor* L. | 1 | | | | + | | FEMP 129 MR | IND |
| **Liliaceae** | | | | | | | | |
| *Allium canadense* var. *canadense* L. | 2 | | + | + | + | | FEMP 099 MR | IND |
| *Allium vineale* L. | 3 | | + | + | + | + | FEMP 018 MR | NON-IND |
| *Trillium sessile* L. | 1 | | | | | + | FEMP 035 MR | IND |
| **Malvaceae** | | | | | | | | |
| *Abutilon theophrasti* Medikus | 1 | + | | | | | FEMP 343 MR | NON-IND |
| *Sida spinosa* L. | 1 | + | | + | | | FEMP 243 MR | IND |
| **Menispermaceae** | | | | | | | | |
| *Menispermum canadense* L. | 3 | | + | | + | | FEMP 079 MR | IND |



000017

3639

| Taxa | Abundance Score[1] | Habitats Present[2] D | MM | OF | FT | FO | FEMP Identification | Indigenous/ Non-indigenous[3] |
|---|---|---|---|---|---|---|---|---|
| **Molluginaceae** | | | | | | | | |
| *Mollugo verticillata* L. | 1 | + | | | | | FEMP 261 MR | NON-IND |
| **Moraceae** | | | | | | | | |
| *Maclura pomifera* (Raf.) C. K. Schneider | 1 | + | + | | | + | FEMP 295 MR | NON-IND |
| *Morus rubra* L. | 2 | | | + | + | | FEMP 132 MR | IND |
| **Oleaceae** | | | | | | | | |
| *Fraxinus americana* L. | 3 | | | | + | | FEMP 165 MR | IND |
| *Fraxinus pennsylvanica* Marshall | 5 | | | + | + | + | FEMP 163 MR | IND |
| *Fraxinus pennsylvanica* var. *subintegerrima* (Vahl) Fern | 5 | | | + | + | + | FEMP 164 MR | IND |
| **Onagraceae** | | | | | | | | |
| *Circaea lutetiana* var. *canadensis* L. | 1 | | | | | + | FEMP 178 MR | IND |
| *Epilobium coloratum* Biehler | 1 | + | | | | | FEMP 388 MR | IND |
| *Ludwigia alata* Elliot | 1 | | + | | | | FEMP 086 MR | IND |
| *Oenothera biennis* var. *biennis* L. | 2 | + | | + | | | FEMP 140 MR | IND |
| *Oenothera fruticosa* L. | 1 | + | | | | | FEMP 386 MR | IND |
| **Oxalidaceae** | | | | | | | | |
| *Oxalis dillenii* Jacq. | 2 | | | | + | + | FEMP 082 MR | IND |
| *Oxalis stricta* L. | 3 | | + | + | + | + | FEMP 154 MR | IND |
| **Phytolaccaceae** | | | | | | | | |
| *Phytolacca americana* L. | 1 | + | | | | | FEMP 200 MR | IND |
| **Plantaginaceae** | | | | | | | | |
| *Plantago lanceolata* L. | 4 | + | + | + | | | FEMP 066 MR | NON-IND |
| *Plantago major* L. | 4 | + | + | + | + | | FEMP 251 MR | IND |
| *Plantago rugelii* Decne. | 3 | + | + | + | | | FEMP 191 MR | IND |
| **Platanaceae** | | | | | | | | |
| *Platanus occidentalis* L. | 4 | | | + | + | + | FEMP 175 MR | IND |
| **Poaceae** | | | | | | | | |
| *Agrostis perennans* var. *perennans* (Walter) Tuckerman | 5 | + | + | + | | | FEMP 091 MR | IND |
| *Alopecurus pratensis* L. | 2 | | | + | | | FEMP 135 MR | NON-IND |



000018

3932

| Taxa | Abundance Score[1] | Habitats Present[2] D | MM | OF | FT | FO | FEMP Identification | Indigenous/ Non-indigenous[3] |
|---|---|---|---|---|---|---|---|---|
| *Andropogon virginicus* var. *virginicus* L. | 2 | | | + | | | FEMP 306 MR | IND |
| *Bromus commutatus* Schrader | 2 | | | + | | | FEMP 145 MR | NON-IND |
| *Bromus inermis* Leysser | 2 | + | + | | | | FEMP 195 MR | NON-IND |
| *Bromus sterilis* L. | 2 | + | + | | | | FEMP 194 MR | NON-IND |
| *Dactylis glomerata* L. | 4 | + | + | + | | | FEMP 077 MR | NON-IND |
| *Digitaria ischaemum* (Schreber) Muhl. | 3 | + | + | + | | | FEMP 245 MR | NON-IND |
| *Digitaria sanguinalis* (L.) Scop. | 2 | + | + | + | | | FEMP 364 MR | NON-IND |
| *Echinochloa crusgalii* var. *crusgalii* (L.) P. Beauv. | 3 | + | + | + | | | FEMP 278 MR | NON-IND |
| *Echinochloa muricata* var. *muricata* (L.) P. Beauv. | 2 | + | + | + | | | FEMP 226 MR | IND |
| *Eleusine indica* (L.) Gaertn. | 1 | | + | | | | FEMP 382 MR | NON-IND |
| *Elymus hystrix* L. | 2 | | | + | + | | FEMP 149 MR | IND |
| *Elymus villosus* Muhl. | 1 | | | + | | | FEMP 198 MR | IND |
| *Elymus virginicus* L. | 2 | | | | + | | FEMP 227 MR | IND |
| *Eragrostis spectabilis* (Pursh.) Steudel. | 2 | | + | | | | FEMP 291 MR | IND |
| *Festuca elatior* L. | 5 | | + | + | | | FEMP 069 MR | NON-IND |
| *Festuca rubra* L. | 4 | | + | + | | | FEMP 325 MR | IND |
| *Festuca subverticillata* (Pers.) E. Alexeev. | 2 | | + | + | + | | FEMP 151 MR | IND |
| *Glyceria striata* (Lam.) A. Hitchc. | 3 | | + | | + | + | FEMP 156 MR | IND |
| *Hordium pussilum* L. | 1 | + | | | | | FEMP 142 MR | IND |
| *Leersia oryzoides* (L.) Swartz | 3 | | + | | | | FEMP 308 MR | IND |
| *Leersia virginica* Willd. | 4 | | + | + | + | + | FEMP 225 MR | IND |
| *Muhlenbergia schreberi* J. F. Gmelin | 3 | | + | | + | | FEMP 311 MR | IND |
| *Panicum clandestinum* L. | 4 | | + | + | + | | FEMP 307 MR | IND |
| *Panicum lanuginosum* var. *fasciculatum* (Torr.) Fern. | 1 | | | + | | | FEMP 362 MR | IND |
| *Panicum lanuginosum* var. *implicatum* (Scribn.) Fern. | 1 | | + | | | | FEMP 324 MR | IND |
| *Panicum lanuginosum* var. *lanuginosum* Elliot | 1 | | | + | | | FEMP 106 MR | IND |
| *Paspalum pubiflorum* var. *glabrum* Vasey. | 1 | + | | | | | FEMP 280 MR | IND |
| *Paspalum setaceum* var. *ciliatifolium* (Mischx.) Vasey | 1 | + | | | | | FEMP 196 MR | IND |
| *Paspalum setaceum* var. *muhlenbergii* (Nash) D. Banks | 2 | + | + | | | | FEMP 322 MR | IND |
| *Phleum pratense* L. | 1 | | | + | | | FEMP 240 MR | NON-IND |
| *Poa annua* L. | 3 | | + | + | | | FEMP 070 MR | NON-IND |
| *Poa compressa* L. | 2 | | + | + | | | FEMP 072 MR | NON-IND |
| *Poa pratensis* L. | 3 | | + | + | + | + | FEMP 061 MR | NON-IND |
| *Poa sylvestris* A. Gray | 3 | | | | + | + | FEMP 096 MR | IND |
| *Poa trivialis* L. | 2 | | + | + | | | FEMP 332 MR | NON-IND |
| *Setaria faberi* R. Herrm. | 3 | + | | + | | | FEMP 231 MR | NON-IND |
| *Setaria glauca* (L.) P. Beauv. | 3 | + | + | + | | | FEMP 250 MR | NON-IND |

000019

3932

| Taxa | Abundance Score[1] | Habitats Present[2] D | MM | OF | FT | FO | FEMP Identification | Indigenous/ Non-indigenous[3] |
|---|---|---|---|---|---|---|---|---|
| *Setaria viridis var. viridis* (L.) P. Beauv. | 4 | + | + | | | | FEMP 363 MR | IND |
| *Tridens flavus* var. *flavus* (L.) A. Hitchc. | 4 | | + | + | | | FEMP 234 MR | IND |
| *Triticum aestivum* L. | 1 | + | | | | | FEMP 333 MR | NON-IND |
| **Polemoniaceae** | | | | | | | | |
| *Phlox divaricata* var. *divaricata* L. | 1 | | | | | + | FEMP 032 MR | IND |
| **Polygonaceae** | | | | | | | | |
| *Polygonum aviculare* L. | 1 | + | + | | | | FEMP 207 MR | IND |
| *Polygonum cespitosum* var. *longisetum* (De Bruyn) Stewart | 2 | | | | + | | FEMP 124 MR | NON-IND |
| *Polygonum hydropiper* L. | 2 | | | | + | | FEMP 155 MR | NON-IND |
| *Polygonum lapathifolium L.* | 3 | + | | | | | FEMP 383 MR | IND |
| *Polygonum pennsylvanicum* L. | 4 | + | + | + | | | FEMP 298 MR | IND |
| *Polygonum persicaria* L. | 5 | | + | + | + | | FEMP 249 MR | NON-IND |
| *Polygonum punctatum* var. *punctatum* Elliott | 2 | | + | | + | | FEMP 224 MR | NON-IND |
| *Polygonum scandens* var. *cristatum* (Englem. & A. Gray) Gleason | 1 | | | | + | | FEMP 254 MR | IND |
| *Polygonum scandens var. scandens* L. | 1 | + | | | | | FEMP 385 MR | IND |
| *Polygonum virginianum* L. | 3 | | | | + | + | FEMP 252 MR | IND |
| *Rumex crispus* L. | 2 | | | + | | | FEMP 074 MR | NON-IND |
| *Rumex obtusifolius* L. | 1 | | | | + | | FEMP 158 MR | NON-IND |
| **Portulacaceae** | | | | | | | | |
| *Claytonia caroliniana* Michx. | 4 | | + | + | + | + | FEMP 036 MR | IND |
| *Claytonia virginica* var. *virginica* L. | 2 | | | | | + | FEMP 341 MR | IND |
| **Primulaceae** | | | | | | | | |
| *Lysimachia nummularia* L. | 4 | + | + | + | + | | FEMP 015 MR | NON-IND |
| *Samolus floribunds* HBK | 1 | | + | | | | FEMP 302 MR | IND |
| **Ranunculaceae** | | | | | | | | |
| *Ranunculus abortivus* var. *abortivus* L. | 4 | | + | + | + | + | FEMP 001 MR | IND |
| *Ranunculus micranthus* Nutt. | 1 | | | | | + | FEMP 398 MR | IND |
| **Rosaceae** | | | | | | | | |
| *Agrimonia parviflora* Aiton | 4 | | | + | + | | FEMP 214 MR | IND |
| *Crataegus crus-galli* L. | 1 | | + | | | | FEMP 051 MR | IND |
| *Crataegus* x *disperma* Ashe | 1 | | | + | | | FEMP 146 MR | IND |

000020

3932

| Taxa | Abundance Score[1] | Habitats Present[2] D | MM | OF | FT | FO | FEMP Identification | Indigenous/ Non-indigenous[3] |
|---|---|---|---|---|---|---|---|---|
| *Crataegus mollis* (T. & G.) Scheele | 1 | | | + | | | FEMP 203 MR | IND |
| *Duchesnea indica* (Andrews) Focke. | 1 | | | | + | | FEMP 055 MR | NON-IND |
| *Fragaria vesca* var. *americana* Porter | 1 | | | | + | | FEMP 125 MR | IND |
| *Geum vernum* (Raf.) T. & G. | 2 | | + | | + | + | FEMP 050 MR | IND |
| *Geum virginianum* L. | 1 | | | | + | | FEMP 160 MR | IND |
| *Potentilla norvegica* L. | 1 | | + | | | | FEMP 347 MR | IND |
| *Potentilla recta* L. | 2 | + | | + | | | FEMP 187 MR | NON-IND |
| *Prunus avium* L. | 1 | | | | + | | FEMP 289 MR | NON-IND |
| *Prunus cerasus* L. | 1 | | | + | | | FEMP 381 MR | NON-IND |
| *Prunus hortulana* L. H. Bailey. | 1 | | + | | | | FEMP 052 MR | IND |
| *Prunus monsoniana* Wight & Hedrick | 1 | | | + | | | FEMP 202 MR | IND |
| *Prunus serotina* Ehrh. | 4 | | | | + | + | FEMP 014 MR | IND |
| *Pyrus communis* L. | 1 | | + | + | | | FEMP 053 MR | NON-IND |
| *Rosa carolina* L. | 3 | + | | + | + | + | FEMP 056 MR | IND |
| *Rosa multiflora* Thunb. | 5 | + | + | + | + | + | FEMP 033 MR | NON-IND |
| *Rosa setigera*Michx. | 2 | | + | | | | FEMP 357 MR | IND |
| *Rubus allegheniensis* T. C. Porter | 3 | | | + | + | | FEMP 076 MR | IND |
| *Rubus flagellaris* Willd. | 2 | | | + | | | FEMP 305 MR | IND |
| *Rubus occidentalis* L. | 2 | | + | + | | | FEMP 104 MR | IND |
| **Rubiaceae** | | | | | | | | |
| *Galium aparine* var. *aparine* L. | 3 | | + | + | + | | FEMP 023 MR | IND |
| *Galium triflorum* var. *triflorum* Michx. | 3 | | + | | + | | FEMP 044 MR | IND |
| **Salicaceae** | | | | | | | | |
| *Populus deltoides* var. *deltoides* Marshall | 2 | + | | + | + | | FEMP 184 MR | IND |
| *Salix eriocephala* Michx. | 1 | | + | | | | FEMP 147 MR | IND |
| *Salix exigua* var. *angustissima* (Anderson) Reveal & Broome | 1 | | | | + | | FEMP 316 MR | IND |
| *Salix nigra* var. *nigra* Marshall | 2 | | | + | | | FEMP 279 MR | IND |
| **Saxifragaceae** | | | | | | | | |
| *Penthorum sedoides* L. | 1 | | + | | | | FEMP 266 MR | IND |
| **Scrophulariaceae** | | | | | | | | |
| *Agalinis tenuifolia* (M. Vahl) Raf. | 3 | | + | + | | | FEMP 229 MR | IND |
| *Mimulus alatus* Aiton | 2 | | + | | | | FEMP 220 MR | IND |
| *Penstemon digitalis* Nutt. | 2 | | | + | | | FEMP 127 MR | IND |



0000021

39332

| Taxa | Abundance Score[1] | Habitats Present[2] D | MM | OF | FT | FO | FEMP Identification | Indigenous/ Non-indigenous[3] |
|---|---|---|---|---|---|---|---|---|
| *Verbascum blattaria* L. | 3 | + | + | | | | FEMP 161 MR | NON-IND |
| *Verbascum thaspus* L. | 2 | + | | | | | FEMP 183 MR | NON-IND |
| *Veronica anagallis-aquatica* L. | 1 | | + | | | | FEMP 128 MR | NON-IND |
| *Veronica arvensis* L. | 3 | | + | | | | FEMP 062 MR | NON-IND |
| *Veronica serpyllifolia* var. *serpyllifolia* L. | 3 | | + | | | | FEMP 059 MR | NON-IND |
| **Simaroubaceae** | | | | | | | | |
| *Ailanthus altissima* (Miller) Swingle | 2 | | | | + | | FEMP 204 MR | NON-IND |
| **Smilacaceae** | | | | | | | | |
| *Smilax hispida* Muhl. | 2 | | | + | + | + | FEMP 150 MR | IND |
| **Solanaceae** | | | | | | | | |
| *Datura stramonium* L. | 1 | + | | | | | FEMP 342 MR | IND |
| *Physalis longifolia* var. *subglabrata* (Mackenzie & Bush) Cronq. | 1 | + | | | | | FEMP 344 MR | IND |
| *Solanum carolinense* L. | 3 | + | + | + | | | FEMP 188 MR | NON-IND |
| *Solanum nigrum* L. | 1 | + | | | | | FEMP 299 MR | IND |
| **Tiliaceae** | | | | | | | | |
| *Tilia americana* var. *americana* L. | 1 | | | | + | | FEMP 284 MR | IND |
| **Ulmaceae** | | | | | | | | |
| *Celtis occidentalis* L. | 5 | | | | + | + | FEMP 120 MR | IND |
| *Ulmus americana* L. | 3 | | | + | + | | FEMP 268 MR | IND |
| *Ulmus rubra* Muhl. | 5 | | | + | + | + | FEMP 113 MR | IND |
| **Urticaceae** | | | | | | | | |
| *Boehmeria cylindrica* (L.) Swartz | 2 | | | | + | | FEMP 157 MR | IND |
| *Pilea pumila* (L.) A. Gray | 3 | + | | | + | + | FEMP 228 MR | IND |
| **Valerianaceae** | | | | | | | | |
| *Valerianella umbilicata* (Sulliv.) A. Wood. | 2 | | | + | + | + | FEMP 080 MR | IND |
| *Valerianella radiata* (L.) Dufr. | 2 | | + | | | | FEMP 331 MR | IND |
| **Verbenaceae** | | | | | | | | |
| *Verbena urticifolia* var *urticifolia* L. | 3 | | | + | + | | FEMP 223 MR | IND |

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| Taxa | Abundance Score[1] | Habitats Present[2] D MM | OF | FT | FO | FEMP Identification | Indigenous/ Non-indigenous[3] |
|---|---|---|---|---|---|---|---|
| **Violaceae** | | | | | | | |
| *Viola pubescens* Aiton | 3 | | | | + | FEMP 030 MR | IND |
| *Viola sororia* Willd. | 4 | + | + | + | + | FEMP 012 MR | IND |
| **Vitaceae** | | | | | | | |
| *Parthenocissus quinquefolia* (L.) Planchon | 3 | | | + | + | FEMP 043 MR | IND |
| *Vitis labrusca* L. | 3 | | | | + | FEMP 300 MR | IND |
| *Vitis vulpina* L. | 5 | | + | + | | FEMP 102 MR | IND |

[1] See Table 3 for Abundance Scores
[2] See Table 2 for Habitat descriptions; a "+" indicates a species' presence in the habitat
[3] IND = Indigenous
NON-IND = Non-indigenous

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