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Gordon C. Tucker

Eastern Illinois University, gctucker@eiu.edu

Richard S. Mitchell

Biological Survey, New York State Museum

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Flora of an unusually diverse virgin and old-growth forest area in the southern Adirondacks of New York¹

Richard S. Mitchell and Gordon C. Tucker

Biological Survey, New York State Museum, Albany, NY 12230

ABSTRACT

MITCHELL R. S. AND G. C. TUCKER (Biological Survey, N. Y. State Museum, 3132 C.E.C., Albany, NY 12230). Flora of an unusually diverse virgin and old-growth forest area in the southern Adirondacks of New York. *Bull. Torrey Bot. Club* 121: 76–83. 1994.—A lowland, virgin white pine-hemlock stand and associated old-growth habitats were studied at Pack Forest Preserve, Warren County, NY. An area of 48.1 acres, interrupted only by nature trails, has white pines up to 58 inches in diameter, and supports 355 native plant species—an unexpectedly high number, considering its location in the climatically severe Adirondack Mountains. This minimally disturbed old-growth forest and its associated wetlands are not only diverse, but essentially weed-free, making them ideal for future ecological research, botanical teaching and monitoring activities.

Key words: Adirondacks, floristics, biodiversity, virgin forest, old-growth forest, Warren County, New York.

During the summer of 1991 the Greater Adirondack Resource Conservation and Development Council (R. C. & D.) contracted the State Botanist's Office of the New York State Museum to carry out a floristic survey of a tract of land within the Charles Lathrop Pack Demonstration Forest, also known as the Warren Campus of the SUNY, Syracuse, College of Environmental Science and Forestry. Located just north of the intersection of Rts. 9 and 28, near Warrensburg, New York (latitude 43°32'30"; longitude 74°47'35"; elevation 760 ± 15 ft), the facility serves both educational and recreational functions for college students and the general public, and special emphasis has been placed on summer programs in the past.

The primary reason for a botanical survey was to determine whether renovation of a nature trail system originally built in 1978 would negatively impact the vegetation of the environmentally

sensitive area that it traverses. The 48.1 acre tract includes historically undisturbed, old-growth, white pine-hemlock forest on lowland rolling terrain, a northern hardwood forest on a floodplain along a stream, dry eskers and natural clearings with additional wet meadow, wooded pond and fen vegetation. In addition to the designated study area (compartments 108, 109, 111–116, 152 of the Pack Demonstration Forest), the botanical team explored another 12 acres of corridors of the proposed nature trails leading to the Pack Forest Lodge, scheduled to be revitalized as a visitor center (compartments 97, 106). These and surrounding lands have long been disturbed and subject to a variety of land-use and timber-management techniques, which included the growing of conifer plantations within close proximity to the old-growth forest.

Botanical Survey Procedures. From late June through early October, 1991, a botanical team of two scientists from the New York State Museum visited Pack Forest at least once every two weeks to search the study area and develop a complete list of the flora, as well as to discover any rare plant species that might occur there. The botany team consisted of Richard Mitchell and Gordon Tucker, except for one visit, in which Gordon Tucker was replaced by Charles Sheviak, a specialist in native orchids. Voucher specimens were deposited in the New York State Museum herbarium (NYS). Historical student and staff-collected plant specimens housed at R.

¹ The authors and other participating members of the Biological Survey of the New York State Museum wish to thank the Greater Adirondack Resource Conservation and Development Council, the Saratoga Warren BOCES and the Steering Committee for the Development of Pack Demonstration Forest for this opportunity to study a very interesting natural area. Special thanks also go to Dr. Richard Schwab, Director of Forest Properties. We enjoyed working with Jim Baker, Bruce Breitmeyer and two helpful summer interns, with whom we frequently hiked: John Pope and Rebecca Rajswasser.

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C. & D. headquarters were studied and annotated by the authors, but these added no species to the current list. Limited botanical exploration of the demonstration forest outside the designated study area yielded few species new to the list, except in the very specialized ice-meadow habitat along the shores of the Hudson River. Following the 1991 study, we visited the Pack Forest nature trail area twice in 1992, and Gordon Tucker and Andrew Greller visited in 1993, adding more species to the list.

Results. The botanical survey of the Pack Forest old-growth stand and adjacent areas resulted in a list of 433 vascular plant species and three hybrids, of which 78 are not native (List 2). A native flora of 355 species (List 1) is particularly rich for such a small area in a relatively severe climate such as that of this north-temperate forest region in the southern Adirondacks. Other accounts of Adirondack old-growth forests, summarized in detail by Leopold et. al. (1988), describe comparatively species-poor communities by comparison. Although data on numbers of species per acre are not available for the large, old-growth forests of the Adirondacks, even the richest tracts of equivalent size rarely support more than half the number of species found in our study area (Donald Leopold, pers. comm.).

At Pack Forest, savannah-like openings beneath the larger trees (white pines up to 45–58 inches d.b.h.), and a variety of undisturbed habitats, such as swampforest, open fen, streamside clearings and eskers, offer natural transition zones in which a variety of plant species flourish today as they must have done in pre-Columbian times. In addition to the well-known old pines and hemlocks, a significant number of common native shrubs and herbs occur in the natural area, some abundantly, but mostly as individuals or in scattered patches rather than dense stands. The lack of weeds in the critical habitat area is notable. Non-native species are almost totally restricted to the periphery, along roadways and power lines outside the old-growth forest. The three rare exceptions to this are: 1) a small colony of *Polygonum hydropiper* L. found directly in the path of a nature trail within the old-growth forest; 2) half a dozen plants of *Veronica officinalis* L. where a stream intersects the main path area; and 3) several plants of *Solanum dulcamara* L. a short distance upstream. A common practice in managing the old-growth forest area has been to section fallen timbers with a chain saw to maintain clear

paths for nature trails. Considering the large number of natural tree-falls, path-clearing can hardly be avoided if access to the area is to be granted to visitors. Although such activities might be expected to disturb the vegetation, they haven't produced a visible impact on the natural ground cover, and no weeds were found in association with sectioned trees.

RARE PLANTS. Two state-listed rarities were found during the botanical survey. Purple milkweed (*Asclepias purpurascens* L.), is a native plant that characteristically grows in disturbed habitats. It grows outside the primary study area near a proposed nature path leading to the Pack Forest Lodge. The New York Natural Heritage Program lists this species as Threatened in New York State (Young 1992), and it is protected under law. Rarity status ranks for the species are G5G4 (apparently globally secure but rare over a portion of its range), and S2 (6-20 occurrences of the species known in New York State). *Carex cryptolepis* Mackz., the northeastern sedge, is listed G4G5 and S2S3 by the Natural Heritage Program, but its rarity status under law has yet to be determined. It occurs in a marshy area south of the old-growth forest area, where there is no danger of impact from path construction.

Other plant rarities are less significant, but the following are worthy of mention: two species of rattlesnake plantain (*Goodyera*) were found in the old-growth forest, and, although these are not listed as endangered or threatened in New York, they are relatively scarce orchids deserving protection. *Goodyera repens* (L.) R. Br. has been recorded historically at a number of locations in the New York State, but it seems to be on the decline. Dr. Charles Sheviak, who is preparing an orchid flora of New York State, noted that ours was the first population of the species he had seen in his 13 years of field work in the state. Another interesting orchid, found in the path of one of the proposed nature trails (now rerouted), is the tiny green adder's-mouth (*Malaxis unifolia* Michx.).

RECOMMENDATION. This preliminary study was carried out by taxonomists, and does not have an ecological motive; however, the authors feel that it lays groundwork for future work by those interested in species-diversity, soils and the invasive capabilities of weedy species into an old-growth area. Most virgin and old-growth stands in the northeastern United States have been reduced to relictual strongholds for a few tree species and hardy herbs. This area, by con-

trast, seems to be a significant remnant of an intact pre-Columbian forest of our region, and we highly recommend it for careful study.

Floristic Lists

In the following lists, plant family names and those of higher categories follow Gleason and Cronquist (1991). Botanical nomenclature follows Mitchell (1986), except where recent taxonomic studies have prompted changes. Families, genera and species are listed alphabetically within major subgroups for convenience. Each species is followed by abbreviations representing abundance and typical habitat. The symbols for abundance are: A (abundant); L (locally abundant); F (frequent); I (infrequent); R (rare). Key habitats in which the species occur are abbreviated as follows: Esk (eskers); Upl (upland forest); Swp (swampforest); Str (stream bed); Pnd (wooded pond); Fen (fen); Clr (natural forest clearings, roadsides and fields). The collection numbers cited are those of Tucker and Mitchell unless preceded by an S- (=Sheviak and Mitchell). Where voucher numbers are missing, the common taxa are often represented by student collections in the local herbarium.

List 1. Native flora of the old-growth forest and adjacent areas

PTERIDOPHYTA

Adiantaceae

Adiantum pedatum L. L, Upl, 6371

Aspleniaceae

Athyrium asplenoides (Michx.) Desv. L, Upl, 7443, S4135

A. thelypteroides (Michx.) Desv. I, Upl, Str

Dryopteris clintoniana (D. Eaton ex Gray) Dowell I, Upl, 6268

D. cristata (L.) Gray I, Upl

D. intermedia (Muhl. ex Willd.) Gray F, Upl, 6374

D. marginalis (L.) Gray I, Esk, Upl, S-4126

Gymnocarpium dryopteris (L.) Newm. I, Str, 6262

Onoclea sensibilis L. F, Str, Swp

Phegopteris connectilis (Michx.) Watt I, Str

P. hexagonoptera (Michx.) Fée I, Upl

Polystichum acrostichoides (Michx.) Schott F, Upl, 6331

Thelypteris noveboracensis (L.) Nieuwl. F, Upl, 6830

T. palustris Schott F, Swp, Str, S-4136

Cyatheaceae

Dennstaedtia punctilobula (Michx.) Moore I, Fld, Clr, S-4136

Pteridium aquilinum (L.) Kuhn I, Fld, Clr

Equisetaceae

Equisetum arvense L. I, Str, Clr

E. fluviatile L. I, Str

E. hyemale L. var. *affine* (Engelm.) A. Eaton I, Clr, Str (Pack)

E. sylvaticum L. I, Swp, Upl (Pack)

Lycopodiaceae

Lycopodium annotinum L. F, Upl, S-4131

L. clavatum L. L, Fld, 6850, S-4152

L. dendroideum Michx. F, Upl, Esk, 6257, S-4130

L. lucidulum Michx. A, Upl, Swp, 6234

L. tristachyum Pursh L, Fld, Clr, 6852

Osmundaceae

Osmunda cinnamomea L. F, Str, Swp

O. claytoniana L. I, Str

O. regalis L. var. *spectabilis* (Willd.) Gray I, Str, Swp, 6240

Oploglossaceae

Botrychium dissectum Spreng. R, Esk, Upl, S-4153

Polypodiaceae

Polypodium virginianum L. I, Esk

PINOPHYTA

Cupressaceae

Juniperus communis L. L, Upl, Esk, Clr

Thuja occidentalis L. I, Swp

Pinaceae

Abies balsamea (L.) Mill. F, Upl, Swp, S-4125

Picea rubens Sarg. F, Upl, Swp

Pinus strobus L. A, Esk, Upl, Swp

Tsuga canadensis (L.) Carr. A, Esk, Upl, Swp, 6427

Taxaceae

Taxus canadensis Marsh. A, Esk (north slopes), Upl, Swp, 6369

MAGNOLIOPHYTA-MAGNOLIOPSIDA

Aceraceae

Acer pensylvanicum L. A, Upl, Swp

A. rubrum L. F, Upl, Swp, Str

A. saccharum Marsh. A, Upl

A. spicatum Lam. F, Upl

Anacardiaceae

Rhus typhina L. I, Upl, Clr

Toxicodendron radicans (L.) Kuntze F, Upl, Swp, Str

Apiaceae

Cicuta bulbifera L. F, Swp, 6452, 6848

Hydrocotyle americana L. I, Str, Swp, 6225

Osmorhiza claytonii (Michx.) Clarke F, Upl, Str

Sium suave Walt. I, Swp, Str, 6455

Apocynaceae

Apocynum androsaemifolium L. I, Upl, Fld

A. androsaemifolium × *cannabinum* = *A.* × *medium* Greene L, Upl, Fld, 6338

A. cannabinum L. I, Upl, Fld

Aquifoliaceae

Ilex verticillata (L.) Gray I, Fen, Swp, 6834, S-4137

Nemopanthus mucronatus (L.) Loes. ex Koehne I, Upl, Swp, S-4124

Araliaceae

Aralia hispida Vent. R, Swp

A. nudicaulis L. I, Upl

A. racemosa L. R, Upl, 6373

Panax quinquefolius L. L, Upl

Asclepiadaceae

Asclepias incarnata L. var. *pulchra* (Willd.) Pers. F, Swp, 6425

A. purpurascens L. L, Fld, 6854
A. syriaca L. L, Fld, 6337

Asteraceae

Anaphalis margaritacea (L.) Benth. & Hook. f. ex Clarke L, Clr, 6421
Antennaria neglecta Greene R, Upl
Aster acuminatus Michx. I, Upl, 6720, S-4156
A. divaricatus L. I, Upl, 9394
A. lateriflorus (L.) Britt. I, Swp, 6750
A. macrophyllus L. F, Upl
A. praealtus Poir. I, Upl
A. puniceus L. I, Swp, 6809, 6849, S-4141
A. umbellatus Mill. F, Swp, Fen, 6359, S-4119
A. undulatus L. I, Upl, Clr, 6799
Bidens cernua L. L, Swp, 9392
B. tripartita L. A, Swp, 6818, 9391
Cirsium discolor (Muhl. ex Willd.) Spreng. I, Clr, 6837
Conyza canadensis (L.) Cronq. I, Clr, 6251
Erigeron pulchellus Michx. R, Upl
E. strigosus Muhl. ex Willd. I, Clr, 9402
Eupatorium dubium Willd. I, Str, 6433
E. maculatum L. I, Swp
E. perfoliatum L. F, Swp, Str
E. rugosum Houtt. L, Str, Upl
Euthamia graminifolia (L.) Nutt. ex Cass. F, Clr, Str, Swp
E. tenuifolia (Pursh) Nutt. I, Swp, 6429
Hieracium gronovii L. I, Upl, Clr, 6816
H. scabrum Michx. I, Upl, Clr
Lactuca biennis (Moench) Fern. I, Str, 9377
Prenanthes alba L. I, Upl, Clr, S-4149
P. trifoliolata (Cass.) Fern. I, Upl
Rudbeckia hirta L. I, Clr, 6248
Solidago bicolor L. I, Upl, Clr, 6800, S-4109
S. caesia L. I, Clr, Upl, 6798
S. canadensis L. I, Clr, 6440, 6797
S. juncea Ait. I, Clr, 6343 (also Pack)
S. rugosa Mill. L, Clr, 6855

Balsaminaceae

Impatiens capensis Meerb. F, Str, Swp (Pack)

Berberidaceae

Caulophyllum thalictroides (L.) Michx. L, Str, Upl, 6998, 7031

Betulaceae

Alnus incana (L.) Moench ssp. *rugosa* (DuRoi) Clausen F, Swp, Str, 6835
Betula alleghaniensis Britt. A, Upl, Str, Swp, 6815
B. lenta L. I, Upl
B. papyrifera Marsh. F, Upl
Corylus cornuta Marsh. I, Upl, Clr, Swp, 6233
Ostrya virginiana (Mill.) Koch R, Upl

Brassicaceae

Cardamine diphylla (Michx.) Wood F, Upl, Str
C. pensylvanica Muhl. ex Willd. F, Str, Swp, 7010

Boraginaceae

Myosotis laxa Lehm. I, Swp, Str, 6228

Cabombaceae

Brasenia schreberi Gmel. L, Pnd

Callitrichaceae

Callitriche verna L. F, Str, 6462

Campanulaceae

Campanula rotundifolia L. R, Clr
Lobelia cardinalis L. F, Str, Swp, 6431
Lobelia inflata L. F, Clr, Str, 6365 (also Pack)

Caprifoliaceae

Diervilla lonicera Mill. I, Upl, Clr, 6363
Linnaea borealis L. ssp. *americana* (Forbes) Hultén, F, Upl, S-4148
Lonicera canadensis Bartr. F, Upl, Swp
Sambucus canadensis L. I, Swp, Str
S. racemosa L. ssp. *pubens* (Michx.) House F, Upl, 6999, S-4133
Viburnum acerifolium L. I, Upl, 6458
V. cassinoides L. F, Upl, Swp, 6450, 6843
V. lantanoides Michx. L, Upl, Swp, 7013, S-4132
V. rafinesquianum Schultes I, Upl, Clr, S-4121
V. recognitum Fern. F, Swp, 6844, S-4116
V. trilobum Marsh. I, Swp

Clusiaceae

Hypericum mutilum L. I, Str, 6445, 9378
Triadenum virginicum (L.) Raf. F, Swp, Pnd

Cornaceae

Cornus alternifolia L. f. I, Upl, Esk, 6472B
C. amomum Mill. F, Swp, 6253, 6442
C. canadensis L. A, Upl, Swp, 6211
C. foemina Mill. ssp. *racemosa* (Lam.) J. Wilson I, Clr
C. sericea L. F, Swp

Ericaceae

Chamaedaphne calyculata (L.) Moench I, Fen, Swp, 6840
Epigaea repens L. I, Upl, Esk, 6366
Gaultheria hispidula (L.) Muhl. ex Bigel. F, Upl, Swp
G. procumbens L. F, Upl, Esk, 6418
Vaccinium angustifolium Ait. F, Upl, Esk, Clr

Fabaceae

Amphicarpaea bracteata (L.) Rickett & Stafleu F, Swp, Clr, Str

Fagaceae

Fagus grandifolia Ehrh. A, Upl, Swp
Quercus rubra L. var. *borealis* (Michx. f.) Farw. F, Upl

Gentianaceae

Gentiana linearis Froel. L, Swp, S-4123

Grossulariaceae

Ribes rotundifolium Michx. R, Str, 7447

Hamamelidaceae

Hamamelis virginiana L. I, Upl, Esk

Juglandaceae

Juglans cinerea L. R, Swp, 9375

Lamiaceae

Lycopus americanus Muhl. ex Bart. F, Swp, 9393
Mentha canadensis L. F, Swp, Str, 6424, 6836
Scutellaria galericulata L. I, Swp, 6252, 7433
S. lateriflora L. F, Swp
Trichostema dichotomum L. L, Clr, 9404

Lentibulariaceae

Utricularia intermedia Hayne I, Fen, Pnd, 6368
U. vulgaris L. L, Str, Pnd, 6467, 6824

Myricaceae

Myrica gale L. F, Swp, Fen, Pnd

Nymphaeaceae

Nymphaea odorata Dryand. ex Ait. L, Str, Pnd, 6470, 7470

Oleaceae

Fraxinus americana L. F, Upl, Swp
F. nigra Marsh. F, Swp, Str

Onagraceae

Circaea alpina L. I, Upl, Swp, 6231
C. lutetiana L. ssp. *canadensis* (L.) Aschers. & Magnus F, Upl, Str
Epilobium angustifolium L. L, Clr, Upl, 6355
E. coloratum Biehl. F, Swp, 6426
E. leptophyllum Raf. I, Swp
Ludwigia palustris (L.) Ell. I, Str, Pnd
Oenothera biennis L. L, Clr, Fld

Oxalidaceae

Oxalis acetosella L. A, Upl, Swp, 6221
O. stricta L. I, Str, Clr, 6224

Plantaginaceae

Plantago rugelii Dcne. I, Str, Swp, Clr, 6352

Polygalaceae

Polygala paucifolia Willd. L, Upl, Esk, 7032, 7469

Polygonaceae

Polygonum amphibium L. var. *stipulaceum* Colem. L, Pnd, S-4150
P. arifolium L. L, Swp, 6464
P. sagittatum L. F, Swp, 6243

Primulaceae

Lysimachia ciliata L. I, Swp, Clr, 7465
L. quadrifolia L. I, Upl, Clr, 7446
L. quadrifolia × *terrestris* = *L. × producta* (Gray) Fern. L, Swp, 7446
L. terrestris (L.) BSP. F, Swp, 6238, 6339
Trientalis borealis Raf. A, Upl, Esk, 7020

Pyrolaceae

Chimaphila umbellata (L.) Bart. ssp. *cisatlantica* (Blake) Hultén F, Upl, 6247
Moneses uniflora (L.) Gray I, Upl
Monotropa hypopithys L. I, Upl, 6459
M. uniflora L. A, Upl, 7007
Pyrola elliptica Nutt. I, Upl, 6342

Ranunculaceae

Actaea pachypoda Ell. I, Upl
A. spicata L. ssp. *rubra* (Ait.) Hultén I, Upl
Anemone virginiana L. I, Clr
Aquilegia canadensis L. I, Upl, Esk, Clr
Caltha palustris L. L, Swp, Pnd, 7029
Clematis virginiana L. I, Swp, Clr, Str, Upl, 6847
Coptis trifolia (L.) Salisb. A, Upl, Swp, 7006
Hepatica nobilis Mill. var. *acuta* (Pursh) Steyerl. I, Upl
Ranunculus abortivus L. F, Upl, 7009
R. hispidus Michx. var. *caricetorum* (Greene) Duncan R, Str, 7008
R. recurvatus Poir. ex Lam. F, Clr, Str
Thalictrum dioicum L. I, Upl, Esk
T. pubescens Pursh F, Swp, Str, Fen, 6219

Rhamnaceae

Rhamnus alnifolia L'Hér. I, Swp, Fen, 6845

Rosaceae

Agrimonia gryposepala Wallr. I, Upl, Clr, 6357
Aronia melanocarpa (Michx.) Ell. F, Swp, 6842, S-4118

Crataegus pruinosa (Wend. f.) Koch L, Str, 9376
Dalibarda repens L. F, Swp, Upl, 6208
Fragaria virginiana Mill. F, Upl, Clr
Geum rivale L. I, Swp, 6827
Potentilla arguta Pursh I, Clr, Upl
Prunus pensylvanica L.f. I, Upl, Clr, 7003
P. virginiana L. I, Upl, 6362
P. serotina Ehrh. I, Upl, Clr
Rosa carolina L. I, Clr
R. palustris Marsh. I, Swp, 6457A, 6841
Rubus allegheniensis Port. ex Bailey F, Swp, Upl, Clr, 6471
R. idaeus L. ssp. *sachalinensis* (Levi.) Focke I, Clr, Upl, 6223
R. odoratus L. I, Clr, Upl, 6332
R. pensylvanicus Poir. ex Lam. I, Upl, 6333, S-4158
R. pubescens Raf. I, Str, Swp, 6227
Spiraea latifolia (Ait.) Borkh. F, Swp, Fen, 6340
S. tomentosa L. I, Swp, 6449

Rubiaceae

Cephalanthus occidentalis L. I, Swp
Galium aparine L. L, Str, Upl, S-4110
G. asprellum Michx. F, Upl, Swp, 6209
G. boreale L. F, Swp, 6220
G. obtusum Bigelow F, Swp, 6827
G. trifidum L. F, Swp
G. triflorum Michx. L, Upl, 6341
Hedyotis caerulea (L.) Hook. L, Clr, 7024
Mitchella repens L. F, Upl, 6232

Salicaceae

Populus grandidentata Michx. I, Upl, Clr, 7457
P. tremuloides Michx. I, Upl, Swp, Clr
Salix bebbiana Sarg. L, Swp, S-4111
S. discolor Muhl. L, Swp, 6994
S. eriocephala Michx. L, Pnd
S. lucida Muhl. F, Swp
S. sericea Marsh. I, Swp, 6995

Saxifragaceae

Chrysosplenium americanum Schwein. ex Hook. F, Str, Swp, 6256
Mitella diphylla L. I, Upl, Str
M. nuda L. I, Str, Swp, 6997
Saxifraga pensylvanica L. I, Str
Tiarella cordifolia L. I, Upl, Swp

Scrophulariaceae

Chelone glabra L. F, Str, 6438
Melampyrum lineare Desr. I, Upl, Clr, 9388
Mimulus ringens L. R, Str, 6266, 9379
Veronica scutellata L. I, Swp

Thymeliaceae

Dirca palustris L. R, Upl, 6372

Tiliaceae

Tilia americana L. F, Upl

Ulmaceae

Ulmus americana L. F, Str, 7428
U. rubra Muhl. I, Str

Urticaceae

Boehmeria cylindrica (L.) Sw. F, Swp, Str
Laportea canadensis (L.) Wedd. L, Str, Swp, S-4134
Pilea pumila (L.) Gray F, Upl, Swp, Str, 6828

Verbenaceae

Verbena hastata L. I, Str, 6435

Violaceae

- Viola adunca* Sm. I, Upl
V. affinis LeConte I, Swp, Str, 7019, 7022
V. conspersa Reichenb. I, Upl, Swp, Str, 7001
V. macloskeyi Lloyd ssp. *pallens* (Banks ex DC.) M.
 Baker F, Swp, Upl, 7014
V. sororia Willd. I, Upl

Vitaceae

- Parthenocissus quinquefolia* (L.) Planch. ex DC. L, Str,
 Upl
Vitis aestivalis Michx. L, Clr, 6822
V. riparia Michx. L, Clr, Upl

LILIOPSIDA**Alismataceae**

- Sagittaria engelmanniana* Sm. I, Str, 6430
S. latifolia Willd. F, Str, Pnd, 6436

Araceae

- Arisaema triphyllum* (L.) Schott ex Schott & Endl. ssp.
pusillum (Peck) Huttleston I, Swp, 7002
A. triphyllum ssp. *triphyllum* I, Upl, 7027

Cyperaceae

- Carex arcuata* Boott ex Hook. F, Upl, Esk, 6218
C. baileyi Britt. I, Swp, 7444
C. canescens L. I, Swp, 7437
C. communis Bailey L, Esk, 7005
C. comosa Boott I, Swp, 6263, 7445
C. cryptolepis Mackz. L, Fen, 7431
C. deweyana Schwen. L, Esk
C. disperma Dewey, F, Swp
C. flava L. L, Fen, 6255
C. gracillima Schwein. I, Upl, 7453
C. interior Bailey I, Fen, 6258, 7437
C. intumescens Rudge F, Swp, Str, 6229, S-4127
C. lacustris Willd. L, Swp
C. leptalea Wahl. F, Swp, 6242
C. lupulina Muhl. ex Willd. I, Swp, 6212, 6441
C. lurida Wahl. F, Swp, 7450
C. pedunculata Muhl. ex Willd. F, Upl, Esk, Str, 7004
C. projecta Mackz. I, Swp, 6264
C. scabrata Schwein. I, Swp, 6237
C. stipata Muhl. I, Swp, 6239
C. tonsa (Fern.) Bickn. L, Upl, Clr, 9406
C. tuckermanii Dewey I, Swp, 6456
C. vesicaria L. L, Swp, 7448
Cyperus bipartitus Torr. L, Swp, Clr, 7427
C. lupulinus (Spreng.) Marcks ssp. *macilentus* (Fern.)
 Marcks L, Upl, Clr, 6422, 6811 (Listed as *C. fil-*
iculmis Vahl. in former works)
Cladium mariscoides (Muhl.) Torr. L, Fen, 6839
Dulichium arundinaceum (L.) Britt. F, Swp, Fen, 6428
Eleocharis acicularis (L.) R. & S. L, Str, 6265
E. intermedia Schultes I, Str, 6434
E. obtusa (Willd.) Schultes F, Str, 6432
Scirpus atrocinctus Fern. I, Swp, 6249, 6446, 9390
S. atrovirens Willd. I, Swp, 6447, 6846
S. atrovirens × *cyperinus* = *S.* × *peckii* Britt. L, Swp,
 6448
S. cyperinus (L.) Kunth F, Swp, 9389
S. hattorianus Makino L, Clr, 6826
S. microcarpus Presl L, Swp, 6250
S. subterminalis Torr. L, Pnd, 6466

Iridaceae

- Iris versicolor* L. I, Swp, Str, Fen
Sisyrinchium montanum Greene L, Clr, 6419

Juncaceae

- Juncus brachycephalus* (Engelm.) Buch. L, Fen, 6838
J. effusus L. var. *pylaei* (Laharpe) Fern. & Wieg. F,
 Swp, Fen
J. tenuis Willd. I, Clr, Upl, 6853
Luzula campestris (L.) DC. var. *multiflora* (Retz.) Lej.
 I, Clr, Upl

Lemnaceae

- Lemna minor* L. L, Pnd, 6360

Liliaceae

- Clintonia borealis* (Ait.) Raf. A, Upl, Swp
Maianthemum canadense Desf. A, Upl
Medeola virginiana L. F, Upl
Polygonatum biflorum (Walt.) Ell. I, Upl, Clr, 6851
Smilacina trifolia (L.) Desf. L, Swp, S-4138
Streptopus amplexifolius (L.) DC. var. *americanus*
 Schultes I, Upl
S. roseus Michx. I, Upl, 6351
Trillium erectum L. L, Upl, 7023
T. undulatum Willd. F, Upl, Swp, 6460, 7017
Uvularia sessilifolia L. F, Upl, 6353, 7025
Veratrum viride Ait. L, Str

Orchidaceae

- Cypripedium acaule* Ait. F, Upl, Swp, Esk, 6244
Goodyera repens (L.) R. Br. L, Upl, 6461, 6752, S-4114
Goodyera tessellata Lodd. L, Upl, S-4115
Malaxis unifolia Michx. R, Upl, 6330
Platanthera psychodes (L.) Lindl. R, Swp, 6463

Poaceae

- Agrostis hyemalis* (Walt.) BSP. I, Swp, 7452
A. stolonifera L. L, Str, 9380
Andropogon gerardii Vitm. L, Clr, 6359
Brachyelytrum septentrionale (Babel) G. Tucker F, Upl,
 Swp, 6213
Bromus altissimus Pursh I, Clr, 6336
B. pubescens Muhl. ex Willd. L, Str, 6832
Calamagrostis canadensis (Michx.) Beauv. var. *scabra*
 (Presl) Hitchc. F, Swp, Str, Pnd, 6364, 6439
Cinna arundinacea L. I, Str
C. latifolia (Trev. ex Goep.) Griseb. ex Ledeb. F, Str,
 9381
Danthonia spicata (L.) Beauv. ex R. & S. F, Upl, Clr,
 6808
Elymus virginicus L. L, Str, 6833
Glyceria canadensis (Michx.) Trin. F, Str, 6246
G. grandis S. Wats. L, Str, 7432 (*G. maxima*, in part)
G. melicaria (Michx.) Hubb. F, Swp, 6264A
G. striata (Lam.) Hitchc. A, Upl, Swp, Str, 6226
Leersia oryzoides (L.) Sw. F, Str, Swp, Pnd, 6443
Muhlenbergia frondosa (Poir.) Fern. I, Clr
M. sylvatica (Torr.) Torr. ex Gray I, Upl
Oryzopsis asperifolia Michx. L, Esk, Upl, 6996, 7026
O. racemosa (Sm.) Ricker ex Hitchc. I, Upl
Panicum boreale Nash I, Swp, 6235
P. capillare L. I, Clr, 6857
P. columbianum Scribn. I, Upl, Clr, 6220, 9405
P. latifolium L. I, Clr
Phalaris arundinacea L. L, Str, 9385
Poa palustris L. I, Str, 6444, 7000
Schizachne purpurascens (Torr.) Swallen I, Esk, 7012
Schizachyrium scoparium (Michx.) Nash F, Clr, 6469
Sporobolus vaginiflorus (Torr. ex Gray) Wood I, Clr,
 6802
Torreyochloa pallida (Torr.) Church var. *fernaldii*
 (Hitchc.) Church I, Str

Pontederiaceae*Pontederia cordata* L. L, Pnd, Str, 6367**Potamogetonaceae***Potamogeton epihydrus* Raf. var. *ramosus* (Peck) House L, Str, 6457*P. natans* L. L, Pnd*P. pusillus* L. var. *tenuissimus* Mert. & Koch L, Pnd**Smilacaceae***Smilax herbacea* L. L, Str, 7446**Sparganiaceae***Sparganium americanum* Nutt. L, Str, Fen, 7446*S. androcladum* (Engelm.) Morong I, Str, 9386**Typhaceae***Typha latifolia* L. L, Fen**List 2. Weedy species found outside the old-growth forest area****MAGNOLIOPSIDA****Apiaceae***Carum carvi* L. L, Clr*Daucus carota* L. F, Clr, 6817**Asteraceae***Achillea millefolium* L. var. *nigrescens* Mey. F, Clr*Ambrosia artemisiifolia* L. I, Clr, 9403*Arctium minus* (Hill) Bernh. L, Clr*Bidens tripartita* L. L, Clr, Swp*Centaurea maculosa* Lam. I, Clr*C. nigra* L. F, Clr, 6380*Cichorium intybus* L. A, Clr*Helianthus annuus* L. R, Clr, 6420*Hieracium aurantiacum* L. I, Clr*H. caespitosum* Dumort. I, Clr*H. pilosella* L. L, Clr*Taraxacum officinale* Weber ex Wiggers F, Clr, 7018*Tussilago farfara* L. L, Clr, 7028**Boraginaceae***Echium vulgare* L. F, Clr, 6347**Brassicaceae***Barbarea vulgaris* R. Br. R, Clr, Pnd, 7021**Caprifoliaceae***Lonicera morrowii* Gray I, Clr, 7462**Caryophyllaceae***Cerastium arvense* L. F, Clr,*Dianthus armeria* L. I, Clr, 6361*Silene vulgaris* (Moench) Garcke I, Clr, 6856**Chenopodiaceae***Chenopodium album* L. L, Clr, 9396**Clusiaceae***Hypericum perforatum* L. I, Clr**Euphorbiaceae***Acalypha virginica* L. var. *rhomboidea* (Raf.) Cooper-
rider I, Clr, 9399*Euphorbia cyparissias* L. L, Clr, 7454*Chamaesyce maculata* (L.) Small I, Clr, 6345**Fabaceae***Lotus corniculata* L. A, Clr*Melilotus alba* Desr. ex Lam. F, Clr*Robinia hispida* L. I, Clr, 7455*Trifolium aureum* Pollich F, Clr, 6349*T. dubium* Sibth. L, Clr, 7468*T. campestre* Schreb. F, Clr*T. hybridum* L. F, Clr*T. repens* L. F, Clr*Vicia tetrasperma* (L.) Schreb. R, Clr, 9408**Lamiaceae***Galiopsis tetrahit* L. L, Clr, 7435*Leonurus cardiaca* L. R, Clr, 6823*Mentha arvensis* L. ssp. *arvensis**Origanum vulgare* L. I, Clr, 6472A*Prunella vulgaris* L. F, Clr*Thymus pulegioides* L. I, Clr, 7460**Lythraceae***Lythrum salicaria* L. L, Swp, Fen, Clr**Oxalidaceae***Oxalis corniculata* L. L, Clr, 9400**Plantaginaceae***Plantago lanceolata* L. F, Clr*P. major* L. F, Clr**Polygonaceae***Polygonum cuspidatum* Sieb. & Zucc. L, Clr, 7464*P. hydropiper* L. L, Clr, Upl S-4151*P. lapathifolium* L. L, Clr, 9397*Rumex acetosella* L. ssp. *angiocarpus* (Murb.) Murb.
A, Clr*R. crispus* L. L, Clr**Primulaceae***Lysimachia nummularia* L. I, Clr**Ranunculaceae***Ranunculus acris* L. I, Clr**Rosaceae***Malus pumila* Mill. I, Clr*Potentilla argentea* L. I, Clr, 6350, 6813*P. recta* L. I, Clr, 6216**Scrophulariaceae***Linaria vulgaris* Mill. F, Clr*Verbascum thapsus* L. I, Clr, 6423*Veronica arvensis* L. I, Clr*V. officinalis* L. F, Clr*V. serpyllifolia* L. F, Clr, 6236, 7449**Solanaceae***Solanum dulcamara* L. F, Clr, Upl**LILIOPSIDA****Liliaceae***Asparagus officinalis* L. L, Clr,*Convallaria majalis* L. R, Clr*Hemerocallis fulva* (L.) L. L, Clr**Orchidaceae***Epipactis helleborine* (L.) Crantz I, Clr, Upl, 6358**Poaceae***Agrostis gigantea* Roth I, Clr, 6346*Bromus inermis* Leyss. I, Clr, 6335*Digitaria ischaemum* (Schreb. ex Schweig.) Schreb. ex
Muhl. F, Clr, 6812*D. sanguinalis* (L.) Scop. F, Clr*Elytrigia repens* (L.) Nevski I, Clr, 6254 (*Agropyron*
repens L.)*Eragrostis minor* Host F, Clr, 9407

- Festuca filiformis* Pourret F, Clr, 7455 (*F. tenuifolia* Sibth.)
Phleum pratense L. I, Clr, 9395
Poa annua L. F, Clr, Str
P. compressa L. F, Clr, Upl
P. pratensis L. F, Clr, 7030
P. trivialis L. I, Clr, 6214
Setaria glauca (L.) Beauv. L, Clr, 9398

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