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The flora on the High Line, New York City, New York: A 17-year comparison[1]

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Abstract. This study compares the lichen, moss, and vascular plant species found on the abandoned High Line rail line in 2002 with those found on a three-block remnant of the High Line between 30th and 33rd Streets and 12th Avenue in 2019. One hundred fifty-five species were identified in 125 genera belonging to 47 families in the 2002 study. The 2019 study identified 79 species within 68 genera belonging to 32 families. Ten lichens were identified in 2019; four were identified in 2002. The number of mosses found in 2019 remained the same (six species); four species were new to the study area, and four species found in 2002 were not relocated. The loss of vascular plant species on the old High Line in 2019 is a function of its reduced size, a three-block remnant of the original site. The increase in lichen diversity might reflect improved air quality and continued lack of disturbance to suitable substrates at the remnant site.

Key words: bryophytes, High Line, lichens, New York, New York City, vascular flora

The original abandoned elevated High Line was a commercial railroad paralleling 10th Avenue between 13th and 34th Streets. Built in the 1930s as an elevated commercial rail line to carry congested rail traffic above New York City streets, the High Line was part of the "West Side Improvement Project," which ran 13 miles (20.92 km) from Spuyten Duyvil at its northern terminus to Spring Street in lower Manhattan. The birth of the Interstate Highway System in the 1950s propelled the trucking industry to dominance, resulting in a precipitous decline in rail freight on the High Line. A train carrying three carloads of frozen turkeys made a final journey on the High Line in 1980 (Stalter 2004).

When initially studied in 2002, the High Line consisted of a 7.5 by 2,330-m strip that traversed 20 city blocks. It was exposed to full sun except in the area of 29th Street, which was partially shaded by tall buildings. Occasional human visitors to the abandoned High Line probably transported seeds to the site, one potential source of vascular plant species. Additional site conditions included a shallow soil profile that induced drought stress in dry weather, low soil fertility, human trampling and cutting vegetation, and the smothering of plants by debris such as tires, bottles, and additional refuse. The aforementioned variables created a multiplicity of habitats on the old High Line that could account for its species diversity (Stalter 2004).

In the time since it was initially studied, the High Line has been transformed into a highly visited urban park. A remnant of the old High Line between 30th and 33rd Streets and 12th Avenue was preserved when the High Line Park was created in 2009 (Fig. 1). The vascular plants, lichens, and mosses of this preserved remnant were the subject of a subsequent study in 2019 that is the focus of this contribution. The High Line remnant is fenced, and access is limited by High Line Park. The lichens, mosses, and vascular plant species at this site were similar to those present on the old High Line sampled by the first author in 2002. Several taxa, notably *Lunaria annua* L., *Celtis occidentalis* L., *Ulmus americana* L., and *Pyrus calleriana* Decne. have invaded the old High Line remnant, most likely from plantings at High Line Park. The preserved remnant also contains mosses and vascular plant species ob-

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FIG. 1. Flora on the old High Line, July 2019.

served by Stalter (2004) when he conducted his original flora study of the High Line in 2002.

The abandoned High Line provided habitat for primary succession taxa, including lichens and mosses. Almost as an afterthought, Stalter (2004) collected lichens and mosses, early colonizers at the site. Lichens and mosses were sent to Bill Buck at The New York Botanical Garden for identification. In the present study during the growing season of 2019, mosses were collected in April and May and sent to Buck for identification. The lichens on the old three-block High Line remnant were collected by R. S. in May, and with The New York Botanical Garden lichenologist J. L. in June, who identified all lichens collected in the present study. The old High Line remnant located adjacent to High Line Park lies between 30th and 33rd Streets and 12th Avenue.

High Line Park, the site of the old abandoned High Line, was created in 2009. The park contains more than 110,000 plants within 500 vascular plant species (Eric Rodriguez, personal communication). Taxa at the park were chosen for their hardiness, sustainability, and ever-changing textures and colors for all seasons. Most of the park's planted taxa can only exist on the multiplicity of special habitats that have been created at the park. Among the selected taxa are *Typha latifolia* L., *Symplocarpus foetidus* (L.) Salisb. ex W.P.C. Barton, *Ilex glabra* (L.) A. Gray, and *Magnolia macrophylla* Michx. that thrive in the artificial habitats. Tallgrass prairie species *Andropogon gerardi* Vitman, *Panicum virgatum* L., and *Sorghastrum nutans* (L.) Nash are conspicuous members of High Line Park's created flora. Diligent, continuous weeding by park horticulturists have eliminated most invasive taxa. However, invasive *Poa annua* L., *Chenopodium album* L., and *Trifolium repens* L. were collected by Stalter at High Line Park in 2019.

The primary objective of this study was to compare the lichens, bryophytes, and vascular plants present at the High Line in 2002 with those present in 2019.

CLIMATE. Climatological data for Central Park, New York City, the closest weather station to the High Line, has been continuously recorded since 1869. Mean January temperature at Central Park is 0.9 °C. July is the warmest month with a mean temperature of 22.6 °C (Garwood 1996). Average annual rainfall of 1,155 mm is evenly distributed throughout the year. August is the wettest month with 126 mm of rain, and October is the driest month, averaging 86 mm. The growing season at Central Park averages 189 days. On clear, still nights, the temperature in New York City is appreciably warmer than the temperature in the surrounding suburbs, a function of the urban heat island effect.

Methods. COLLECTIONS. Lichens, bryophytes, and vascular plants at the High Line were collected monthly from April 2002 to October 2002 and April 2019 to October 2019. Voucher specimens of vascular plant species were prepared, and the 2002 collections were deposited at the University of South Carolina's A. C. Moore Herbarium, Columbia, SC; those collected in 2019 were deposited in the Clemson University Herbarium. Lichens and bryophytes collected in 2002 and 2019 are housed at The New York Botanical Garden. Nomenclature of the vascular flora followed Werier (2017). Lichens are classified according to Brodo et al. (2001). Bryophytes are classified according to Crum and Anderson (1981). In the annotated checklist below, lichens, bryophytes, and vascular plants are arranged first by division, then alphabetically by family, genus, and species. Each entry contains the scientific name and date of collection

Table 1. Summary of lichens, bryophytes, and vascular flora of the High Line, New York City, NY in 2002 and 2019. Those from 2019 are in parentheses. Total values are for vascular plants.

	Lichens	Bryophytes	Gymnosperms	Dicots	Monocots	Total
Families	4 (6)	4 (3)	0 (1)	41 (28)	6 (3)	47 (32)
Genera	4 (7)	6 (5)	0 (1)	100 (56)	25 (11)	125 (68)
Species	4 (10)	6 (6)	0 (1)	128 (66)	27 (12)	155 (79)
Native species	4 (10)	6 (6)	0 (1)	56 (24)	11 (6)	67 (31)
Introduced species	0 (0)	0 (0)	0 (0)	72 (42)	16 (6)	88 (48)

and native/nonnative status. Changes in plant nomenclature for those taxa classified by Gleason and Cronquist (1991) to the modern classification of Werier (2017) account for changes in numbers of species, genera, and families reported by Stalter (2004) in the 2002 study. Nonnative plants, as defined by Werier (2017), are designated by an asterisk (*).

Results and Discussion. The vascular flora collected at the High Line in 2002 consisted of 155 species in 125 genera in 47 families. The largest families in the flora were the Asteraceae (31 species), Poaceae (22 species), and Rosaceae (12 species). All together, these families, totaling 65 species, composed 42.2% of the flora. The largest genera were *Solidago* and *Potentilla*, each with four species. Eighty-eight invasive species (56.8%) composed more than half of the flora. No New York State endangered or threatened species occurred there (Young and Weldy 2004).

Four lichen species were identified in the original 2002 study, whereas 10 were found in 2019 (Table 1). One of the species, *Endocarpon petrolepideum* (Nyl.) Nyl., a common squamulose species of calcareous rocks (Lendemer 2007), appears to be a new record for New York State (Harris 2004). All of the lichens found in 2019 were saxicolous (rock-dwelling) or terricolous (soil-dwelling); none were corticolous (bark-dwelling). Unfortunately, only one lichen voucher from the original study could be located at NY, and it was thus not possible to reexamine all the original specimens. Nonetheless, none of the species found in 2002 were relocated in 2019. Three of the lichens found in 2002 were foliose macrolichens (*Cladonia* sp. reported as *C. mateocyatha* Robb. by Stalter in 2002, *Phaeophyscia insignis* (Mereschk.) Moberg., and *Xanthoria parietina* (L.) Th. Fr.), and one was a crustose microlichen (*Lecanora* sp.). Specimens of *Lecanora* collected by Stalter in 2002 and deposited at The New York Botanical Garden were not located by Lendemer in 2019, so *Lecorna* could not be identified to species. *Rinodia glauca* was not correctly identified in 2002, because this lichen does not occur in New York State, although it could represent a species of *Rinodia*. In contrast, 6 of the 10 lichens collected in 2019 were crustose microlichens and four were foliose or fruticose macrolichens. None of the species found in 2002 were relocated in 2019, and likewise it appears as though none of the species found in 2019 were present in 2002.

Some of the taxa found in 2019 could have been overlooked in the original study due to their inconspicuous appearance (e.g., *Bacidina egenula* (Nyl.) Zahlbr., *Psorotichia schaereri* (A. Massal.) Arnold, *Verrucaria* sp.). However, it is unlikely that the fruticose *Cladonia* with mature podetia found in 2019 and that were readily identifiable to species would have been overlooked in 2002. The same is true of *Caloplaca feracissima* H. Magn. and *Candelariella aurella* (Hoffm.) Zahlbr., both of which have conspicuous bright orange or yellow apothecia. It seems likely that the majority of the lichens found in 2019 became established on the High Line after the original study in 2002. All of the lichens found on the High Line, both in 2002 and 2019, are typical of early successional or urban habitats (Allen 2020). Nonetheless, their discovery in a remnant section of elevated rail line in Manhattan, nearly two decades after a search of the same area failed to locate them, is noteworthy.

Six species of bryophytes were found in 2002 and 2019, although only two, *Tortella humilis* (Hedw.) Jenn. and *Weissia controversa* Hedw., were detected in both studies. *Brachythecium campestre* (C.M.) BSG., *Bryum pseudotriquestum* (Hedw.) Brid., *Atrichum angustatum* BSG., and *Ceratodon purpureus* (Hedw.) Brid., were found exclusively in 2002, and *Hygroamblystegium varium* (Hedw.) Monkemeyer, *Leptodictyum riparium* (Hedw.) Warnst., *Bryum argenteum* Hedw.,

and *B. lisae* De Not. *var. cuspitadum* were present in 2019. The increase in the number of lichens found in 2019 (six taxa), and four new mosses are best explained by the author's primary objective in the 2002 study that focused on vascular plant species. Crustose lichens were overlooked by Stalter in the 2002 study, because mosses and lichens are usually not included in vascular plant floras. No rare mosses occurred at this site.

The vascular plant species collected in 2019 consisted of 32 families, 68 genera, and 79 species. Nonnative taxa, 48 species, compose 60.8% of the flora. The High Line remnant shared 55 taxa with the original High Line, including 45 dicots and 10 monocots. Twenty-three taxa were new to the High Line: 21 dicots and 2 monocots. The Asteraceae, 15 species, and Poaceae, 9 species, were the largest families in the flora in 2019, as they were in 2002 when they were composed of 32 and 18 taxa, respectively. No genus was represented by more than two species in 2019.

Thirty-four woody taxa were identified in 2002, 22% of the flora and 155 species. These included 18 species of trees, 10 species of shrubs, and 6 lianas. Fourteen woody taxa were identified in 2019, including nine species of trees, three species of shrubs, and two lianas (17.7% of the flora). Seventeen invasive woody taxa were identified in 2002 (50% of the total), whereas nine invasive woody taxa were identified in 2019 (53% of the total).

The most conspicuous species of the spring flora were species of *Potentilla* spp., along with the rosettes of *Eupatorium*, *Symphyotrichum*, and *Solidago*. These genera were also the most conspicuous herbaceous components of the summer and early fall flora, when the goldenrods, beginning with *S. juncea* Ait., flowered. By late September, the flowering goldenrods and asters were the prominent members of the flora. *Eupatorium hyssopifolium* L., another common member of the Asteraceae, flowered in mid-October, along with wiregrass, *Aristida dichotoma* Michx. From mid-October to mid-November the aforementioned taxa were the most common components of the fall flora.

Abundant woody species in 2002 were the nonnative *Celastrus orbiculatus* Thunb., *Rosa multiflora* Thunb., and *Ailanthus altissima* (Mill.) Swingle. *Ailanthus* reached its best development on the partially shaded portion of the rail line around 29th Street in 2002. Species associated with *Ailanthus* at 29th Street in 2002, but nowhere else, included *Quercus palustris* Münchh, *Ageratina altissima* (L.) R.M. King & H. Rob. (*Eupatorium rugosum* Houtt.), *Acer platanoides* L., and *Trichostema dichotomum* L.

Shrubs and low-growing trees grew in small clumps or individually; they were components of both the forb/grassland and *Ailanthus*-dominated thicket communities in 2002 described above. Notable woody taxa included the shrubby *Rosa multiflora* and lianas *Celastrus orbiculatus, Parthenocissus quinquefolia* (L.) Planch., and *Ampelopsis glandulosa* (Wall.) Momiy. Low-growing individual trees scattered about the High Line included *Prunus serotina* Ehrh., *Ulmus pumila* L., *Malus pumila* Mill. (*Pyrus malus* L.), and *Populus* spp.

Common woody taxa in 2019 were *Rhus copallinum* L., *R. typhina* L., *Rosa multiflora*, *Morus alba* L., *Prunus serotina* Ehrh., *Pyrus calleryana* Decne., and *Populus* spp.

The number of taxa identified in 2019 (79) was slightly more than half the taxa identified in 2002 (155). The lower number of taxa was expected, because the 2019 site, a three-block remnant of the old High Line, is approximately 10% the size of the original High Line. This small remnant is exposed to bright sun throughout the day, whereas the original High Line experienced both shade and bright sun.

The old High Line was not easily accessible. R. S.'s original entry was through an adjacent artist's loft to the roof of an adjoining building. There, a ladder and rope provided a "bridge" to the plant community on the High Line in 2002. No other person was observed on the High Line while R. S. was plant collecting during the growing season of 2002. The preserved, fenced old High Line remnant borders a three-block portion of the north side of High Line Park, where hundreds of thousands visit the park each year. These visitors are a potential source of new seeds, especially those of invasive taxa. Nearly fifty-six percent (55.8%) of the flora of the original High Line in 2002 was composed of nonnative taxa, compared to 60.8% in 2019 (Table 2). The percent invasive taxa in 2019 was similar to that reported at Liberty Island, NY (65%; Stalter and Tang 2002), and Ellis Island, NY (60.3%; Stalter and Scotto 1999). Two islands in New York Harbor that were part of the Ellis Island immigration complex, Hoffman and Swinburne, also had a high percent

Table 2. Frequencies of native *versus* nonnative plants at High Line, NY 2002; High Line, NY 2019; Hoffman and Swinburne Islands, NY (Stalter and Munir 2002); Liberty National Monument, NY (Stalter and Tang 2002); Ellis Island, NY (Stalter and Scotto 1999); and sidewalk plots, Brooklyn and Queens, NY (Stalter and Rachlin 2018).

	High Line, 2002	High Line, 2019	Hoffman and Swinburne Islands	Liberty Island	Ellis Island	Sidewalk plots
Native species	67	31	33	34	98	36
Nonnative species	88	48	55	63	149	85
% Nonnative species	55.8	60.8	63	65	60.3	70.2
Total species	155	79	88	97	247	121

of invasive taxa, 63% (Stalter and Munir 2002). That visitation contributed to invasive taxa was predictable, because Lamont and Stalter (1991) found 47% of the flora at the accessed eastern portion of Orient Beach State Park, NY, was populated by nonnative taxa, whereas the rarely visited western portion of the park's flora was 19% alien. When Orient Park was sampled by Latham (1934), few people visited the site; 19 alien taxa were observed by him (8% of the 227 species he identified).

The percent of nonnative taxa on the old High Line in 2019 was almost as high as the percent of invasive taxa found on sidewalk plots in Queens and Brooklyn reported in a 5-yr study by Stalter and Rachlin (2018), 70.2%. Stalter and Rachlin (2018) found 121 taxa on 100 sidewalk plots, but 31, 25.5% of the total, were only reported once in 5 yr. They concluded that many vascular plant species colonized the sidewalk plots briefly and disappeared. Predictably, sites that are visited by thousands of people generally have significantly more alien taxa than those with few visitors (Table 2). We predict that thousands of visitors to High Line Park can bring seeds of invasive taxa to the preserved old High Line and that the flora there will experience constant change.

The preserved old High Line serves as a refuge for lichens, mosses, and vascular plant species occupying a unique habitat within New York City. Data in the present study and by Stalter in 2002 will enable future lichenologists, bryophyte specialists, and vascular plant enthusiasts to conduct comparative studies at the old preserved High Line in the future.

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Annotated Checklist of Species
(* nonnative)

1. LICHENS

Candelariaceae

Candelariella aurella (Hoffm.) Zahlbr. 2019

Cladoniacae

Cladonia chlorophaea (Sommerf.) Spreng. 2019

Cladonia polycarpoides G. Merr. 2019

Cladonia peziziformis (With.) J.R. Laundon. 2019

Cladonia mateocyatha Robb. 2002

Lecanoraceae

Lecanora sp. 2002

Myriolecis dispersa (Pers.) Sliwa, Zhao Xin & Lumbsch. 2019

Lichinaceace

Psorotichia schaereri (A. Massal.) Arnold 2019

Physciaceae

Phaeophyscia insignis (Mereschk.) Moberg. 2002

Rinodina sp. 2002

Ramalinaceae

Bacidina egenula (Nyl.) Zahlbr. 2019

Teloschistaceae

Caloplaca feracissima H. Magn. 2019

Xanthoria parietina (L.) Th. Fr. 2002

Verrucariaceae

Endocarpon petrolepideum (Nyl.) Nyl. 2019

Verrucaria sp. 2019

2. MOSSES

Amblystegiaceae

Hygroamblystegium varium (Hedw.) Monkemeyer 2019

Leptodictyum riparium (Hedw.) Warnst. 2019

Brachytheciaceae

Brachythecium campestre (C.M.) BSG. 2002

Bryaceae

Bryum argenteum Hedw. 2019

Bryum lisae De Not. var. *cusipdatum* 2019

Bryum pseudotriquetrum (Hedw.) Brid. 2002

Ditrichaceae

Atrichum angustatum BSG. 2002

Ceratodon purpureus (Hedw.) Brid. 2002

Pottiaceae

Tortella humilis (Hedw.) Jenn. 2002, 2019

Weissia controversa Hedw. 2002, 2019

3. PINOPHYTA

Cupressaceae

Juniperus virginiana L. invading from planted material at High Line Park. 2019

4. MAGNOLIOPHYTA

Dicots

Aceraceae

**Acer platanoides* L. 2002, 2019

Adoxaceae

Sambucus nigra L. ssp. *canadensis* (L.) Bolli 2002

Amaranthaceae

**Amaranthus albus* L. 2002

Amaranthus hybridus L. 2002

**Amaranthus viridus* L. 2002

**Chenopodium album* L. 2002

Anacardiaceae

Rhus copallinum L. 2002, 2019

Rhus typhina L. 2002, 2019

Toxicodendron radicans (L.) Kuntze (*Rhus radicans* L.) 2002

Apiaceae

**Daucus carota* L. 2002, 2019

Apocynaceae

Apocynum cannabinum L. 2002, 2019

Asclepias syriaca L. 2002, 2019

Araliaceae

**Hedera helix* L. 2002

Asteraceae

Achillea millefolium L. 2002

Ageratina altissima (L.) King and R.M.H. Robinson (*Eupatorium rugosum* Houtt.) 2002

Ambrosia artemisiifolia L. 2002, 2019

**Arctium minus* (Hill) Bernh. 2002

**Artemisia annua* L. 2002

**Artemisia vulgaris* L. 2002, 2019

Bidens bipinnata L. 2002

**Centaurea stoebe* L. ssp. *micranthos* (S.G. Gmel. ex Gugler) Hayek (*Centaurea maculosa* Lam.) 2002, 2019

**Cichorium intybus* L. 2002

**Coreopsis lanceolata* L. 2002

Erechtites hieraciifolius (L.) Raf. ex DC. var. *hieracifolius* 2002, 2019

Erigeron philadelphicus L. 2002

Erigeron strigosus Muhl. ex Willd. 2019

Eupatorium hyssopifolium L. 2002, 2019

Eupatorium rotundifolium L. 2019

Eurybia divaricata (L.) G.L Newsom (*Aster divaricatus* L.) 2002

**Galinsoga quadriradiata* Ruiz and Pavon (*Galinsoga ciliata* (Raf.) S.F. Blake) 2002

**Hieracium lachenalii* Suter (*Hieracium vulgatum* Fr.) 2002

**Hieracium sabaudum* L. 2019

Lactuca canadensis L. 2002

**Lactuca serriola* L. 2002, 2019
**Leucanthemum vulgare* Lam. (*Chrysanthemum leucanthemum* L.) 2002
**Pilosella caespitosa* (Dumort.) P.D. Sell and C. West (*Hieracium caespitosum* Dumort., *Hieracium pratense* Tausch) 2002
**Pilosella caespitosa* × *P. lactucella* = *Pilosella floribunda* (Wimm. and Grab.) Fr., (*Hieracium* × *floribundum* Wimm. and Grab.) 2002
Rudbeckia hirta L. 2002
**Senecio vulgaris* L. 2002, 2019
Solidago canadensis L. 2002
Solidago juncea Aiton 2002, 2019
Solidago rugosa Mill. 2002
Solidago sempervirens L. 2002
**Sonchus asper* (L.) Hill 2019
**Sonchus oleraceus* L. 2002, 2019
Symphotrichum ericoides (L.) G.L. Newsom (*Aster ericoides* L.) 2002
Symphotrichum novi belgii (L.) G.L. Newsom (*Aster novi-belgii* L.) 2002
Symphotrichum pilosum (Willd.) G.L. Newsom (*Aster pilosus* Willd.) 2002
**Taraxacum officinale* F.H. Wigg. 2002, 2019
**Tragopogon dubius* Scop. 2019

Berberidaceae
**Berberis thunbergii* DC. 2002

Brassicaceae
Arabidopsis lyrata (L.) O'Kane and Al-Shehbaz (*Arabis lyrata* L.) 2002
**Arabidopsis thaliana* (L.) Heynh. 2002, 2019
**Capsella bursa-pastoris* (L.) Medik. 2002
**Draba verna* L. 2019
Lepidium virginicum L. 2002
**Lunaria annua* L. 2019

Campanulaceae
Triodanus perfoliata (L.) Nieuwl. 2002

Cannabaceae
Celtis occidentalis L. 2002, 2019

Caprifoliaceae
**Lonicera japonica* Thunb. 2002
**Lonicera morrowii* A. Gray 2019
Lonicera sempervirens L. 2019
**Lonicera tartarica* L. 2002

Caryophyllaceae
**Arenaria serpyllifolia* L. 2019
**Cerastium arvense* L. 2002
**Dianthus armeria* L. 2002, 2019
Sagina decumbens (Elliott) Torr. and A. Gray. 2019
**Saponaria officinalis* L. 2002
Silene antirrhina L. 2019
Silene latifolia* Poir. (Lychnis alba* Mill.) 2002
**Stellaria graminea* L. 2002
**Stellaria media* (L.) Vill. 2002

Celastraceae
**Celastrus oribiculatus* Thunb. 2002, 2019

Convolvulaceae
Calystegia sepium (L.) R. Br. 2002, 2019
**Convolvulus arvensis* L. 2002
**Ipomoea hederacea* Jacq. 2002

Crassulaceae
**Sedum acre* L. 2002, 2019

Euphorbiaceae
Acalypha rhomboidea Raf. 2002, 2019
**Euphorbia davidii* Subils (*Euphorbia dentata* Michx.) 2002
Euphorbia maculata L. (*E. supina* Raf.; *Chamaesyce maculata* (L.) Small.) 2002

Fabaceae
**Gleditsia triacanthos* L. 2002, 2019
Lespedeza capitata Michx. 2002, 2019
**Medicago lupulina* L. 2002
**Melilotus albus* Medik. 2002, 2019
**Melilotus officinalis* (L.) Lam. 2019
**Robinia pseudoacacia* L. 2002
**Trifolium arvense* L. 2002
**Trifolium campestre* Schreb. 2019
**Trifolium hybridum* L. 2002
**Trifolium repens* L. spp. *sativa* 2002, 2019
**Vicia sativa* L. 2002

Fagaceae
Quercus palustris Münchh. (one individual found in the *Ailanthus* grove) 2002

Lamiaceae
**Lamium amplexicaule* L. var. *amplexicaule* 2002, 2019
**Mentha arvensis* L. 2002
Trichostema dichotomum L. 2002

Malvaceae
**Abutilon theophrasti* Medik. 2019

Molluginaceae
**Mollugo verticillata* L. 2002

Moraceae
**Morus alba* L. 2002, 2019

Oleaceae
Fraxinus americana L. (one tree near 30th St.) 2002
**Ligustrum vulgare* L. 2002

Onagraceae
Epilobium coloratum Biehler 2002, 2019
Oenothera biennis L. 2002, 2019

Oxalidaceae

Oxalis stricta L. 2002
Phytolacaceae
Phytolacca americana L. 2002
Plantaginaceae
**Linaria vulgaris* Mill. 2002
Nuttallanthus canadensis (L.) D.A. Sutton (*Linaria canadensis* (L.) Dum-Cours.) 2002
**Plantago lanceolata* L. 2002, 2019
Plantago rugelii Decne. 2002, 2019
**Veronica arvensis* L. 2002, 2019
**Veronica peregrina* L. 2019
**Veronica persica* Poir. 2002
Polygonaceae
**Fallopia convolvulus* (L.) A Löve (*Polygonum convolvulus* L.) 2019
**Persicaria extemiorientalis* (Vorsch.) Tzvelev 2019
**Persicaria maculosa* Gray (*Polygonum persicaria* L.) 2019
**Polygonum aviculare* L. 2002
**Rumex acetosella* L. 2002
**Rumex crispus* L. spp. *crispus* 2002, 2019
Portulacaceae
**Portulaca oleracea* L. 2002, 2019
Rosaceae
Crataegus uniflora Münchh. 2002
**Malus pumila* Mill. (*Pyrus malus* L.) 2002
**Potentilla argentea* L. 2002, 2019
Potentilla canadensis L. 2002
Potentilla norvegica L. 2002
**Potentilla recta* L. 2002, 2019
**Prunus avium* (L.) L. 2002
Prunus serotina Ehrh. 2002, 2019
**Pyrus calleryana* Decne. 2002, 2019
**Rosa multiflora* Thunb. 2019
Rubus allegheniensis Porter 2002
Rubus flagellaris Willd. 2002
Sorbus americana Marshall 2002
Rubiaceae
**Galium album* Mill. (*Galium mollugo* L.) 2002
Galium aparine L. 2002, 2019
Salicaceae
Populus deltoides W. Bartram ex Marshall 2002, 2019
Populus tremuloides Michx. 2002
Salix discolor Muhl. 2002
Sapindaceae
**Acer platanoides* L. 2002, 2019
Scrophulariaceae
**Verbascum thapsus* L. 2002, 2019
Simaroubaceae
**Ailanthus altissima* (Mill.) Swingle 2002, 2019
Solanaceae
**Solanum dulcamara* L. 2002
**Solanum nigrum* L. spp. *nigrum* 2002
Ulmaceae
**Ulmus pumila* L. 2002
Verbenaceae
**Verbena bracteata* Lag. and Rodr. 2002
Verbena urticifolia L. 2002
Violaceae
Viola sororia Willd. 2002
Vitaceae
**Ampelopsis glandulosa* (Wall.) Momiy. (*Ampelopsis brevipedunculata* (Maxim.) Trautv.) 2002
Parthenocissus quinquefolia (L.) Planch. 2002, 2019
Vitis aestivalis Michx. 2002
Liliopsida
Monocots
Amaryllidaceae
**Allium vineale* L. 2002
Asphodelaceae
**Hemerocallis fulva* (L.) L. 2002
Cyperaceae
Cyperus strigosus L. 2002
Iridaceae
Sisyrinchium angustifolium Mill. 2002, 2019
Juncaceae
Juncus tenuis Willd. 2002, 2019
Poaceae
**Anthoxanthum odoratum* L. 2002
Aristida dichotoma Michx. 2002, 2019
**Bromus racemosus* L. 2002
**Bromus sterilis* L. 2019
**Bromus tectorum* L. 2002
Calamagrostis cinnoides (Muhl.) W.P.C. Barton (*Calamagrostis coarctata* Eaton) 2002
**Cynodon dactylon* (L.) Pers. 2002
**Dactylis glomerata* L. 2002, 2019
**Digitaria sanguinalis* (L.) Scop. 2002, 2019
**Echinochloa crusgalli* (L.) P. Beauv. 2002
**Eleusine indica* (L.) Gaertn. 2002
**Elymus repens* (L.) Gould 2019
Eragrostis capillaris (L.) Nees. 2002, 2019
Eragrostis spectabilis (Pursh) Steud. 2002, 2019
**Festuca trachyphylla* (Hack.) Krajina (*Festuca ovina* L.) 2002
**Lolium perenne* L. 2002
Panicum dichotomiflorum Michx. 2002
**Phleum pratense* L. 2002

**Phragmites australis* (Cav.) Trin. ex Steud. (*Phragmites communus* Trin.) 2002, 2019
**Poa annua* L. 2002, 2019
Schizachyrnum scoparium (Michx.) Nash (*Andropogan scoparius* Michx.) 2002, 2019
**Setaria pumila* (Poir.) Roem. and Schult. (*Setaria glauca* (L.) P. Beauv.) 2002
Sporobolus clandestinus (Biehler) Hitchc. 2002
Tridens flavus (L.) Hitchc. (*Triodia flava* (L.) Smyth) 2002