

Sixty years of floristic change at the Black Rock Forest, Cornwall, New York

Kerry Barringer and Steven Clemants

Brooklyn Botanic Garden, 1000 Washington Avenue, Brooklyn, NY 11225-1099

Abstract: The vascular flora of Black Rock Forest in Cornwall, New York, consists of 713 species. Six hundred species were found between 1991 and 1998. One hundred thirteen species reported in the Forest in 1938 were not found. One hundred thirty-eight species not previously reported were found. The flora includes nineteen rarities. Of the three species in the Forest considered imperiled in the state, *Aristolochia serpentaria* L. is extant; *Juncus debilis* A. Gray, and *Malaxis bayardii* Fern. have not been relocated.

Introduction

Comparison of floristic data collected at different times documents floristic change and can provide insight into the changes that have occurred through the gain and loss of species. Analysis of floristic change, when combined with an understanding of the biology of plant species, gives us a picture of recent change, but techniques and standards for comparing floras across time are few.

Floristic data differs from most other environmental data in that it has no quantitative data on the abundance of taxa. Data are usually presented as lists of taxa, often with morphological descriptions and notes on habitat and species biology. If abundance data is cited, it is usually qualitative and relative with each species ranked in one of several categories. The absence of quantitative data on abundance means that many of the standard indices of diversity cannot be used.

Three types of errors are common in floristic data. Sampling error occurs when the flora is underreported because the area was not completely sampled (Nilsson & Nilsson 1985). This error can

never be completely eliminated, but it can be minimized by thorough sampling during all seasons.

Collector bias can lead to some species being over or under reported in a flora. This can be minimized by having different people collecting independently or by using different survey methods that minimize collector bias. Identification errors occur when plants are misidentified and are especially troublesome in comparative studies. In comparative studies, it is often necessary to reidentify taxa from earlier studies, so that vouchers become necessary. Comparative floristic studies are also sensitive to nomenclatural errors, where the name of one taxon changes. The only solution is to adopt a standard nomenclature and apply it to all studies used.

Comparative floras are rare. Buegler and Parisio (1982) compiled a tabular comparison of the flora of Staten Island, New York, over 102 years. This data formed the basis of an analysis of the flora by Robinson, et al. (1995) that focused on the species lost and gained while the Island changed from rural to urban.

The Black Rock Forest is located on 1520 hectares (3750 acres) in the Hudson Highlands of Orange County, New York State. It is immediately north of the West Point Military Reservation and immediately southwest of Storm King Mountain (see map in D'Arrigo et al. 2000). It is bisected by the line separating the towns of Cornwall and Highlands.

The Forest sits atop the ridge of the Highlands which runs southwest to northeast in this section. The highest point, Spy Rock, is at 446 m elevation (1463 ft). Many peaks or ridges rise above 350m, including Mt. Misery (386 m., 1268 ft), Black Rock Hill (429 m., 1408 ft), Hill of Pines (427 m., 1400 ft), Rattlesnake Hill (1410 feet), Sackett (390-427 m., 1300-1400 ft), and many unnamed ridges. The lowest elevations, about 135 m (about 450 ft), occur at the northeastern edge of the Forest.

Most of the Forest is covered by mixed oak, upland forest, dominated by *Quercus rubra* L, typical of the Highlands (Collins and Anderson 1994). The south-facing, upper slopes are dominated by *Quercus montana* Willd. The hilltops and ridges generally have a mix dominated by oaks, *Carya glabra*,

and *Pinus rigida* Mill. On ridgetops and hilltops with shallow soil, an open vegetation dominated by shrubs and grasses is often found. In the north facing coves, *Tsuga canadensis* L. is dominant on steep slopes and intergrades with mixed northern hardwoods and swampy forest vegetation on lesser slopes and basins.

There are five reservoirs and one pond in the Forest. All are relatively shallow and oligotrophic. The reservoirs supply water to the towns of Cornwall and Highlands and were all built before 1920. All but one were constructed on land that was formerly pasture or farmland. The Tamarack Pond reservoir, also called Spruce Pond, was created by flooding a black spruce swamp. The spruce has all died off, but a portion of the sphagnum mat has floated up and created a boggy island (Tryon 1940).

The Forest was assembled by James Stillman, the founder of First National City Bank, who purchased farms and woodlots in the 1920's in order to establish an estate for his family (Dunwell 1991). His son, Dr. Ernest Stillman, established the Black Rock Forest as an experimental forest in 1928. Under director Henry Tryon, an active program of experimental cuttings and plantings was begun that lasted into the 1980's. Dr. Stillman bequeathed the Forest to Harvard University and it was transferred to Harvard in 1949. In 1989, William T. Golden organized the Black Rock Forest Consortium, fifteen scientific and educational institutions, to manage the Forest. The land was purchased from Harvard and the Consortium began to transform the Forest into a preserve for environmental research, education, and recreation.

Tryon (1930) published the first description of the flora and vegetation of the Forest. His study produced a classification of the woody vegetation and a map of forest types. In 1936 and 1937, H. Raup began a series of floristic surveys with Tryon and others. Raup collected throughout the Forest and published a complete flora and description of the major vegetation types (Raup 1938). Two partial plant lists also exist. Cooney (1995) posted a partial plant list for the Forest on the Torrey Botanical Society web site. In addition, the Nature Conservancy made a floristic survey of the Mineral Spring Tract, a

parcel of land in the southwestern corner of the Forest, before it was incorporated into the Forest (Nature Conservancy, 1988).

We began this study with two goals. First, we wanted to produce a complete account of the current vascular flora of the Forest with estimates of the distribution and abundance of the species. Second, we wanted to compare our results to those of Raup in order to see the floristic changes that occurred in the Forest since 1938.

Methods

Field surveys for this project began in 1990. All parts of the Forest as well as adjacent areas were collected at various times of the year. The first set of collections were filed in the Brooklyn Botanic Garden Herbarium (BKL) and the extra sets were sent to Black Rock Forest and to the New York State Museum Herbarium (NYS). After a break in 1994 and 1995, collections began again in 1996 along with quantitative surveys of vegetation. Additional collections were made available by J. G. Barbour and T. Weldy who surveyed the Forest for rare and endangered species, and R. Mitchell, who was collecting as part of a broad study of the flora of the Hudson Highlands.

The results of the surveys were constantly compared with the Raup's (1938) list. In addition, an internal report by Raup, on file at the Forest, describing a series of vegetation transects he made in the Forest proved invaluable in relocating certain species. In cases where there was disagreement between the Raup's results and our own, we searched the herbaria at NY and NYS for Raup's specimens, looking for collection localities and checking identifications.

Names follow Mitchell & Tucker (1997) with synonyms from Raup (1938) and Gleason and Cronquist (1991). In order to make comparison easier, the nomenclature of Raups' species were updated. In the rare case, where Raups' identification of a species differed from ours, we changed the name used by Raup.

All taxa were classified as native or non-native following Mitchell and Tucker (1997). The only difficulty was with *Pinus banksiana* Lamb., a species represented in the Forest by two trees of unknown origin. The species is native to the state, but the two trees in the Forest are far outside the natural range of the species (Cope 1992). Since it is most likely that the trees in the Forest are escapes from cultivation, this species is classified here as an introduction.

Each taxon was classified as a tree, shrub, perennial herb, or annual herb following Gleason and Cronquist (1991). *Hamamelis virginiana* L., is classified as a tree, though they are often multi-stemmed. *Potentilla norvegica* L. and *Polygonum punctatum* Ell., are classified as both annual and perennial herbs because they often survive winters in this area.

Rarity rankings cite both the New York State Museum (NYSM) rank (Mitchell & Tucker 1997) and the New York Natural Heritage Program (NYNHP) rank (New York State Natural Heritage Program 1999a). Rankings are given only for those species on the Natural Heritage Programs Active List (New York Natural Heritage Program 1999b) and Watch List (New York Natural Heritage Program 1999c).

Each taxon was also assigned to one or more habitat categories based on the classification by Raup (1938): (1) hilltop, (2) upper slope, (3) lower slope and cove, (4) swamp and fen, (5) aquatic, (6) limestone erratic, (7) disturbed, and (8) cultivated. Taxa with a broad range of habitat tolerance were assigned to each habitat in which they occurred. One of the changes suggested by the data was the change of the habitat types themselves over time. Additional evidence from photographs and descriptions indicates that the upper and lower slope woods were more open, with less mature trees and more shrubs than now (Raup 1938, Tryon 1939, Tryon and Finn 1949, Black Rock Forest Compartment Files). In order to evaluate this change, habitat categories were recorded separately for Raup's records and for current records.

In his report, Raup (1938) cited each species as either "abundant," "common," "occasional," or "rare." We try to update these qualitative judgements, but we use the word "uncommon" instead of

“rare” because we do not want to confuse our estimate of abundance within the Forest with the New York State Museum and Nature Conservancy rankings of rarity. In some cases, Raup reported species as “common” or “abundant” that are common only within certain narrow habitats, not throughout the Forest. In the list, we have added the word “local” in parentheses to distinguish these from species that are more widespread. Because of the qualitative nature of the data, we did not make detailed comparisons of the abundance data. Only in those instances where the abundance appears to change greatly is any difference noted (Palmer, et al. 1995).

In order to obtain a figure that could be compared with other floras, the total number of species and the number of introduced species were divided by the number of 1,000 hectare units in the Forest (Withers, et al. 1999). In 1938, the Forest covered xx hectares, so the Forest covered xx 1,000 hectare units. It now covers 1500 hectares.

Floristic change was estimated by comparing the number of species found by Raup and the number found now. The differences were also considered for nativity, growth form, rarity within the state, and abundance within the Forest. The number of species lost was determined by counting the species found by Raup that are not found now. Similarly, the number of species gained was determined by counting the species found now that were not reported by Raup.

Two simple percentages were calculated to estimate the amount of change between 1938 and today. Percentage change in the total number of species present was calculated using the formula:

$$\text{Change in number of species (\%)} = \frac{N_2 - N_1}{N_1} * 100$$

where N_t is the number of species reported at time t , also known as the species richness at time t . This gives an approximation of the magnitude of the increase or decrease in the total number of species from one time to another. Dissimilarity, an index of the replacement of species, is calculated using the formula:

$$\text{dissimilarity (\%)} = \frac{2 ((N_{\text{all}} - N_1) + (N_{\text{all}} - N_2))}{N_1 + N_2} * 100$$

where N_{all} is the number of species in the flora and N_t is the number of species reported at time t . This sums the percentage gained and lost and gives an estimate of the amount of turnover between two times. Floristic turnover is, essentially, an index of dissimilarity, based on a simple version of Sørenson's similarity index (Pielou 1984, Bramwell 1991).

Results

The flora of the Black Rock Forest consists of 712 species in 329 genera and 116 Families (Appendix 1, Table 1). The most diverse families are the Asteraceae with 76 species, the Poaceae, with 63 species, and the Cyperaceae, with 62 species (Table 2). With an average of 469 species per 1,000 hectares, the Forest is about as diverse as any similar sized area in the region (Withers, et al. 1998).

Some of the plants reported in this survey that were not reported by Raup were undoubtedly present when Raup made his survey, just not found. Species such as *Dulichium arundinaceum* (L.) Britt., *Aristolochia serpentaria* L., *Isoetes echinospora* Durieu, *Corydalis flavula* (Raf.) DC., *Kalmia polifolia* Wang., and *Carex brunneoscens* (Pers.) Poir. are easily overlooked or are so uncommon that they are not readily found. Likewise, some of the species not found recently may, simply, be overlooked. However, the current study surveyed all parts of the Forest over a period of seven years and brings together data from six individuals who for the most part, collected independently.

Introduced and invasive plants. Almost eighty percent of the species in the Forest are native and about twenty percent are introduced (Table 3). This is better than the 33.5% non-native species of Staten Island (Robinson et al. 1994), the 35.5% non-native species in the Bronx River Parkway Reservation (Frankel 1999), and the 60.3% non-species plants from Ellis Island (Stalter and Scotto 1999),

all more disturbed sites. It is comparable to the 25% non-species plants at Saratoga National Historical Park (Stalter 1993) and the 18% non-native species from the Pack Forest Preserve (Mitchell & Tucker 1994), both relatively undisturbed sites. The percentage is much higher, though, than that predicted by Withers, et al. (1998).

Since Raup's survey, the number of native species has decreased from 491 to 475. As a percentage of the flora then and now, they have decreased from 85.2% to 79.2%.

Introduced plants are usually found only in disturbed sites where they make up more than half of the species (Table 3). At this time, invasive introductions (Westbrooks 1998) are absent from the ponds and reservoirs, and the limestone erratics, but they are found in disturbed sites, pond margins, and along roads. *Berberis thunbergii* Thunb. is found on roadsides and in recently cut areas. In areas cut thirty years ago, it is still present in the understory, but is being replaced by *Vaccinium corymbosum* L. in open sites. *Robinia pseudoacacia* L. is found only along State Route 9W. *Euphorbia esula* L. is found only at the site of an old sawmill at the base of Hulse road. *Rhamnus cathartica* L., *Populus alba* L. , *Euonymus alata* (Thunb.) Sieb., *Lonicera morrowii* A. Gray, *Rosa multiflora* Thunb., *Hesperis matronalis* L., *Polygonum cuspidatum* Sieb. & Zucc., *Microstegium vimineum* (Trin.) A. Camus, and *Celastrus orbiculata* Thunb. are uncommon and are found only along roadsides.

A much smaller number of invasive species are found in moist, relatively rich sites on the lower slopes and in swamps and fens. *Lythrum salicaria* L. is only found in small colonies near dams. *Phragmites australis* (Cav.) Trin. is also found near dams, but has made small inroads into undisturbed habitats along the edge of Beaver Swamp and Sutherland Swamp. Both *Phragmites* and *Lythrum* are abundant in a wetland just outside the Forest that receives runoff from State Route 9W. Their occurrence along dams and in this wetland suggest that they may need a more nutrient rich habitat to become dominant than is generally available in the Forest.

Ailanthus altissima (Mill.) Swingle appears occasionally in disturbed sites, especially near the

reservoirs, but is also found in a small section of upland woods. The site is a steep, wooded slope with shallow soil, overlooking State Route 9W. Forest records indicate that the site suffered a blowdown in the late 1960's that knocked down most trees on the slope (Black Rock Forest Compartment Files). Trees were removed and stumps were sprayed with 2, 4, D which prevented sprouting. The *Ailanthus* now grow, mixed with oaks and *Carya glabra* L. There is no indication that the *Ailanthus* is reproducing under the forest canopy.

Rare and endangered plants. Seventeen rare or endangered plants have been found, four with the rank of S1 (New York Natural Heritage Program 1999) (Table 4.). Of the S1 plants, only *Aristolochia serpentaria* L. is known to be extant in the Forest. *Juncus debilis* L. and *Malaxis bayardii* Fernald were both reported by Raup, but have not been seen recently. *Utricularia inflata* Walt., appeared in Tamarack Pond in 1992 and became abundant in the reservoir between 1995 and 1997. After 1997 the population declined and it was not found in the reservoir in 1999. It may still be extant, but in much lower numbers.

The number of rare species found in the Forest has increased. Raup reported nine species that are now considered rare. Fourteen rarities have been found in the Forest recently. The increase is probably due to their intensive search for rarities in the Forest by J. G. Barbour and T. Weldy. Of the eight rarities found now that were not found by Raup, they are responsible for locating and identifying four.

The distribution of rare and endangered plants is uneven in the Forest (Table 5.). More endangered species occur in dry, upper slopes than in any other habitat. Nine occur on upper slopes and ridges, including seven which are extant: *Aristolochia serpentaria*, *Carex albicans* var. *emmonsii*, *Carex argyrantha*, *Corydalis flavula*, *Cunila origanoides*, and *Pinus banksiana*. This is significant, because the upper slopes are also the only habitat in the Forest that has shown a net loss in number of species (Table 1.). These habitats are the most vulnerable to fires and the hilltops are popular as vistas along trails. Two rare species reported by Raup as occurring on upper slopes are no longer found in the Forest: *Lespedeza*

violacea (L.) Pers., *Malaxis bayardii*.

Disturbed habitats are also relatively rich in endangered species, but most are ranked as S3.

Carex lupuliformis Sartw. Ex Dewey and *Aster pilosus* var. *pringlei* (A. Gray) Blake are found on dams and around reservoirs. *Aster schreberi* sometimes grows along roads on the lower slopes and coves.

Cunila origanoides, once found only on hilltops and upper slope woods is now spreading on roadsides.

Raup collected *Juncus debilis* L. in swampy thickets. It is the only S1 species in the Forest reported from disturbed habitats and has not been found recently.

The composition of the flora. The flora has changed since Raup surveyed the Forest. In 1938, Raup reported 575 species: there are now 599 species (Table 1). The number of native species has declined by 3.1% from 490 species to 475 species while the number of introduced species has increased 45.9% from 85 species to 124 species.

The Forest was smaller in 1938 than it is now. When Raup collected, the Forest covered 1290 hectares (3200 acres). Since that time, the Forest has grown through gift and purchase and now occupies 1520 hectares (3750 acres). Adjusting the numbers of species collected by Raup and those collected now to number of species per 1000 hectares gives a more comparable value (Withers, et al. 1998). Raup's flora reports 446 species per 1000 hectares, while the current survey found 394 species per 1000 hectare.

As the forest has matured and the canopy closed, a few species have apparently decreased in abundance. *Viburnum acerifolium* L. was abundant in Raup's time where it was the primary shrub in the slope and cove woods. It is only occasionally found now and occurs in Forest openings and on roadsides. Similarly, *Viburnum rafinesquianum* Schultes was the primary shrub species in the upper slope woods and on south facing slopes. It is now uncommon in the upper slope wood, only growing in openings and in the open, hilltop meadows. Raup reported *Ceanothus americanus* L. as common in the upper slope woods and hilltops, but that species has not been found since his reports. A similar pattern can be seen for the abundance of *Cornus rugosa* Lam., *Diervilla lonicera* Mill.,

The abundance of five woodland herbs has also decreased markedly. Understory herbs *Actaea pachypoda* Ell., *Aster lowrieanus* Porter, *Aureolaria flava* (L.) Farwell, *Cypripedium acaule* Ait. and *Uvularia sessilifolia* (L.) Wats. have all decreased in abundance. Unlike the shrubs mentioned above which are predominantly upper slope species, these are mostly lower slope and cove species in the Forest.

Twenty six species characteristic of disturbed habitats and old fields have declined in abundance. These include clearly weedy species, such as *Arctium minus* (Hill.) Bernh., *Chamaesyce vermiculata* (Raf.) House, *Plantago lanceolata* L., *Polygonum virginianum* L., and *Verbena urticifolia* L., as well as native plants such as *Aster novae-angliae* L., *Comptonia peregrina* (L.) Coul., and *Rosa carolina* L. *Rhus hirta* (L.), once common is now found only along the entrance road. Raup found *Staphylea trifoliata* and *Lyonia ligustrina* (L.) DC. along old fencerows and in the slope woods, but it is now absent from the Forest. *Toxicodendron radicans* was abundant in Raup's time, but is found only on roadsides in the lower cove woods now.

Inceased in abundance

Turnover

Discussion

In the sixty years since Raup's survey of Black Rock Forest, the floristic composition of the Forest has changed, as has the relative abundance of many of the species. While the total number of species has risen, the number of species has declined in relation to area. Many species have been lost, especially in the upland habitiat unique to the Highlands.

As the forest has matured and the canopy closed, species once found in the forest understory are now absent or are limited to roadsides and recently disturbed sites. Species of *Cornus*, *Desmodium*,

Lespedeza, and *Viburnum* provide the most striking examples of this.

Though there is no direct evidence, it is likely that disease and infestation have caused decline in some species. *Ulmus americana* L. has declined, probably due to Dutch Elm disease. The decline of *Cornus florida* L. may have been due to shading by the canopy, infection by mycoplasma disease, or a combination, but Forest trees were never tested for the presence of disease. In the future, disease and infestation could seriously affect even more forest species. It is very likely that some *Fraxinus americana* L. in the forest are infected by ash yellows () which can kill trees and many of the hemlocks, *Tsuga canadensis* L., are infested with hemlock adelgid ().

The numbers of non-native plants and plants of disturbed habitats have increased more than any other, but have also seen the greatest turnover. The proportion of native species has decreased and the proportion of non-native species increased, though not to the extent of more disturbed areas. This has occurred even as disturbance has been limited, cutting greatly curtailed, and the forest allowed to grow.

Acknowledgements.

This research was funded, in part, by grants from the Black Rock Forest Consortium. We are grateful for their continuing support of this project. We especially thank Dr. William Schuster, Director of Black Rock Forest, Mr. Jack Karnig, Director emeritus, and Mr. John Brady, Forest Manager, for their help and encouragement throughout this project. Mr. J.G. Barbour, Dr. Richard Mitchell, and Mr. Troy Weldy generously shared their field observations. Dr. Patricia Holmgren (NY), Dr. Charles Sheviak (NYS) and Ms. Emily Wood (GH, A) allowed us to study the Raup specimens in their collections.

References:

Bramwell, D. 1991. Plants and Islands.

- Buegler, R. & S. Parisio. 1982. A comparative flora of Staten Island 1879 - 1981. Staten Island, NY:
Staten Island Institute of Arts and Sciences.
- Collins, B. R. & K. Anderson. 1994. Plant Communities of New Jersey. A study in landscape diversity.
New Brunswick, NJ: Rutgers University Press.
- Cooney, P. 1995. Hiking Black Rock Forest. <http://www.torreybotanical.com/whudson/nyblkrock.html>
- Cope, E. 1992. Pinophyta (Gymnosperms) of New York State. In, R. Mitchell, ed. Contributions to a
Flora of New York State IX. New York State Musuem Bull. 483: 1-80.
- D'Arrigo, R., D. M. Lawrence, E. R. Cook, W. S. F. Schuster, M. Wiljanen, & R.D. Thetford. 2007.
Climate-Growth Relationships of Eastern Hemlock and Chestnut Oak from Black Rock Forest in
the Highland of Southeastern New York. J. Torrey Bot. Soc. In review.
- Dunwell, F. 1991. The Hudson River Highlands. New York: Columbia University Press.
- Frankel, E. 1999. A floristic survey of vascular plants of the Bronx River Parkway Reservation in
Westchester, New York: Compilation 1973-1998. J. Torrey Bot. Soc. 126: 359-367.
- Gleason, H. A. & A. Cronquist. 1991. Manual of Vascular Plants of the Northeastern United States &
Canada, 2nd edition. New York: The New York Botanical Garden.
- Mitchell, R. S., T. E. Maenza-Gmelch, & J. G. Barbour. 1994. *Utricularia inflata* Walt.
(Lentibulariaceae) new to New York State. Bull. Torrey Bot. Club 121: 295-297.
- Mitchell, R. S. & G. C. Tucker. 1994. Flora of an unusually diverse virgin and old-growth forest in the
southern Adirondacks of New York. Bull. Torrey Bot. Club. 121: 76-83.
- _____ & _____. 1997. Revised checklist of New York State plants. New York State Museum Bulletin
490:1-400.
- Nature Conservancy. 1988. Flora of Mineral Spring Falls Preserve (typescript at Black Rock Forest).
- New York Natural Heritage Program. 1999a. New York Natural Heritage Program rare Plant Status List.
Overview. <http://www.heritage.tnc.org/nhp/us/ny/overvw.pdf> .

- _____. 1999b. New York rare Plant Status List (Active Inventory List) -- 4/23/99.
<http://www.heritage.tnc.org/nhp/us/ny/invent99.pdf>.
- _____. 1999c. New York State rare Plant Status List (Watch List) – 4/23/99. .
<http://www.heritage.tnc.org/nhp/us/ny/watch99.pdf>
- Palmer, M. W., G. L. Wade, & P. Neal. 1995. Standards for the writing of floras. Bioscience 45: 339-345.
- Pielou, E. C. 1984. The Interpretation of Ecological Data. A Primer on Classification and Ordination. New York: J. Wiley & Sons.
- Raup, H. M. 1938. Botanical studies in the Black Rock Forest. Black Rock Forest Bulletin 7:1-161.
- Robinson, G., Mary E. Yurlina & Steven N. Handel. 1994. A century of change in the Staten Island flora: Ecological correlates of species losses and invasions. Bull. Torrey Bot. Soc. 121: 119-129.
- Schlessman, M. 1991. Size, gender, and sex change in dwarf ginseng, *Panax trifolium* (Araliaceae) Oecologia 87: 588-595.
- Stalter, R., P. Lynch, & J. Schaberl. 1993. Vascular flora of Saratoga National Historical Park, New York, Bull. Torrey Bot. Club 120: 166-176.
- Stalter, R. & S. Scotto. 1999. The vascular flora of Ellis Island, New York City, New York. J. Torrey Bot. Soc. 126: 367-375.
- Tryon, H. H. 1930. Black Rock Forest. Black Rock Forest Bulletin 1:1-37.
- _____. 1939. Ten Year Progress Report 1928-1938, Black Rock Forest Bulletin 10: 1-76.
- _____. & R. F. Finn. 1949. Twenty-year Progress Report 1928-1948. Black Rock Forest Bulletin 14: 1-87.
- Westbrooks, Randy G. 1998. Invasive plants: changing the landscape of America: fact book. Washington, D.C.: Federal Interagency Committee for the Management of Noxious and

Exotic Weeds.

Withers, M. A., M. W. Palmer, G. L. Wade, P.S. White, & P. R. Neal. 1998. Changing patterns in the number of species in North American floras. In, T. D. Sisk, ed. Perspectives on the land-use history of North America: a context for understanding our changing environment. U.S. Geological Survey, Biological Resources Division, Biological Science Report USGS/BRD/BSR 1998-0003 (Revised September 1999). 104 pp. <http://biology.usgs.gov/luhna/>

Yost, S. 1987. The effect of shade on petiole length in the *Viola fimbriatula* – *sagittata* complex (Violaceae) *Brittonia* 39: 180-187.

Appendix 1. Vascular plants found in the Black Rock Forest.

Species are named and arranged, following Mitchell and Tucker (1997), by division, family, and species. Non-native species are marked with an asterisk (*).

Voucher collectors are designated as follows: "B" = K. Barringer, "Br" = J. G. Barbour, "C"= S. Clemants, "G"= S. Glenn, "M"= R. Mitchell, "R"= H. Raup. All specimens are in the Brooklyn Botanic Garden Herbarium unless otherwise noted.

Lycopodophyta

Lycopodiaceae

Huperzia lucidula (Michx.) Trev. (*Lycopodium lucidulum* Michx.) Occasional. Raup: occasional. -- lower slopes and coves. (B, 5253).

Lycopodium obscurum L. Uncommon. Raup: rare-occasional. -- lower slopes and coves. (B, 5036).

Lycopodium dendroideum Michx. Uncommon. Raup: not found. -- along Goethel's trail near the ski slope.

Lycopodium digitatum Dill. (*L. complanatum* var. *flabelliforme* Fern.) Not found. Raup: rare-occasional. -- moist, rich woods southwest of Sutherland Pond.

Selaginellaceae

Selaginella rupestris (L.) Spring Uncommon. Raup: rare. -- open, rocky hilltops. (B, 5888).

Isoetaceae

Isoetes echinospora Durieu Occasional. Raup: not found. -- Arthur's and Sutherland Ponds. (B, 5314).

Equisetophyta

Equisetaceae

Equisetum arvense L. Occasional. Raup: occasional. -- moist, disturbed sites. (B, 5223).

Equisetum sylvaticum L. Uncommon. Raup: rare. -- wet, disturbed site south of the Upper Reservoir. (B, 5252).

Equisetum hyemale L. (*E. prealtum* Raf.) Uncommon. Raup: rare. -- a wet thicket near the Upper Reservoir. (B, 5254).

Pteridophyta

Ophioglossaceae

Botrychium dissectum Spreng. Uncommon. Raup: not found. -- open, grassy area near Aleck Meadow Reservoir. (B, 5027).

Botrychium virginianum (L.) Sw. Uncommon. Raup: occasional. -- rich, cove woods along Canturbury brook.

Osmundaceae

Osmunda cinnamomea L. Uncommon. Raup: not found. -- swampy woods at low elevations.

Osmunda claytoniana L. Occasional. Raup: occasional-common. -- cove woods, in swampy ground and near streams. (B, 5555).

Osmunda regalis L. Occasional. Raup: common. -- cove woods in swampy ground.

Pteridiaceae

Adiantum pedatum L. Occasional. Raup: common. -- rich woods in the cove along Black Rock Brook. (B, 5094).

Dennstaedtiaceae

Dennstaedtia punctilobula (Michx.) Moore Common. Raup: common. -- roadsides, clearings and openings throughout the lower slopes. (B, 4897).

Pteridium aquilinum (L.) Kuhn Occasional. Raup: abundant (local). -- dry woods and thickets on the upper slopes and disturbed sites along the roads and on hilltops. (B, 5510).

Thelypteridaceae

Phegopteris connectilis (Michx.) Watt (*Dryopteris phegopteris* (L.) C. Chr.) Uncommon. Raup: rare. -- rich, cove woods along Black Rock Brook. (B, 5495).

Phegopteris hexagonoptera (Michx.) Fee (*Dryopteris hexagonoptera* (Michx.) Nieuwl.) Not found. Raup: rare. -- in slope woods.

Thelypteris noveboracensis (L.) Nieuwl. (*Dryopteris noveboracensis* (L.) A. Gray) Occasional. Raup: occasional-common. -- moist to wet, rich woods. (B, 5558).

Thelypteris palustris Schott (*Dryopteris thelypteris* (L.) A. Gray) Occasional. Raup: common. -- wet woods.

Woodwardia virginica (L.) Sm. Occasional. Raup: common (Local). -- swamp south of Sutherland Pond

and the island in Tamarack Pond. (B, 5999).

Aspleniaceae

Asplenium platyneuron (L.) BSP. Not found. Raup: occasional. -- rocky upland woods.

Asplenium trichomanes L. Uncommon. Raup: rare. -- near a limestone erratic in Canterbury Brook. (B, 5002).

Asplenium rhizophyllum L. (*Camptosorus rhizophyllus* (L.) Link) Uncommon. Raup: rare. -- on or near limestone erratics. (B, 4926).

Dryopteridaceae

Athyrium felix-femina (L.) Roth (*Athyrium angustum* (Willd.) Presl) Occasional. Raup: occasional - common. -- damp woods and sedge meadows. (B, 5614).

Dryopteris campyloptera (Kunze) Clarkson (*D. spinulosa* sensu Raup p. p.) Occasional. Raup: common. -- rich, wet woods, especially near streams. (B, 5168).

Dryopteris carthusiana (Vill.) Fuchs. (*D. spinulosa* sensu Raup p. p.) Common. Raup: common. -- rich, wet woods, especially in the coves. (B, 4928).

Dryopteris intermedia (Muhl.) A. Gray Uncommon. Raup: not found. -- damp roadside in coves. (B, 5091).

Dryopteris marginalis (L.) A. Gray Common. Raup: common. -- lower slope and cove woods. (B, 4952).

Onoclea sensibilis L. Occasional. Raup: common (Local). – wet, disturbed sites and along streams. (B, 4916).

Polystichum acrostichoides (Michx.) Schott Common. Raup: common-abundant. -- lower slope and cove woods. (B, 4953).

Woodsia ilvensis (L.) R. Br. Uncommon. Raup: rare. -- undisturbed hilltops. (B, 5889).

Polypodiaceae

Polypodium virginianum L. Common. Raup: occasional-common. -- ledges and boulders in woods. (B, 4906).

Pinophyta

Pinaceae

**Larix decidua* Mill. Not found. Raup: Cultivated. -- Tryon (1949).

**Larix kaempferi* (Lamb.) Carr. Not found. Raup: not found. – unsuccessfully planted. Tryon (1949)

**Larix laricina* (DuRoi) Koch Occasional. Raup: cultivated. -- once planted, a few trees remain. (B, 5304).

**Picea glauca* (Moench) Voss Cultivated. Raup: Cultivated. -- plantations along Continental road from the Stone House to Sphagnum Pond, sometimes spreading in disturbed areas nearby. (B, 5533).

Picea mariana (Mill.) BSP. Not found. Raup: rare. – remnant stumps in Tamarack pond. (R, 7737 (NY)).

**Pinus banksiana* Lamb. Uncommon. Raup: not found. NYSM: R. NYNHP: G5 S3. -- Two trees grow on an exposed knob on Pine Tree Hill, probably introduced. (B, 5989).

**Pinus resinosa* Soland. Cultivated-occasional. Raup: cultivated. -- plantations near the Stone House, sometimes spreading nearby. (B, 4987).

Pinus rigida Mill. Occasional. Raup: common-abundant (local). -- hilltops and rocky, exposed slopes. (B, 5576).

Pinus strobus L. Uncommon. Raup: occasional (local). – rocky slopes, coves, and rarely hilltops. (B, 4976).

Tsuga canadensis (L.) Carr. Common. Raup: common-abundant. -- north facing slopes and coves. (B, 4948).

Cupressaceae

Juniperus virginiana L. Occasional. Raup: common (local). -- exposed, rocky slopes, cliffs, and open, disturbed sites. (B, 4982).

Magnoliophyta

Magnoliaceae

Liriodendron tulipifera L. Occasional. Raup: common-abundant. -- rich woods, especially in the coves. (B, 4872).

Lauraceae

Lindera benzoin (L.) Blume Occasional. Raup: common-abundant. -- rich, moist woods with partial sun, in the coves and lower slopes. (B, 4985).

Sassafras albidum (Nutt.) Nees (*S. officinale* Nees & Eb.) Occasional. Raup: common-occasional. -- rich woods, coves and lower slopes. (B, 4817).

Aristolochiaceae

Aristolochia serpentaria L. Uncommon. Raup: not found. NYSM: E. NYNHP: G5 S1. -- Recently reported by J. G. Barbour and W. Schuster.

Asarum canadense L. Occasional. Raup: common (local). -- rich woods, especially near limestone erratics. (B, 5004).

Nymphaeaceae

Nuphar variegata Engelm. Occasional. Raup: common (local). -- Sutherland Pond and Jim's Pond.

Nymphaea odorata Dryand. Occasional. Raup: common (local). -- Sutherland Pond and Jim's Pond. (G, 3832).

Cabombaceae

Brasenia schreberi Gmel. Uncommon. Raup: common (local). -- Sutherland Pond.

Ranunculaceae

Actaea pachypoda Ell. (*A. alba* sensu Raup) Uncommon. Raup: common. -- roadside near lower Black Rock Brook. (B, 4955).

Anemone quinquefolia L. Uncommon. Raup: occasional. -- lower slope and cove woods. (B, 5020).

Anemone virginiana L. (incl. *A. riparia* Fern.) Not found. Raup: common-occasional. -- old clearings.

Aquilegia canadensis L. Uncommon. Raup: occasional (local). -- rocky disturbed sites and cliffs. (B, 5247).

Caltha palustris L. Uncommon. Raup: occasional-common. -- swampy woods. (B, 5276).

Clematis virginiana L. Occasional. Raup: common. -- thickets, often found near dams. (B, 5597).

Hepatica nobilis Mill. (*H. americana* (DC.) Ker., *Anemone americana* (DC.) H. Hara) Occasional.
Raup: common. -- rich woods of the coves. (B, 4991).

Ranunculus abortivus L. Occasional. Raup: occasional-common. -- roadsides and roadside ditches. (B, 5019).

**Ranunculus acris* L. Occasional. Raup: common. -- roadsides and disturbed sites. (B, 5439).

Ranunculus ambiguens S. Wats. (*R. laxicaulis* (T. & G.) Darby) Not found. Raup: occasional. -- swampy channels of cove brooks.

**Ranunculus bulbosus* L. Not found. Raup: occasional-common. -- roads and disturbed sites.

Ranunculus micranthus Nutt. Uncommon. Raup: not found NYSM: T. NYNHP: G5 S2. -- southeast corner of the Forest. Reported by J. G. Barbour (pers. comm.).

Ranunculus recurvatus Poir. Occasional. Raup: occasional. -- roadsides in coves. (B, 5089).

Thalictrum dioicum L. Occasional. Raup: common. -- roadsides in coves and lower slopes. (B, 5228).

Thalictrum pubescens Pursh (*T. polygamum* Muhl.) Uncommon. Raup: common-occasional. -- along Continental Road. (B, 5392).

Thalictrum thalictroides (L.) Eames and Boivin (*Anemonella thalictroides* (L.) Spach) Occasional. Raup: common. -- coves and lower slopes. (B, 5018).

Berberidaceae

**Berberis thunbergii* DC. Common. Raup: occasional. -- disturbed sites. (B, 4853).

Caulophyllum thalictroides (L.) Michx. Not found. Raup: rare. -- in talus below Mt. Misery.

Menispermaceae

Menispermum canadense L. Uncommon. Raup: occasional. -- thickets and old clearings. (B, 5985).

Papaveraceae

**Chelidonium majus* L. Uncommon. Raup: not found. -- roadsides and riprap along Black Rock Brook.

(B, 5083).

Fumariaceae

Corydalis flavula (Raf.) DC. Uncommon. Raup: not found NYSM: T. NYNHP: G5 S3. -- open, rocky slopes. (C, 4881).

Corydalis sempervirens (L.) Pers. Occasional. Raup: occasional. -- on, open rocky slopes and, rarely, dry roadsides. (B, 5577).

Dicentra cucullaria (L.) Bernh. Uncommon. Raup: not found. -- on rocky slopes. (B, 4986).

Platanaceae

Platanus occidentalis L. Uncommon. Raup: occasional. -- rich woods, especially north-facing coves. (B, 4943).

Hamamelidaceae

Hamamelis virginiana L. Abundant. Raup: common-abundant. – slopes and coves. (B, 4945).

Ulmaceae

Ulmus americana L. Uncommon. Raup: common. -- coves and lower slopes. (B, 5230).

Moraceae

Morus rubra L. Uncommon. Raup: not found. -- Recently introduced along Reservoir Road. (B, 5836).

Urticaceae

Laportea canadensis (L.) Wedd. Uncommon. Raup: abundant (local). -- lower stretches of Black Rock Brook.

Pilea pumila (L.) A. Gray Common. Raup: common. -- roadside ditches in coves. (B, 4860).

Juglandaceae

Carya cordiformis (Wang.) Koch Occasional. Raup: occasional. -- swampy woods. (B, 4950).

Carya glabra (Mill.) Sweet. Common. Raup: common-abundant. -- hilltops and slope woods. (B, 5584).

Carya ovata (Mill.) Koch Occasional. Raup: occasional-common. -- swampy woods. (B, 4854).

Juglans cinerea L. Uncommon. Raup: occasional. -- rich woods, usually on the lower slopes. (B, 4983).

**Juglans nigra* L. Not found. Raup: not found. -- formerly cultivated (J. Karnig, pers. com.)

Myricaceae

Comptonia peregrina (L.) Coulter. (*Myrica asplenifolia* L.) Uncommon. Raup: common. -- dry, open, disturbed sites, especially hilltops. (B, 4980).

Fagaceae

Castanea dentata (Marsh.) Borkh. Occasional. Raup: common. – sprouts in moist sites in the slope woods. (B, 4818).

**Castanea mollissima* Blume Not found. Raup: not found. – unsuccessfully planted. Tryon (1949).

Fagus grandifolia Ehrh. Occasional. Raup: occasional. -- slopes, especially lower slopes. (B, 5885).

Quercus alba L. Common. Raup: occasional-common. -- throughout the Forest, common on hilltops and in lower slopes. (B, 5266).

Quercus bicolor Willd. Uncommon. Raup: rare. -- swampy woods. (R, 8196 (NYS)).

Quercus coccinea Muenchh. Common. Raup: common. -- hilltops and upper slopes. (R, 8126 (NYS)).

Quercus ilicifolia Wang. Occasional. Raup: abundant (local). -- thickets on hilltops. (B, 4827).

Quercus montana Willd. (*Quercus prinus* auctt.) Abundant. Raup: common. -- upper slope woods. (B, 4829).

Quercus rubra L. (*Q. borealis* Michx.f.) Abundant. Raup: common. -- throughout. (B, 5257).

Quercus velutina Lam. Occasional. Raup: occasional. – throughout, especially lower slopes. (B, 5271).

Betulaceae

Alnus incana (L.) Moench (*A. rugosa* (DuRoi) Spreng.) Occasional. Raup: occasional-common. -- moist, open or disturbed sites. (B, 5269).

Alnus serrulata (Dryand) Willd. (*A. rugosa* sensu Raup) Occasional. Raup: common. -- swampy woods

and along streams. (B, 5184).

Betula alleghaniensis Britt. (*B. lutea* Michx. f.) Common. Raup: common-abundant. -- lower slopes and coves. (B, 4949).

Betula lenta L. Common. Raup: abundant. -- slopes and hilltops. (B, 5040).

Betula papyrifera Marsh. Not found. Raup: rare. -- Raup found one tree near Arthur's Pond.

Betula populifolia Marsh. Occasional. Raup: occasional-common. -- disturbed sites. (B, 5060).

Carpinus caroliniana Walt. Occasional. Raup: occasional. – coves, lower slopes and hilltops. (B, 5298).

Corylus cornuta Marsh. Not found. Raup: occasional. – open, disturbed sites.

Ostrya virginiana (Mill.) Koch Occasional. Raup: occasional. – coves, lower slopes and hilltops. (B, 4877).

Phytolaccaceae

Phytolacca americana L. Occasional. Raup: occasional. -- disturbed sites and roadsides. (B, 5313).

Chenopodiaceae

**Chenopodium album* L. Uncommon. Raup: not found. -- along the roads. (B, 5774).

**Chenopodium standleyanum* Aellen Uncommon. Raup: Not Found. – along roads. (B, 5779).

Caryophyllaceae

**Cerastium arvense* L. Not found. Raup: occasional. -- dry, disturbed sites and hilltops.

**Cerastium fontanum* Baung. (*C. vulgatum* sensu Raup) Occasional. Raup: occasional. -- moist, open, disturbed sites. (B, 5051).

Cerastium nutans Raf. Uncommon. Raup: not found. -- road to Arthur's Pond Dam. (B, 5305).

**Cerastium semidecandrum* L. Uncommon. Raup: not found. -- open, disturbed ground near Aleck Meadow Reservoir. (C, 4862).

**Dianthus armeria* L. Uncommon. Raup: common. -- moist, disturbed sites. (B, 5117).

Paronychia canadensis (L.) Wood Occasional. Raup: occasional. -- dry roadsides. (B, 4875).

Paronychia fastigiata (Raf.) Fern. Not found. Raup: occasional. -- roadsides.

**Sagina procumbens* L. Not found. Raup: occasional. -- wet spots along upland trails.

**Scleranthus annuus* L. Uncommon. Raup: not found. -- open, disturbed ground near Aleck Meadow Reservoir. (C, 4854).

Silene antirrhina L. Not found. Raup: occasional (local). -- hilltops

**Silene latifolia* Poir. Occasional. Raup: common. -- roadsides and disturbed sites. (B, 5084).

Silene stellata (L.) Ait. f. Not found. Raup: rare-occasional. -- rocky slopes.

**Silene vulgaris* (Moench) Garke Uncommon. Raup: not found. -- open, disturbed ground near Aleck Meadow Reservoir.

**Stellaria graminea* L. Uncommon. Raup: occasional. -- weedy roadsides.

Polygonaceae

Polygonum arifolium L. Occasional. Raup: common. -- wet, disturbed sites. (B, 5844).

**Polygonum aviculare* L. Not found. Raup: common. -- road, trails, disturbed sites. (B, 5786).

**Polygonum cespitosum* Blume Common. Raup: not found. -- disturbed sites, especially roadsides. (B, 5422).

**Polygonum cuspidatum* Sieb. & Zucc. Uncommon. Raup: not found. -- disturbed site at the lower end of Hulse road. (B, 4946).

**Polygonum hydropiper* L. Common. Raup: common-abundant. -- in and along streams. (B, 5409).

Polygonum hydropiperoides Michx. Common. Raup: not found. -- moist, disturbed sites and along streams. (B, 4885).

Polygonum pensylvanicum L. Occasional. Raup: common. -- pond edges and along streams. (B, 4841).

**Polygonum persicaria* L. Occasional. Raup: common-abundant. -- moist, disturbed sites and edges of ponds. (B, 5539).

Polygonum punctatum Ell. Occasional. Raup: occasional-common. -- edges of ponds and streams. (C, 3934).

Polygonum sagittatum L. Common. Raup: abundant. -- wet places, especially the edges of reservoirs. (B, 5542).

Polygonum scandens L. (incl. *P. dumetorum* L.) Occasional. Raup: common. -- thickets and disturbed sites. (B, 5457).

Polygonum virginianum L. Uncommon. Raup: common (local). -- the lower stretch of Black Rock

Brook and along lower Hulse Road. (B, 5527).

**Rumex acetosella* L. Occasional. Raup: common. -- roadsides. (B, 5334).

**Rumex crispus* L. Occasional. Raup: common. -- roadsides and disturbed sites.

**Rumex obtusifolius* L. Not found. Raup: occasional-common. -- disturbed sites

**Rumex orbiculatus* A. Gray (*R. brittanica* sensu Raup) Not found. Raup: rare. -- the island in Tamarack Pond.

Clusiaceae

Hypericum canadense L. Common. Raup: not found. -- Not reported by Raup, but he included individuals of this species under *H. mutilum*. edges of reservoirs. (B, 5771).

Hypericum gentianoides (L.) BSP Uncommon. Raup: occasional. -- hilltops.

Hypericum mutilum L. Common. Raup: common. -- edges of reservoirs. (B, 5602).

**Hypericum perforatum* L. Occasional. Raup: common. -- roadsides and clearings. (B, 5434).

Hypericum punctatum Lam. Occasional. Raup: common. -- damp, disturbed sites. (B, 5462).

Triadenium virginicum (L.) Raf. (*Hypericum virginicum* L.) Occasional. Raup: common (local). -- edges of reservoirs. (B, 4868).

Tiliaceae

Tilia americana L. Occasional. Raup: common-occasional. -- coves and lower slopes. (B, 4858).

Sarraceniaceae

Sarracenia purpurea L. Not found. Raup: common (local). -- the swampy area south of Sutherland Pond.

Droseraceae

Drosera intermedia Hayne Uncommon. Raup: not found. -- swampy area near Sutherland Pond. (B, 5354).

Drosera rotundifolia L. Uncommon. Raup: rare. -- swampy area near Sutherland Pond. (B, 5352).

Cistaceae

Helianthemum bicknellii Fern. Not found. Raup: occasional. – hilltops.

Helianthemum canadense (L.) Michx. Uncommon. Raup: occasional. -- hilltops. (C, 3918).

Lechea mucronata Raf. (*L. villosa* Ell.) Not found. Raup: occasional. -- along trails and on the hilltops.

Lechea intermedia Leggett. Uncommon. Raup: occasional-common. -- dry open sites. (B, 5990).

Violaceae

Viola affinis LeConte (*V. latiuscula* Greene) Not found. Raup: occasional. -- ravines.

Viola blanda Willd. Common. Raup: occasional. -- swampy ground. (B, 5065).

Viola conspersa Reichb. Common. Raup: occasional. -- dry woods and thickets. (B, 5009).

Viola cucullata Aiton Occasional. Raup: common. -- swampy ground. (B, 5029).

Viola macloskeyi Lloyd (*V. pallens* (Banks) Brainerd) Occasional. Raup: common-abundant. -- cove woods. (B, 5090).

Viola palmata L. Uncommon. Raup: occasional. -- upper slope woods.

Viola pubescens Aiton Common. Raup: occasional. -- swampy areas. (B, 5088).

Viola sagittata Aiton (*V. fimbriatula* J. E. Sm.) Occasional. Raup: common-abundant. -- open, disturbed slopes and roadsides (C, 4344). (Yost 1987).

Viola sororia Willd. Uncommon. Raup: rare. -- disturbed sites especially roadsides. (B, 5277).

Salicaceae

**Populus alba* L. uncommon. Raup: not found. -- near Route 9W in an area that was not part of the Forest when Raup collected. (B, 5251).

Populus deltoides Bartr. Uncommon. Raup: not found. -- old fields and clearing, now found only in wet, disturbed sites. (B, 5722).

Populus grandidentata Michx. Occasional. Raup: occasional. -- disturbed sites, in cove and lower slope woods. (B, 5451).

Populus tremuloides Michx. uncommon. Raup: common. -- disturbed sites. (B, 5964).

**Salix bebbiana* Sarg. Uncommon. Raup: occasional. -- Aleck Meadow dam. (B, 5759).

Salix discolor Muhl. Uncommon. Raup: occasional-common. -- damp, disturbed sites along the roads.

(B, 5265).

Salix eriocephala Michx. (*Salix cordata* Muhl.) Not found. Raup: occasional. -- wet, disturbed sites. (R, 8091 (NY)).

Salix humilis Marsh. Not found. Raup: occasional. -- wet, disturbed sites. (R, 8073 (A)).

Salix lucida Muhl. Uncommon. Raup: rare-occasional. -- Originally in a damp thicket at Aleck Meadow reservoir, now along the Sphagnum pond dam. (B, 5759).

Salix nigra Marsh. Uncommon. Raup: occasional. -- wet, disturbed sites. (B, 5718).

Salix purpurea L. Uncommon. Raup: Not Found. – Sphagnum Pond dam. (B, 5758).

Salix sericea Marsh. Uncommon. Raup: occasional-common. -- wet, disturbed sites. (B, 4985).

Brassicaceae

**Alliaria petiolata* (Bieb.) Vav. & Grande (*A. officinalis* Andrz.) Occasional. Raup: occasional. -- disturbed sites. (B, 5068).

Arabis canadensis L. Uncommon. Raup: rare. hilltops. (B, 5041).

Arabis laevigata (Muhl.) Poir. Occasional. Raup: occasional. – dry, upland woods. (B, 4988).

Arabis lyrata L. Uncommon. Raup: occasional. -- near or on limestone boulders. (B, 4923).

**Barbarea vulgaris* R. Br. Occasional. Raup: common. -- damp disturbed sites. (B, 5093).

**Brassica nigra* (L.) Koch Uncommon. Raup: occasional. -- disturbed sites, usually roadsides.

**Capsella bursa-pastoris* (L.) Medik. Now Uncommon. Raup: not found. -- old fields and lawns.

Cardamine pensylvanica Muhl. Occasional. Raup: common. -- damp, disturbed sites and cove woods. (B, 5101).

**Hesperis matronalis* L. Occasional. Raup: not found. -- disturbed sites and roadsides (B, 5099).

Lepidium virginianum L. Occasional. Raup: common-abundant. -- dry, disturbed sites.

Rorippa palustris (L.) Besser Uncommon. Raup: common. -- wet areas around the reservoirs and slow-moving streams

**Sinapis arvensis* L. (*Brassica arvensis* (L.) Kuntze) Occasional. Raup: common. -- disturbed sites.



Clethraceae

Clethra alnifolia L. Occasional. Raup: abundant (local). -- near ponds, reservoirs and swamps (B, 5569).

Ericaceae

Chamaedaphne calyculata (L.) Moench Common. Raup: abundant. -- edges of ponds and the island in Tamarack Pond. (B, 4973).

Chimaphila maculata (L.) Pursh Occasional. Raup: occasional. -- slope woods, usually sites with northern exposure. (B, 4874).

Epigaea repens L. Uncommon. Raup: occasional. -- open sites in slope woods. (B, 4981).

Gaultheria procumbens L. Occasional. Raup: occasional. -- lower slope and cove woods. (B, 4962).

Gaylussacia baccata (Wang.) Koch Abundant. Raup: abundant. -- slope woods and hilltops. (B, 5297).

Kalmia angustifolia L. Occasional. Raup: common. -- swampy woods near Sutherland Pond. (R, 7734 (NYS)).

Kalmia latifolia L. Abundant. Raup: common-abundant. -- north to northeast facing slopes. (B, 4837).

Kalmia polifolia Wang. Uncommon. Raup: not found. -- open, boggy sites. (B, 5125).

Lyonia ligustrina (L.) DC Not found. Raup: occasional. -- clearings and along fences. (R, 7805 (NY, NYS)).

Monotropa hypopithys L. Occasional. Raup: rare. -- upper slope woods. (B, 5573).

Monotropa uniflora L. Common. Raup: occasional-common. -- slope and cove woods. (B, 5407).

Pyrola americana Sweet (*P. rotundifolia* L.) Not found. Raup: rare. -- slope woods

Pyrola elliptica Nutt. Occasional. Raup: common. -- lower slope woods. (B, 5191).

Rhododendron maximum L. Uncommon. Raup: rare. -- north-facing slope woods, especially Canterbury Brook cove. (B, 4830).

Rhododendron periclymenoides (Michx.) Shinners (*R. nudiflorum* (L.) Torrey) Occasional. Raup: common-abundant. -- damp thickets. (B, 5107).

Rhododendron viscosum (L.) Torrey Common. Raup: abundant. -- edges of ponds and reservoirs and open, swampy ground. (B, 5360).

Vaccinium angustifolium Ait. (*V. pensylvanicum* Lam.) Abundant. Raup: abundant. -- hilltop and slope woods. (C, 4359).

Vaccinium corymbosum L. Common. Raup: abundant (Local). -- swampy ground and damp woods. (B, 4888).

Vaccinium macrocarpon Ait. Uncommon. Raup: abundant (Local). -- open sphagnum meadows. (G, 3844).

Vaccinium pallidum Ait. (incl. *V. vacillans* Kalm) Common. Raup: abundant-occasional. -- upper slope and hilltop woods. (B, 5035).

Vaccinium stamineum L. Common. Raup: occasional-common. -- upper slope and hilltop woods. (R, 7803 (NY, NYS)).

Primulaceae

Lysimachia ciliata L. (*Steironema ciliatum* (L.) Raf.) Uncommon. Raup: common. -- wet, disturbed sites and along streams. (B, 5438).

**Lysimachia nummularia* L. Uncommon. Raup: not found. -- the sawmill pond along Black Rock Brook. (B, 5183).

Lysimachia quadrifolia L. Occasional. Raup: abundant-occasional. -- throughout the Forest in woods. (B, 5178).

Lysimachia terrestris (L.) BSP. Occasional. Raup: common. -- open, wet sites at the edges of ponds, reservoirs, and streams. (B, 5393).

Trientalis borealis Raf. Uncommon. Raup: rare. -- rich cove woods. (B, 5714).

Grossulariaceae

Ribes rotundifolium Michx. Uncommon. Raup: occasional. -- woods near limestone erratics or enriched soil and thickets along the entry road. (B, 5003).

Crassulaceae

Penthorum sedoides L. Not found. Raup: common (Local). -- swampy ground in an old clearing near Aleck Meadow Reservoir. (R, 7686 (NY)).

**Sedum telephium* L (*S. triphyllum* (Haw.) S. Gray) Not found. Raup: occasional. -- roadsides and on old farm roads. (B, 5243).

Sedum sarmentosum Bunge Uncommon. Raup: not found. -- dry, disturbed sites. (B, 5243).

Saxifragaceae

Chrysosplenium americanum Schwein. Occasional. Raup: occasional. -- slow-moving streams and swampy woods. (B, 5066).

Heuchera americana L. Not found. Raup: rare. -- among loose rock on the west slope of Mt. Misery.

Mitella diphylla L. Occasional. Raup: occasional-common. -- lower slopes and coves. (B, 5006).

Saxifraga virginiana Michx. Occasional. Raup: occasional. -- rocky, slope woods. (B, 5042).

Rosaceae

Agrimonia gryposepala Wallr. Occasional. Raup: occasional-common. -- dry, disturbed sites. (B, 5456).

Amelanchier arborea (Michx. f.) Fern. (*A. canadensis* (L.) sensu Raup) Common. Raup: common. -- slopes. (B, 4964).

Aronia arbutifolia (L.) Pers. Occasional. Raup: common. -- edges of reservoirs and open, upland sites. (G, 165118). *A. x prunifolia* (Marsh.) Rehder, the hybrid of this species and the following is also present.

Aronia melanocarpa (Michx.) Ell. Occasional. Raup: common. -- hilltops and edges of ponds. (B, 4892).

Crataegus crus-galli L. Uncommon. Raup: not found. -- edges of old pastures.

Crataegus macrosperma Ashe Uncommon. Raup: occasional. -- dry upland woods and hilltops. (R, 7395 (NY)).

Fragaria virginiana Dcne. Uncommon. Raup: common (local). -- dry, open, disturbed sites. (B, 5063).

Geum canadense Jacq. Not found. Raup: occasional. -- damp thickets.

Geum laciniatum Murr. Not found. Raup: occasional. -- damp thickets.

**Malus pumila* Mill. Uncommon. Raup: occasional. -- abandoned orchards and old house sites. (B, 5264).

Physocarpus opulifolius (L.) Maxim. Occasional. Raup: occasional. -- upper slope woods.

**Potentilla argentea* L. Not found. Raup: rare. -- rocks at the edge of Sutherland Pond.

Potentilla arguta Pursh Uncommon. Raup: occasional-rare. -- open hilltops.

Potentilla canadensis L. Occasional. Raup: occasional-common. -- damp, disturbed sites. (B, 5109).

Potentilla norvegica L. Not found. Raup: common. -- damp thickets.

**Potentilla recta* L. Uncommon. Raup: occasional-common. -- open, disturbed sites.

Potentilla simplex Michx. Uncommon. Raup: common. -- dry clearings and open, upland woods.

Prunus pensylvanica L.f. Occasional-common. Raup: common. -- successional sites and hilltops.

Prunus pumila L. Not found. Raup: common. -- dry, upper slope woods, and hilltop thickets.

Prunus serotina Ehrh. Occasional. Raup: common. -- successional sites and slope woods. (C, 4888).

Prunus virginiana L. Uncommon. Raup: occasional. -- dry, disturbed sites and successional sites. (B, 5061).

**Pyrus communis* L. Uncommon. Raup: occasional. -- near old house sites. (R, 7547).

Rosa carolina L. Uncommon. Raup: common. -- thickets and roadsides. (C, 4884).

**Rosa multiflora* Thunb. Occasional. Raup: not found. -- damp, disturbed sites. (B, 5338).

Rosa palustris Marsh. Uncommon. Raup: occasional. -- open, swampy sites near Sutherland Pond. (B, 5902).

Rubus allegheniensis Porter Common. Raup: common. -- thickets at the edge of woods. (B, 5751).

Rubus flagellaris Willd. Occasional. Raup: not found. -- disturbed sites.

Rubus hispida L. Common. Raup: common-abundant. -- open, disturbed sites. (B, 5368).

Rubus idaeus L. Common. Raup: common. -- thickets at the edge of woods. (B, 5745).

Rubus occidentalis L. Occasional. Raup: occasional. -- damp thickets. (B, 5339).

Rubus odoratus L. Occasional. Raup: occasional-common. -- thickets at the edge of woods. (B, 4959).

Rubus pensylvanicus Poir. (*R. frondosus* Bigel.) Not found. Raup: occasional. -- roadsides.

**Rubus phoenicolasius* Maxim. Occasional. Raup: not found. -- disturbed sites in rich cove woods. (B, 5396).

Spiraea alba DuRoi (*S. latifolia* (Ait.) Borkh.) Occasional. Raup: common-abundant. -- wet, disturbed sites near the ponds and reservoirs. (B, 5315).

Spiraea tomentosa L. Occasional. Raup: common. -- wet, disturbed sites near reservoirs. (B, 5546).

Fabaceae

Amphicarpa bracteata (L.) Rickett & Stafleau Occasional. Raup: common (Local). -- rich cove woods.

Apios americana Medik. (*A. tuberosa* Moench.) Uncommon. Raup: rare-occasional. -- swampy woods near Sutherland Pond and along Mineral Spring Brook. (C, 4448).

Baptisia tinctoria (L.) R. Br. Not found. Raup: occasional. -- dry, upland roadsides.

Desmodium cuspidatum (Muhl.) DC. (*D. bracteosum* (Michx.) DC.) Uncommon. Raup: occasional. -- roadsides and dry hilltops. (B, 5735).

Desmodium glutinosum (Muhl.) Wood (*D. acuminatum* (Michx.) DC.) Not found. Raup: occasional-common. -- rocky, slope woods.

Desmodium nudiflorum (L.) DC. Occasional. Raup: occasional-common. -- in woods and roadsides. (B, 5832).

Desmodium paniculatum (L.) DC. Not found. Raup: occasional. -- dry, upper slope woods.

Desmodium rotundifolium DC. Not found. Raup: occasional. -- dry, upper slope woods.

Lespedeza capitata Michx. Uncommon. Raup: rare. – dry roadsides and open hilltops.

Lespedeza hirta (L.) Hornem. Not found. Raup: occasional. -- upper slope woods.

Lespedeza intermedia (S. Wats.) Britt. Not found. Raup: occasional. – roadsides and dry, upper slopes

Lespedeza violacea (L.) Pers. Not found. Raup: occasional. NYSM: T. NYNHP: G5 S3. -- upper slope woods.

**Lotus corniculata* L. uncommon. Raup: Not found. -- disturbed sites along Continental Road. (B, 5435).

**Melilotus alba* Desr. Uncommon. Raup: occasional. -- disturbed sites near Aleck Meadow Reservoir. (B, 5458).

**Melilotus officinalis* (L.) Pallas Uncommon. Raup: occasional. – roadsides and disturbed sites in coves and lower slopes. (B, 5141).

Robinia pseudo-acacia L. Occasional. Raup: common. -- successional sites and along Route 9W. (B, 5236).

**Trifolium arvense* L. Uncommon. Raup: not found. -- disturbed sites near Aleck Meadow Reservoir. (B, 5471).

**Trifolium aureum* Pollich (*T. agrarium* L.) Uncommon. Raup: common-abundant. -- damp, disturbed sites. (B, 5762).

**Trifolium campestre* Schreb. Uncommon. Raup: not found. – disturbed sites. (B, 5976).

**Trifolium dubium* Sibth. Uncommon. Raup: not found. -- disturbed sites near the Arthur's Pond Dam.

(B, 5310).

**Trifolium hybridum* L. Uncommon. Raup: common. -- disturbed ground near Aleck Meadow

Reservoir. (B, 5474).

**Trifolium pratense* L. Uncommon. Raup: occasional-common. -- wet to damp disturbed sites. (B,

5189).

**Trifolium repens* L. Uncommon. Raup: not found. -- disturbed ground below Sphagnum Pond Dam.

(B, 5372).

Vicia cracca L. Uncommon. Raup: rare-occasional. -- disturbed sites along the entry road and Route

9W.

Lythraceae

Decodon verticillatus (L.) Ell. Uncommon. Raup: common (Local). -- around Sutherland Pond and in

the swamp south of Jim's Pond. (G, 3840).

**Lythrum salicaria* L. Occasional. Raup: common-abundant. -- disturbed ground near dams. (B, 5755).

Rotala ramosior (L.) Hoehne Uncommon. Raup: not found. NYSM: T. NYNHP: G5 S2. -- just outside

the Forest along the Upper Reservoir. Reported by R. Mitchell (pers. comm.)

Thymelaeaceae

Dirca palustris L. Uncommon. Raup: rare. -- lower cove along Black Rock and Canterbury Brooks. (B,

5021).

Onagraceae

Circea lutetiana L. (*C. latifolia* Hill) Occasional. Raup: common. -- cove woods along the streams and on damp, disturbed sites. (B, 5398).

Epilobium angustifolium L. Uncommon. Raup: occasional. -- old clearings. Recently it has only been found on the top of Mt. Rascal.

Epilobium ciliatum Raf. (*E. glandulosum* Lehm.) Common. Raup: common. -- damp disturbed sites and along the edges or reservoirs.

Epilobium coloratum Muhl. Uncommon. Raup: occasional. -- Sphagnum Pond dam and damp, disturbed sites. (B, 5760).

Ludwigia palustris (L.) Ell. Occasional. Raup: common. -- slow-moving streams and along the edges of ponds and reservoirs. (B, 5900).

Oenothera biennis L. Uncommon. Raup: common. -- dry, disturbed sites and clearings. common just outside the Forest near the Upper Reservoir

Oenothera perennis L. Uncommon. Raup: occasional. -- roadsides, prefers damp soil. (B, 4840).

Melastomataceae

Rhexia virginica L. uncommon. Raup: rare. -- along the edge of Sutherland Pond. (B, 5901).

Nyssaceae

Nyssa sylvatica Marsh. Common. Raup: occasional-common. -- moist, cove woods and swamps. (B, 5709).

Cornaceae

Cornus amomum Mill. (*C. stolonifera* sensu Raup) Not found. Raup: occasional. -- near Arthur's Pond. (R, 7844 (NY)).

Cornus florida L. Occasional. Raup: common-abundant. -- lower slope and cove woods and along Route 9W. (B, 5278).

Cornus foemina Mill. (*C. racemosa* Lam.) Not found. Raup: common. -- roadsides and along streams. (R, 7835 (NY)).

Cornus rugosa Lam. Uncommon. Raup: common. -- rich, slope woods. (B, 5079).

Cornus sericea L. Uncommon. Raup: Not Found. – old field. (B, 5837).

Santalaceae

Comandra umbellata (L.) Nutt. Not found. Raup: rare-occasional. -- rocky upland woods.

Celastraceae

**Celastrus orbiculata* Thunb. Uncommon. Raup: not found. -- rich, disturbed sites. (B, 5123).

Celastrus scandens L. Not found. Raup: occasional. -- thickets and fencerows.

**Euonymus alata* (Thunb.) Sieb. Uncommon. Raup: not found. -- roadsides. (B, 4861).

Aquifoliaceae

Ilex verticillata (L.) A. Gray Common. Raup: common. -- moist woods and swamps. (B, 5143).

Nemopanthus mucronatus (L.) Loesener Uncommon. Raup: rare. -- swampy woods near Sutherland and Tamarack Pond. (R, 8131 (NY)).

Euphorbiaceae

Acalypha virginica L. Common. Raup: occasional. -- damp roadsides and disturbed sites. (B, 5592).

Chamaesyce vermiculata (Raf.) House (*Euphorbia vermiculata* Raf.) Not found. Raup: common. -- roads an parrking lots.

**Euphorbia cyparissias* L. Uncommon. Raup: not found. -- dry, open disturbed sites. (B, 5106).

**Euphorbia esula* L. Uncommon. Raup: not found. -- at an old building site at the base of Hulse Road. (B, 5224).

Buxaceae

**Pachysandra terminalis* Uncommon. Raup: Not Found. -- roadsides. (B, 5638).

Rhamnaceae

Ceanothus americanus L. Not found. Raup: common. -- openings in south-facing, upper slope woods.
(R, 7276 (NYS)).

**Rhamnus cathartica* L. Uncommon. Raup: occasional. -- damp roadsides. (B, 5067).

Vitaceae

Parthenocissus quinquefolia (L.) Planch. Occasional. Raup: common. -- rich cove woods. (B, 5487).

Vitis aestivalis Michx. Occasional. Raup: common. -- lower slope and cove woods. (R, 7396 (NY)).

Vitis labrusca L. Occasional. Raup: occasional-common. -- lower slope and cove woods near openings.
(B, 5366)

Vitis riparia Michx. Uncommon. Raup: not found. -- disturbed sites in coves. (B, 5874).

Linaceae

Linum virginianum L. Not found. Raup: rare-occasional. -- dry roadsides

Polygalaceae

Polygala sanguinea L. Not found. Raup: occasional. -- damp, disturbed sites.

Polygala verticillata L. Uncommon. Raup: rare. -- damp, disturbed sites. (B, 5772).

Staphyleaceae

Staphylea trifolia L. Not found. Raup: occasional. -- old fencerows and in open, slope woods.

Aceraceae

Acer pensylvanicum L. Common. Raup: common. -- lower slopes and coves. (B, 4820).

Acer rubrum L. Common. Raup: common-abundant. -- throughout, especially swampy areas. (B, 5250).

Acer saccharinum L. Uncommon. Raup: not found. -- along Brook Road. (B, 4816).

Acer saccharum Marsh. Common. Raup: common. -- lower slopes and coves. Often dominant in the coves. (B, 5017).

Acer spicatum Lam. Uncommon. Raup: rare. -- in coves along Black Rock Brook and Mineral Spring Brook. (R, 8071 (NY)).

Anacardiaceae

Rhus copallina L. Not found. Raup: common. -- hilltops, cliffs, and open, disturbed slopes. (R, 7312).

Rhus glabra L. Not found. Raup: common. -- open, disturbed sites. (R, 7549 (NYS)).

Rhus hirta (L.) Sudworth (*R. typhina* L.) Uncommon. Raup: common. -- roadsides and open, disturbed sites. (R, 7483 (NY)).

Toxicodendron radicans (L.) Kuntze (*Rhus toxicodendron* L.) Occasional. Raup: abundant. -- disturbed sites in rich woods. (G, 165086).

Toxicodendron vernix (L.) Kuntze (*Rhus vernix* L.) Not found. Raup: common. -- open swampy sites just outside the Forest. (R, 7715 (NYS)).

Simaroubaceae

**Ailanthus altissima* (Mill.) Swingle Occasional. Raup: not found. -- disturbed sites. (B, 5855).

Oxalidaceae

**Oxalis corniculata* L. (*O. europaea* sensu Raup p. p.) Occasional. Raup: common. -- along the roads. (B, 4842).

Oxalis dillenii Jacq. (*O. filipes* Small) Occasional. Raup: Occasional. -- along the roads, especially in the coves.

Oxalis stricta L. (*O. europaea* Jord.) Occasional. Raup: common. -- along the roads and in moist, disturbed sites. (B, 4896).

Geraniaceae

Geranium bicknellii Britt. Not found. Raup: occasional. --roadsides.

Geranium carolinianum L. Uncommon. Raup: not found. -- disturbed site along Brook Road. (B, 5505).

Geranium maculatum L. Common. Raup: common. -- disturbed sites in coves and lower slopes. (C, 4366).

**Geranium robertianum* L. Uncommon. Raup: not found. -- Hulse road, near Black Rock Brook. (B, 4947).

Balsaminaceae

Impatiens capensis Meerb. (*I. biflora* Walt.) Common. Raup: common. -- in damp, disturbed sites, around the reservoirs, and along streams. (B, 4833).

Impatiens pallida Nutt. Uncommon. Raup: not found. -- along Brook Road near Route 9W. (B, 4839).

Araliaceae

Aralia nudicaulis L. Occasional. Raup: common. -- coves and lower slopes.

Aralia racemosa L. Occasional. Raup: occasional. -- coves and slopes. (B, 4957).

**Aralia spinosa* L. Uncommon. Raup: not found. -- disturbed sites. (B, 5988).

Panax trifolius L. Occasional. Raup: common. -- coves and lower slopes (Schlessman 1991). (B, 5031).

Apiaceae

Angelica venenosa (Greenway) Fern. (*A. villosa* (Walt.) BSP.) Not found. Raup: occasional. -- along the roads.

Cicuta bulbifera L. Not found. Raup: rare. -- beside Jim's Pond.

Cicuta maculata L. Uncommon. Raup: occasional. -- open, wet sites.

Conium maculatum L. Uncommon. Raup: not found. – along Brook Road. (B, 4836).

Cryptotaenia canadensis (L.) DC. Occasional. Raup: common. -- cove woods. (B, 5231).

**Daucus carota* L. Uncommon. Raup: common. -- open, disturbed sites. (B, 5484).

Heracleum maximum Bartr. (*H. lanatum* Michx.) Uncommon. Raup: not found. -- open, moist, disturbed sites.

Hydrocotyle americana L. Common. Raup: common. -- very wet soil and slow-moving streams. (B, 4857).

Osmorrhiza claytonii (Michx.) Clarke Not found. Raup: common. -- disturbed sites in cove woods.

Sanicula marilandica L. Not found. Raup: occasional-common. -- damp roadsides

Sium suave Walt. Not found. Raup: rare. -- along Cascade Brook in Glycerine Hollow.

Zizia aptera (A. Gray) Fern. (*Z. cordata* (Walt.) Koch) Not found. Raup: occasional. -- old clearings and roads.

Zizia aurea (L.) Koch Not found. Raup: occasional. -- upper slope woods.

Gentianaceae

Bartonia virginica (L.) BSP. Uncommon. Raup: rare-occasional. -- dry, upland woods and open, disturbed sites. (C, 3775).

Gentiana clausa Raf. Not found. Raup: occasional. -- damp, disturbed sites. (R, 7901 (NY)).

Gentianopsis crinita (Froel.) Ma (*Gentiana crinita* Froel.) Not found. Raup: occasional. -- damp,

disturbed sites. (R, 7949 (NY)).

Apocynaceae

Apocynum androsaemifolium L. Not found. Raup: occasional-common. -- hilltops and dry, disturbed sites. (R, 7316 (NY)).

Apocynum cannabinum L. Uncommon. Raup: occasional. -- disturbed sites. (B, 4937).

Asclepiadaceae

Asclepias exaltata L. (*A. phytolaccoides* Pursh) Uncommon. Raup: occasional. -- damp, disturbed sites.

Asclepias incarnata L. Uncommon. Raup: occasional-common. -- wet, disturbed sites. (B, 5640).

Asclepias quadrifolia Jacq. Uncommon. Raup: rare-occasional. -- dry, upper slope woods. (B, 5983).

**Asclepias syriaca* L. Uncommon. Raup: not found. -- disturbed site at base of Hulse Road. (B, 5490).

**Cynanchum louiseae* Kartesz & Gandhi Uncommon. Raup: not found. -- rich woods near Route 9W. (B, 5139).

Solanaceae

**Solanum dulcamara* L. Uncommon. Raup: occasional-common. -- damp, disturbed sites. (B, 5080).

**Solanum nigrum* L. Uncommon. Raup: not found. -- along the roads.

Convolvulaceae

Calystegia sepium (L.) R. Br. (*Convolvulus sepium* L.) Uncommon. Raup: occasional. -- roadsides in cove woods. (B, 5819).

**Convolvulus arvensis* L. Uncommon. Raup: not found. -- disturbed ground. (B, 5490).

Cuscutaceae

Cuscuta gronovii Willd. Uncommon. Raup: common. -- damp, disturbed sites. (B, 5607).

Menyanthaceae

Nymphoides cordata (Ell.) Fern. (*N. lacunosa* (Vent.) Kuntze) Not found. Raup: common (local). -- Sutherland Pond. (R, 7751 (NY)).

Boraginaceae

**Echium vulgare* L. Uncommon. Raup: common. -- roadsides. (B, 5480).

Myosotis laxa Lehm. Uncommon. Raup: common. -- streams and along reservoirs. (B, 5526).

**Myosotis scorpioides* L. Occasional. Raup: not found. -- along reservoirs. (B, 5561).

Verbenaceae

**Phryma leptostachya* L. Uncommon. Raup: not found. -- disturbed ground. (B, 5740)

Verbena hastata L. Uncommon. Raup: occasional-common. -- damp, disturbed sites. (B, 5482).

Verbena urticifolia L. Uncommon. Raup: common. -- dry, disturbed sites. (B, 5494).

Lamiaceae

**Ajuga reptans* L. Occasional. Raup: not found. -- damp, roadsides in coves. (B, 5096).

**Clinopodium vulgare* L. (*Satureja vulgaris* (L.) Fritsch.) Occasional. Raup: occasional. -- disturbed sites in coves and lower slopes. (B, 5491).

Collinsonia canadensis L. Common. Raup: common. -- cove woods along streams and in damp, disturbed sites. (B, 5797).

Cunila origanoides (L.) Britt. Occasional. Raup: occasional. NYSM: T. NYNHP: G5 S3. -- hilltops, dry woods, disturbed sites..

Hedeoma pulegioides (L.) Pers. Occasional. Raup: occasional. -- roadsides. (B, 4911).

**Leonurus cardaica* L. Uncommon. Raup: occasional. -- disturbed sites near old houses and barns. (B, 5417).

Lycopus uniflorus Michx. Common. Raup: common. -- along streams, and damp, disturbed sites. (B, 5537).

**Mentha arvensis* L. Occasional. Raup: occasional. -- disturbed sites, especially roadsides. (B, 5528).

**Nepeta cataria* L. Uncommon. Raup: common. -- disturbed sites near old buildings. (B, 5433).

**Origanum vulgare* L. Not found. Raup: occasional. -- roadsides.

Prunella vulgaris L. Common. Raup: common. -- roadsides and damp, disturbed sites. (B, 4944).

Pycnanthemum tenuifolium Schrad. (*P. flexuosum* (Walt.) BSP.) Uncommon. Raup: common. -- open, disturbed sites near Aleck Meadow Reservoir. (B, 5460).

Scutellaria lateriflora L. Common. Raup: occasional-common. -- swamps and the edges of ponds and reservoirs. (B, 5529).

Callitrichaceae

Callitriche palustris L. Common. Raup: common. -- slow-moving streams and small ponds. (B, 5239).

Plantaginaceae

**Plantago lanceolata* L. Uncommon. Raup: common. -- roads and roadsides. (B, 5319).

**Plantago major* L. occasional. Raup: not found. -- roads and roadsides. (C, 4444).

**Plantago rugelii* Dcne. Occasional. Raup: common. -- roadsides. (B, 5605).

Oleaceae

Fraxinus americana L. (incl. *F. pensylvanica* sensu Raup) common. Raup: abundant. -- lower slopes and coves. (B, 4855).

Fraxinus nigra Marsh. Not found. Raup: occasional. -- coves and swampy sites. (R, 7499 (NY)).

**Syringa vulgaris* L. Uncommon. Raup: occasional. -- old house sites. (B, 5634).

Scrophulariaceae

Agalinis tenuifolia (Vahl) Raf. (*Gerardia tenuifolia* Vahl) uncommon. Raup: occasional. -- dry, open sites. (B, 4844).

Aureolaria flava (L.) Farwell uncommon. Raup: common. -- roadsides and open slope woods. (B, 5441).

Aureolaria pedicularia (L.) Raf. not found. Raup: occasional. -- roadsides and open, dry woods.

Aureolaria virginica (L.) Pennell Uncommon. Raup: occasional. -- open woods. (B, 5847).

Chelone glabra L. Occasional. Raup: common. -- along streams and damp, disturbed sites. (B, 4913).

Gratiola neglecta Torrey Occasional. Raup: not found. -- damp, disturbed sites. (B, 4879).

**Linaria vulgaris* Mill. Occasional. Raup: common. -- disturbed sites. (B, 5473).

Melampyrum lineare Desv. Occasional. Raup: occasional-common. -- dry, slope woods and roadsides. (B, 4823).

Mimulus ringens L. Occasional. Raup: common. -- along streams and edges of ponds and reservoirs. (B, 5493).

Pedicularis canadensis L. Occasional. Raup: common. -- dry, slope woods. (B, 5108).

**Penstemon tubaeformis* Nutt. Uncommon. Raup: not found. -- along Brook Road. (B, 5791).

**Verbascum blattaria* L. Not found. Raup: occasional. -- open, disturbed sites.

**Verbascum thapsus* L. Occasional. Raup: common. -- roads and disturbed sites. (B, 5459).

Veronica americana (Raf.) Schwein. Uncommon. Raup: occasional. -- open, swampy ground around reservoirs.

**Veronica arvensis* L. Occasional. Raup: not found. -- disturbed sites. (B, 5227).

**Veronica officinalis* L. Occasional. Raup: occasional-common. -- disturbed sites. (B, 4905).

Veronica scutellata L. Not foundl. Raup: common. -- along the edge of ponds.

**Veronica serpyllifolia* L. Occasional. Raup: not found. -- disturbed sites along the road and spruce plantations. (B, 5102).

Bignoniaceae

Catalpa bignonioides Walt. Uncommon. Raup: not found. -- near the parking lot. (B, 5846).

Orobanchaceae

Conopholis americana (L.) Wallr. Uncommon. Raup: rare. -- rich cove woods along lower Black Rock Brook. (B, 518)1.

Epifagus virginiana (L.) Bartr. Uncommon. Raup: rare. -- rich cove and lower slope woods on roots of *Fagus grandifolia*. (B, 4940).

Orobanche uniflora L. Uncommon. Raup: not found. -- disturbed roadside in Glycerine Hollow. (B, 5046).

Lentibulariaceae

Utricularia minor L. Uncommon. Raup: rare. NYSM: T. NYNHP: G5 S3. -- open water in the swamps.

Utricularia inflata Walt. Uncommon. Raup: not found. NYSM: E. NYNHP: G5 S1.-- Tamarack Pond. Mitchell et al. (1994). (B, 5371).

Campanulaceae

Campanula rotundifolia L. Uncommon. Raup: occasional-common. -- hilltops and cliffs.

Lobelia cardinalis L. Uncommon. Raup: common. -- streams and swamps. (B, 5824).

Lobelia dortmanna L. Uncommon. Raup: uncommon. -- Sutherland Pond. Voucher B, 5828).

Lobelia inflata L. Common. Raup: common. – dry, clearings and roadsides. (B, 5618).

Lobelia siphilitica L. Uncommon. Raup: not found. -- clearings near Black Rock Brook. (B, 5726).

Lobelia spicata Lam. Occasional. Raup: occasional-common. – damp, disturbed sites especially along the roads.

**Triodanis perfoliata* (L.) Nieuwl. Occasional. Raup: not found. Damp, disturbed sites. (B, 5370).

Rubiaceae

Cephalanthus occidentalis L. Common. Raup: common (local). -- along reservoirs and ponds. (B, 5445).

Galium asprellum Michx. Occasional. Raup: not found. -- disturbed sites near Black Rock Brook. (B, 4917).

**Galium boreale* L. Uncommon. Raup: not found. -- disturbed ground. (B, 5810).

Galium lanceolatum Torr. Occasional. Raup: common. -- openings in lower slopes.

Galium mollugo L. Occasional. Raup: occasional. -- disturbed sites and roadsides.

Galium obtusum Bigel. Occasional. Raup: not found. -- disturbed ground near Aleck Meadow Reservoir. (C, 3774).

Galium tinctorum L. Not found. Raup: occasional. -- edges of ponds.

Galium trifidum L. Uncommon. Raup: common. -- swampy areas.

Galium triflorum Michx. Common. Raup: occasional-common. -- damp to wet, disturbed ground. (B, 5188).

Mitchella repens L. Occasional. Raup: occasional. -- slope woods. (B, 4935).

Caprifoliaceae

Diervilla lonicera Mill. Uncommon. Raup: common. -- upper slope wood, on hilltops and on cliffs. (B, 5570).

Lonicera dioica L. Not found. Raup: occasional. -- thickets and disturbed sites.

**Lonicera morrowii* A. Gray Uncommon. Raup: not found. -- disturbed ground near Aleck Meadow Reservoir.

Sambucus canadensis L. Uncommon. Raup: occasional-common. -- disturbed sites. (B, 5389).

**Sambucus racemosa* L. (*S. pubens* Michx.) Not found. Raup: occasional. -- thickets

Viburnum acerifolium L. Occasional. Raup: abundant. -- lower slopes and coves. (B, 5238).

Viburnum dentatum L. Uncommon. Raup: occasional. -- wet clearings and roadsides. (B, 5306).

Viburnum lentago L. Uncommon. Raup: common-occasional. -- swampy woods. (B, 5234).

Viburnum nudum L. (*V. cassinoides* L.) Occasional. Raup: common. -- open, swampy sites. (B, 5079).

Viburnum prunifolium L. Occasional. Raup: occasional. -- damp clearings. (C, 4353).

Viburnum rafinesquianum Schultes (*V. affine* Bush) Uncommon. Raup: abundant. -- hilltops and openings in slope woods.

Asteraceae

**Achillea millefolium* L. Occasional. Raup: occasional-common. -- disturbed sites. (B, 5346).

Ambrosia artemisiifolia L. Occasional. Raup: occasional. -- disturbed sites. (B, 5606).

Anaphalis margaritacea (L.) Benth. & Hook. f. Occasional. Raup: occasional. -- roadsides. (B, 5475).

Antennaria neglecta Greene (incl. *A. neodioica* Greene) Occasional. Raup: occasional. -- roadsides and damp, disturbed sites. (B, 5386).

Antennaria plantaginifolia (L.) Rich. Occasional. Raup: common. -- along the roads. (B, 5077).

**Arctium minus* (Hill.) Bernh. Uncommon. Raup: common. -- roadsides.

Aster acuminatus Michx. Occasional. Raup: common. -- lower slopes and coves. (C, 3941).

Aster cordifolius L. Occasional. Raup: not found. -- open woods, especially near roads. Not reported by Raup, but it can be difficult to distinguish from *A. lowrieanus*, so that some of Raup's reports of that species may be *A. cordifolius*. (B, 5562).

Aster divaricatus L. Common. Raup: common. -- disturbed sites. (B, 5204).

Aster ericoides L. Uncommon. Raup: not found. – Sphagnum pond dam. (B, 5873).

Aster lanceolatus Willd. (*A. paniculatus* Lam.) Uncommon. Raup: occasional. -- damp, disturbed sites. (B, 5616).

Aster lateriflorus(L.) Britt. Uncommon. Raup: Occasional. -- hilltops and dry roadsides. (C, 4888).

Aster linariifolius L. Occasional. Raup: occasional. – dry, roadsides and hilltops. (B, 4808).

Aster lowrieanus Porter Uncommon. Raup: common. -- dry, disturbed sites.

Aster macrophyllus L. Occasional. Raup: common-abundant. -- damp roadsides. (B, 4938).

Aster novae-angliae L. Uncommon. Raup: common. -- dry, disturbed sites. (B, 4915).

Aster patens Ait. Uncommon. Raup: occasional-common. -- dry, disturbed sites.

Aster paternus Cronq. (*Seriocarpus asteroides* (L.) BSP) Uncommon. Raup: occasional-common. -- upper slope woods and occasionally along the roads. (C, 3777).

Aster pilosus Willd. Occasional. Raup: occasional-common NYSM: E. NYNHP: G4G5 S2S3. -- disturbed sites, often along the edges of reservoirs. (B, 5613).

Aster puniceus L. Uncommon. Raup: occasional. -- damp disturbed sites and at the edges of the

reservoirs.

Aster racemosus Ell. Uncommon. Raup: Not found. -- damp, disturbed sites. (B, 5457).

Aster schreberi Nees. Occasional. Raup: occasional-common. – NYNHP: G4 S3. disturbed sites. (B, 5869).

Aster umbellatus Mill. Occasional. Raup: common. -- damp disturbed sites. (B, 5612).

Bidens cernuua L. Common. Raup: occasional. -- along the edges of the reservoirs and at disturbed sites along the streams. (B, 4918).

Bidens connata Muhl. Occasional. Raup: occasional-common. -- along the edges of the reservoirs.

Bidens coronata (L.) Britt. Uncommon. Raup: not found. -- damp, disturbed sites. (B, 4891).

Bidens frondosa L. Occasional. Raup: occasional-common. -- edges of reservoirs and openings along streams.

**Centaurea nigra* L. Occasional. Raup: not found. -- open, disturbed sites. (B, 5611).

**Cichorium intybus* L. Uncommon. Raup: not found. -- roadsides.

**Cirsium arvense* (L.) Scopoli Uncommon. Raup: occasional. – damp, disturbed sites, especially roadside ditches. (B, 5388).

Cirsium discolor (Muhl.) Spreng. Uncommon. Raup: not found. -- moist, open, disturbed sites. (B, 5619).

**Cirsium vulgare* (Sav.) Tenore (*C. lanceolatum* sensu Raup) Not found. Raup: occasional. -- old fields and clearings.

Conyza canadensis (L.) Cronq. (*Erigeron canadensis* L.) Common. Raup: occasional. -- on and along the roads. (B, 5595).

Erectites hieracifolia (L.) Raf. Occasional. Raup: common. -- disturbed sites, especially roadsides. (B, 5431).

Erigeron annuus (L.) Pers. (*E. ramosus* sensu Raup) Occasional. Raup: common. -- disturbed sites. (B, 5364).

Erigeron philadelphicus L. (*E. canadensis* sensu Raup) Uncommon. Raup: occasional. -- disturbed sites. (B, 5098).

Erigeron pulchellus Michx. Occasional. Raup: occasional. -- open, disturbed sites. (B, 5730)

Eupatorium perfoliatum L. Uncommon. Raup: common. -- open, disturbed sites. (B, 5754).

Eupatorium purpureum L. Occasional. Raup: common. -- disturbed sites, especially roadsides. (B, 4956).

Eupatorium rugosum Houtt. (*E. urticifolium* Reich.) Occasional. Raup: occasional. -- disturbed sites in rich woods. (B, 4834).

Eupatorium sessilifolium L. Uncommon. Raup: rare. -- open, upper slope woods.

Euthamia graminifolia (L.) Nutt. Occasional. Raup: occasional. -- open, disturbed sites. (B, 4919).

**Galinsoga quadriradiata* Ruiz & Pavon (*G. ciliata* (Raf.) Blake) Occasional. Raup: occasional. -- disturbed sites, especially in rich, recently disturbed soil. (B, 4942).

Gnaphalium obtusifolium L. Uncommon. Raup: occasional. -- disturbed sites. (B, 4912).

**Gnaphalium uliginosum* L. Uncommon. Raup: occasional. -- damp, disturbed sites. (B, 5449).

Helianthus decapetalus L. Occasional. Raup: common. -- damp, open sites. (B, 5477).

Helianthus divaricatus L. Uncommon. Raup: common. -- on roadsides and hilltops. (B, 5808).

Heliopsis helianthoides (L.) Sweet Uncommon. Raup: not found. -- just outside the Forest near the Upper Reservoir. (B, 5825).

**Hieracium aurantiacum* L. Not found. Raup: occasional. -- old clearings.

**Hieracium caespitosum* Dumort. (*H. pratense* Tausch) Uncommon. Raup: occasional. -- open, disturbed sites. (B, 5719).

Hieracium paniculatum L. Occasional. Raup: occasional. -- dry, upper slope woods and roadsides. (B, 4824).

Hieracium venosum L. Uncommon. Raup: occasional. -- old clearings and old fields. (B, 5078).

Krigia biflora (Walt.) Blake Not found. Raup: rare. -- moist woods.

Krigia virginica (L.) Wild. Not found. Raup: rare-occasional. -- hilltops.

Lactuca canadensis L. Not found. Raup: occasional-common. -- disturbed sites.

**Lapsana communis* L. Occasional. Raup: not found. -- disturbed sites. (B, 5175).

**Leucanthemum vulgare* Lam. (*Chrysanthemum leucanthemum* L.) Uncommon. Raup: common. -- disturbed sites. (B, 5176).

Prenanthes altissima L. Uncommon. Raup: not found. -- damp, disturbed sites. (B, 4894).

Prenanthes trifoliata (Cass.) Fern. Not found. Raup: common. -- roadsides.

**Rudbeckia hirta* L. Uncommon. Raup: common. -- along the roads. (B, 4843).

Senecio obovatus Muhl. Occasional. Raup: common. -- rich woods, lower slopes and coves. (B, 5049).

Solidago arguta Ait. Not found. Raup: common-abundant. – roadsides and upper slope woods.

Solidago bicolor L. Occasional. Raup: common. -- upper slope woods, hilltops and, roadsides. (B, 4909).

Solidago caesia L. Common. Raup: common-abundant. -- disturbed sites and openings in slope woods. (B, 4899).

Solidago canadensis L. Common. Raup: occasional-common. -- in disturbed sites and roadsides.

Solidago flexicaulis L. Uncommon. Raup: not found. -- disturbed sites in rich, cove woods and near limestone erratics. (B, 4835).

Solidago juncea Ait. Common. Raup: common. -- disturbed sites. (B, 4822).

Solidago odora Ait. Not found. Raup: occasional. – dry, upland woods and roadsides.

Solidago puberula Nutt. Not found. Raup: common. -- dry thickets and meadows.

Solidago rugosa Mill. Occasional. Raup: common. -- disturbed sites. (B, 5604).

Solidago squarrosa Muhl. Uncommon. Raup: not found. -- hilltops. (B, 5583).

Solidago ulmifolia Muhl. Occasional. Raup: not found. -- roadside near parking lot. (B, 5838).

**Taraxacum laevigatum* (Wild) DC. Occasional. Raup: not found. -- along the roads. (B, 5294).

**Taraxacum officinale* L. (*T. palustre* var. *vulgare* (Lam.) Fern.) Not found. Raup: occasional. -- in the roads and on roadsides.

**Tussilago farfara* L. Occasional. Raup: occasional. -- recently disturbed sites, especially roadsides. (B,

5025).

Xanthium strumarium L. Uncommon. Raup: not found. -- disturbed sites in rich woods. (B, 5815).

Alismataceae

Alisma subcordatum Raf. (*A. plantago-aquatica* sensu Raup) Uncommon. Raup: occasional. -- along the edge of some ponds.

Sagittaria graminea Michx. Uncommon. Raup: occasional. -- swamp near Sutherland Pond. (G, 3846)

Sagittaria latifolia Willd. Uncommon. Raup: rare. -- swamp near Sutherland Pond.

Hydrocharitaceae

Elodea nuttallii (Planch.) St. John Uncommon. Raup: not found. -- sawmill pond along Black Rock Brook. (B, 5193).

Potamogetonaceae

Potamogeton natans L. Not found. Raup: rare-occasional. -- Sutherland Pond.

Potamogeton spirillus Tuckerm. Uncommon. Raup: not found. -- brook and fen below Sphagnum Pond dam. (B, 5610).

Araceae

Arisaema triphyllum (L.) Schott Common. Raup: common. -- rich, wet, coves and swampy woods. (B, 5054).

Calla palustris L. Uncommon. Raup: occasional. -- the swamp below Jim's Pond. (R, 8136 (NYS)).

Peltandra virginica (L.) Schott Uncommon. Raup: common. -- in the swamp south of Sutherland Pond.

Symplocarpus foetidus (L.) Salisb. Uncommon. Raup: not found. -- in swampy woods near Continental Road. (B, 4978).

Lemnaceae

Lemna minor L. Uncommon. Raup: not found. -- pond at Annie's Cabin. The determination is tentative.

Commelinaceae

**Commelina communis* L. Occasional. Raup: not found. -- damp, disturbed sites. (B, 5488).

Eriocaulaceae

Eriocaulon aquaticum (Hill) Druce (*E. septangulare* With.) Occasional. Raup: common. -- shallow water of the ponds and reservoirs. (B, 5897).

Juncaceae

Juncus acuminatus Michx. Occasional. Raup: common-abundant. -- edges of ponds and reservoirs. (W,

2069).

Juncus brevicaudatus (Engelm.) Fern. Uncommon. Raup: rare. -- Formerly found near Tamarack Pond, now on swampy ground and along the streamside at White Oak Corner.

Juncus canadensis Gay Occasional. Raup: not found. -- at the edges of the ponds and reservoirs. (B, 5466).

Juncus debilis A. Gray Not found. Raup: occasional NYSM: E. NYNHP: G5 S1 . -- swampy thickets. (R, 7707 (NY)).

**Juncus dichotomus* Ell. Not found. Raup: rare. -- swampy thickets

Juncus effusus L. Common. Raup: common. -- damp roadsides and along the edge of the reservoirs and ponds. (B, 5538).

Juncus marginatus Rostk. Uncommon. Raup: common. -- near Aleck Meadow Reservoir. (C, 3776).

Juncus tenuis Willd. Common. Raup: common. -- damp roadsides and along the edge of the reservoirs and ponds. (B, 5156).

Luzula campestris (L.) DC. Common. Raup: common. -- along trails and roads and occasionally in other dry, disturbed sites. (B, 5046).

Cyperaceae

Carex albicans var. *emmonsii* (*C. varia* sensu Raup) Uncommon. Raup: occasional NYSM: R. NYNHP: G5T5 S3. -- upper slope woods.

Carex albursina Sheldon Uncommon. Raup: occasional. -- slope woods.

Carex annectens (Bickn.) Bickn. (*C. vulpinoidea* sensu Raup) Common. Raup: common. -- wet, disturbed sites. (B, 5403).

Carex argyrantha Tuckerm. (*C. foena* sensu Raup *pro parte*) Occasional. Raup: occasional NYSM: T. NYNHP: G5 S3. -- disturbed sites and open woods. (C, 3783).

Carex atlantica Bailey (*C. howei* Mackz.) Occasional. Raup: occasional. -- at the edge of ponds and and in damp, disturbed sites in the coves. (B, 5056).

Carex blanda Dewey Uncommon. Raup: not found. -- along Aleck Meadow Reservoir and near the Chlorinator. (C, 4390).

Carex bromoides Schkuhr Occasional. Raup: occasional. -- in swampy woods and along slow-moving streams. (R, 8137 (NY)).

Carex brunneascens (Pers.) Poir. Uncommon. Raup: not found. -- wet or swampy woods. (B, 5446).

Carex canescens L. Uncommon. Raup: occasional. -- edges of ponds and reservoirs. (R, 8139).

Carex cephalophora Muhl. Not found. Raup: occasional. -- in dry, slope woods. (R, 7273).

Carex communis Bailey Occasional. Raup: occasional. -- dry, slope woods. (B, 5157).

Carex comosa Boott Occasional. Raup: occasional. -- Glycerine Hollow swamp and edges of ponds and reservoirs. (B, 5148).

Carex crinita Lam. Occasional. Raup: common. -- Glycerine Hollow swamp and edges of ponds and reservoirs. (B, 5301).

Carex debilis Michx. Occasional. Raup: occasional. -- Glycerine Hollow swamp. (B, 5155).

Carex digitalis Willd. Occasional. Raup: occasional. -- damp, disturbed sites, especially in coves. (B,

5522).

Carex disperma Dewey Uncommon. Raup: not found. -- along Black Rock Brook. (B, 5492).

Carex festucacea Schkuhr Uncommon. Raup: not found. -- edges of ponds and reservoirs. (C, 3770).

Carex foena Willd. Not found. Raup: occasional. -- upper slope woods.

Carex gracillima Schwein. Occasional. Raup: occasional. -- lower slopes and coves. (B, 5440).

Carex granularis Muhl. Not found. Raup: occasional. -- pond margins. This species is generally a calciphile and, if found in the Forest, would be quite rare.

Carex gynandra Schwein. (*C. crinita* var *gynandra* (Schwein.) Schwein. & Torrey) Occasional. Raup: common. -- edges of ponds and reservoirs. (R, 7233 (NY)).

Carex hirsutella Mackz. (*C. triceps* Mackz.) Not found. Raup: occasional. -- wet open sites.

Carex interior Bailey Uncommon. Raup: not found. -- swamps. (B, 5146).

Carex intumescens Rudge Occasional. Raup: occasional. -- open, wet sites, especially near ponds and reservoirs. (B, 5153).

Carex laevigata (Kük.) Mackenzie Uncommon. Raup: not found. -- Reported by J. G. Barbour from the swamp below Jim's Pond.

Carex laxiflora Lam. (*C. anceps* Willd.) Uncommon. Raup: occasional. -- cove woods. (B, 5706).

Carex leptalea Wahl. Not found. Raup: common. -- wet places in the coves. (R, 7450 (NY)).

Carex lucorum Willd. Uncommon. Raup: rare. -- upper slopes and hilltops. (R, 7245 (NYS)).

Carex lupuliformis Sartw. ex Dewey Uncommon. Raup: not found. NYSM: R. NYNHP: G3G4 S3. --

Sphagnum pond dam. (B, 5879).

Carex lurida Wahl. Common-abundant. Raup: abundant. -- edges of ponds and reservoirs and wet openings in lower slope and cove woods. (B, 5560).

Carex muhlenbergii Schk. Uncommon. Raup: not found. -- Reported by J. G. Barbour from pine plantations along Continental Road.

Carex normalis Mackz. Uncommon. Raup: not found. -- Aleck Meadow. (C, 4383).

Carex pallescens L. Uncommon. Raup: occasional. -- damp roadsides. (R, 7464 (NY)).

Carex peckii Howe Uncommon. Raup: not found. -- rich cove woods near Route 9W. (C, 4349).

Carex pedunculata Muhl. Occasional. Raup: occasional. -- along streams in cove woods. (B, 5087).

Carex pensylvanica Lam. Common. Raup: common. -- dry, slope woods. (B, 4960).

Carex platyphylla Carey Occasional. Raup: common. -- lower slope and cove woods. (C, 4350).

Carex prasina Wahl. Occasional. Raup: occasional. -- near streams in the wet, cove woods. (B, 5174).

Carex radiata (Wahl.) Small (*C. rosea* var. *radiata* (Wahl.) Dewey) Occasional. Raup: occasional-common. -- damp, cove woods. (B, 5331).

Carex rosea Schk. (incl. *C. convoluta* Mackz.) Common. Raup: occasional. -- damp sites in the cove and lower slope woods. (B, 5055).

Carex scabrata Schwein. Uncommon. Raup: occasional. -- swampy sites in the coves. (R, 7446).

Carex scoparia Schkuhr Common. Raup: common. -- edges of ponds and reservoirs and occasionally on wet roadsides. (B, 5357).

Carex seorsa Howe Uncommon. Raup: not found. NYSM: T. NYNHP: G4 S2. Glycerine Hollow swamp. (B, 5146).

Carex sparganioides Muhl. Not found. Raup: occasional. -- rocky slopes. (R, 7638 (NY)).

Carex stipata Muhl. Common. Raup: occasional-common. -- swampy ground and along streams in the lower slope and cove woods. (B, 5129).

Carex stricta Lam. Common. Raup: common. -- open, swampy ground. (B, 5145).

Carex swanii (Fern.) Mackz. (*C. virescens* var. *swanii* Fern.) Uncommon. Raup: occasional. -- upland woods and along the ridges. (C, 3782).

Carex torta Boott Uncommon. Raup: occasional. -- along streams in the cove woods. (C, 4342).

Carex tribuloides Wahl. Not found. Raup: occasional. -- near ponds and reservoirs. Some of the specimens identified as *C. scoparia* Schk. may be this species.

Carex trisperma Dewey Uncommon. Raup: rare. -- wet sites in lower slope woods. (B, 5421).

Carex virescens Muhl. Occasional. Raup: common. -- slope woods. (B, 5440).

Carex vulpinoidea Michx. Raup: -- wet, disturbed soils. (B, 5394).

Cyperus strigosus L. Common. Raup: common. -- edges of ponds and reservoirs and wet disturbed sites. (B, 5609).

Dulichium arundinaceum (L.) Britt. Uncommon. Raup: not found. -- swamps south of Sutherland Pond. (B, 5348).

Eleocharis acicularis (L.) R. & S. Occasional. Raup: abundant (Local). -- edges of reservoirs and ponds. (B, 5311).

Eleocharis elliptica Kunth (*E. capitata* (L.) R. Br.) Not found. Raup: rare-occasional. -- peaty shore margins.

Eleocharis obtusa (Willd.) Schultes Common. Raup: common-abundant (local). -- edges of reservoirs and ponds in shallow water. (B, 5268).

Eleocharis palustris (L.) R. & S. Occasional. Raup: occasional. -- shallow water in ponds, especially Sutherland Pond. (G, 3848).

Scirpus atrovirens Muhl. Common. Raup: common-abundant. -- along the edge of ponds and reservoirs. (B, 5363).

Scirpus cyperinus (L.) Kunth Common. Raup: common. -- in wet, open sites, especially along the edge of ponds and reservoirs. (B, 4880).

Scirpus hattorianus Makino (*S. planifolius* Muhl. sensu Raup) Uncommon. Raup: rare-occasional. -- near reservoirs and ponds. (R, 7235 (NYS)).

Scirpus verecundus Fern. Uncommon. Raup: not found. -- wet woods near Upper Reservoir (B, 5268).

Poaceae

**Agrostis capillaris* L. (*A. tenuis* Sibth.) Occasional. Raup: common. -- roadsides and disturbed sites. (B, 5518).

Agrostis hiemalis (Walt.) BSP. Occasional. Raup: not found. -- damp, disturbed sites. (B, 5384).

Agrostis perennans (Walt.) Tuckerm. Uncommon. Raup: occasional. -- Glycerine Hollow. (B, 4882).

Agrostis scabra Willd. Occasional. Raup: occasional-common. -- moist, disturbed sites edges of reservoirs. (C, 3935).

Agrostis stolonifera L. Occasional. Raup: rare-occasional. -- moist, disturbed sites and edges of reservoirs. (B, 4887).

Andropogon gerardii Vitm. Uncommon. Raup: not found. -- Carpenter road overlooking Glycerine Hollow. (C, 3919).

**Anthoxanthum odoratum* L. Common. Raup: common. -- dry, disturbed sites, especially roadsides and trails. (B, 5163).

**Arrenatherum elatius* (L.) Beauv. Not found. Raup: occasional. -- old fields and roadsides. (R, 7489). (NY).

**Avena sativa* L. Not found. Raup: occasional. -- along the roads.

Brachyelytrum erectum (Schreb.) Beauv. Occasional. Raup: common. -- cove and slope woods and in disturbed sites. (C, 3928).

Bromus ciliatus L. Not found. Raup: occasional. -- along the roads. (R, 7930).

**Bromus commutatus* Schrader Uncommon. Raup: not found. -- open, disturbed sites. (C, 4377).

**Bromus inermis* Leyss. Uncommon. Raup: not found. -- open, disturbed sites. (C, 4384).

Bromus pubescens Muhl. (*B. purgans* sensu Raup) Not found. Raup: occasional. -- rocky, upper slope woods. (B, 5733).

Calamagrostis canadensis (Michx.) Beauv. Occasional. Raup: occasional-common. -- damp, disturbed sites and damp openings in slope woods. (R, 7596 (NY)).

Calamagrostis cinnoides (Muhl.) Barton Uncommon. Raup: occasional. -- damp, disturbed sites in cove woods

Cinna arundinacea L. Occasional. Raup: occasional. -- damp, cove woods. (B, 5617).

Dactylis glomerata L. Uncommon. Raup: occasional-common. -- open, disturbed sites. (B, 5166).

Danthonia compressa Austin Uncommon. Raup: common. -- dry, disturbed sites. (B, 5451).

Danthonia spicata (L.) Beauv. Common. Raup: abundant (local). -- hilltops and upper slope woods. (R, 7249 (NYS)).

Deschampsia flexuosa (L.) Trin. Common. Raup: common-abundant. -- hilltops, upper slope woods, and roadsides. (B, 5418).

**Digitaria ischaemum* (Schreb.) Schreb. Uncommon. Raup: occasional-common. -- disturbed sites and roadsides. (R, 7904 (NY)).

**Echinchloa crusgalli* (L.) Beauv. Uncommon. Raup: not found. -- damp to wet, open, disturbed sites. (B, 5534).

**Echinochloa muricata* (Michx.) Fern. Not found. Raup: common. -- wet areas, especially near the reservoirs. (R, 7906 (NY)).

Elymus hystrix L. (*Asprella hystrix* (L.) Humb.) Occasional. Raup: common. -- dry slope woods and in disturbed sites. (B, 5376).

Elymus riparius Wieg. Not found. Raup: occasional. -- along the edge of the reservoirs. (B, 5578).

Elymus villosus Muhl. Uncommon. Raup: not found. -- in open, disturbed sites. (C, 3769).

**Elytrigia repens* (L.) Nevski (*Agropyron repens* (L.) Beauv.) Not found. Raup: occasional-common. --

waste places

**Festuca rubra* L. Uncommon. Raup: not found. -- recently planted to cover construction, not expected to persist. (B, 5373).

Festuca subverticillata (Pers.) Alexe' ex (*F. obtusa* Spreng.) Uncommon. Raup: occasional-common. -- damp to wet openings in cove woods. (B, 5164).

Glyceria canadensis (Michx.) Trin. Common. Raup: common-abundant. -- edges of ponds and reservoirs and open swamps. (B, 5307).

Glyceria melicaria (Michx.) Hubb. Occasional. Raup: common. -- along the streams in cove woods.

Glyceria striata (Lam.) Hitchc. Uncommon. Raup: common-abundant. -- along streams and ponds. (B, 5731).

Leersia oryzoides (L.) Sw. Uncommon. Raup: occasional. -- open, wet sites, especially near streams. (R, 7800).

Leersia virginica Willd. Common. Raup: occasional-common. -- wet woods and roadsides. (B, 4881).

**Lolium perenne* L. (*L. multiflorum* Lam.) Occasional. Raup: occasional-common. -- open, damp, disturbed sites. (B, 5332).

**Lolium pratense* (Hudson) S. Darbyshire (*Festuca elatior* L.) Not found. Raup: occasional. -- old clearings and roadsides.

Microstegium vimineum (Trin.) A. Camus Uncommon. Raup: not found. -- spreading, along Continental road. Reported by J. G. Barbour (pers. comm.)

Muhlenbergia mexicana (L.) Trin. Not found. Raup: occasional. -- damp roadsides. (B, 4883).

Muhlenbergia schreberi J. F. Gmel. Uncommon. Raup: Not Found. – edge of Aleck Meadow Reservoir.

(B, 5594).

Muhlenbergia tenuiflora (Willd.) BSP. Occasional. Raup: occasional. -- dry sites in the slope woods. (B, 5404).

Oryzopsis asperifolia Michx. Not found. Raup: Occasional. -- dry upland woods. (R, 7274 (NYS)).

Oryzopsis racemosa (Sm.) Not found. Raup: Occasional. -- summit of Mt. Misery. (R, 7767 (NY)).

Panicum acuminatum Sw. (*P. lindheimeri* Nash) Common. Raup: occasional. -- hilltops, upper slope woods, and roadsides. (B, 4901).

Panicum capillare L. Not found. Raup: occasional-common. -- on roadsides.

Panicum clandestinum L. Uncommon. Raup: not found. -- wet, disturbed ground near Arthur's Pond dam. (B, 5316).

Panicum commutatum Schultes Uncommon. Raup: not found. -- on the ridges overlooking Glycerine Hollow. (C, 3916).

Panicum dichotomum L. Occasional. Raup: common. -- slope woods and roadsides. (C, 3780).

Panicum depauperatum Muhl. Not found. Raup: occasional. -- roadsides. (B, 5344).

Panicum dichotomiflorum Michx. Uncommon. Raup: not found. -- disturbed ground near parking lot. (B, 5732).

Panicum latifolium L. Common. Raup: common. -- upper slope woods and hilltops. (C, 4376).

Panicum linearifolium Scribn. Occasional. Raup: common-occasional. -- dry roadsides. (C, 4839).

Panicum rigidulum Nees Uncommon. Raup: not found. – Arthur's Pond dam. (B, 5598).

Phalaris arundinacea L. Uncommon. Raup: not found. – disturbed sites along Brook Road. (B, 5506).

**Phleum pratense* L. Uncommon. Raup: occasional. -- open, disturbed sites. (B, 5165).

**Phragmites australis* (Cav.) Trin. Uncommon. Raup: not found. -- edges of reservoirs. (B, 5752).

**Poa annua* L. Occasional. Raup: not found. -- roadsides.

**Poa compressa* L. Uncommon. Raup: common-abundant. -- roadsides. (R, 7248 (NY)).

**Poa nemoralis* L. Uncommon. Raup: not found. – Arthur's Pond dam. (B, 5343).

Poa palustris L. Uncommon. Raup: occasional. -- damp roadsides and the edges of reservoirs.

**Poa pratensis* L. Occasional. Raup: occasional. -- disturbed sites and sometimes planted at constructions sites. (B, 5476).

Schizachyrium scoparium (Michx.) Nash (*Andropogon scoparius* Michx.) Common. Raup: common-abundant (Local). -- hilltops and open, dry, disturbed sites. (B, 4821).

**Setaria pumila* (Poir.) Schultes (*S. lutescens* (Weigel) Hubb.) Occasional. Raup: common. -- disturbed sites, especially roadsides. (B, 4904).

Sorghastrum nutans (L.) Nash Uncommon. Raup: not found. -- ridges overlooking Glycerine Hollow. (C, 3920).

Sphenopholis obtusata (Michx.) Scribn. (incl. *S. pallens* sensu Raup) Not found. Raup: occasional. – roadsides. (R, 7535 (NY)).

Sparganiaceae

Sparganium americanum Nutt. Uncommon. Raup: common-occasional. -- shallows in Sutherland Pond, Jim's Pond and swamps. (B, 5347).

Typhaceae

Typha angustifolia L. Uncommon. Raup: rare-occasional. -- wet, open, disturbed sites. (B, 5381).

Typha latifolia L. Uncommon. Raup: common. -- wet, open, disturbed sites. (B, 5485).

Pontederiaceae

Pontederia cordata L. Uncommon. Raup: occasional . -- around Sutherland Pond (G, 3838).

Liliaceae

Allium tricoccum Ait. Uncommon. Raup: not found. -- near parking lot.

**Allium vineale* L. Occasional. Raup: occasional. -- damp, disturbed sites, especially along Continental Road. (B, 5427).

Erythronium americanum Ker Occasional. Raup: occasional-common. -- cove woods. (B, 5026).

Hemerocallis fulva (L.) L. Uncommon. Raup: not found. -- disturbed woods along Reservoir road.

Hypoxis hirsuta (L.) Cov. Occasional. Raup: common. -- damp roadsides and trails. (B, 5048).

Lilium canadense L. Not found. Raup: occasional. -- old meadows. (R, 7605 (GH)).

Lilium philadelphicum L. Uncommon. Raup: occasional. -- thickets and in the old enclosure near Sutherland Pond. (R, 7478 (NY)).

Maianthemum canadense Desf. Occasional. Raup: occasional-common. -- upper and lower slopes. (B, 5053).

Maianthemum racemosum L. (*Smilacina racemosa* (L.) Desf.) Occasional. Raup: common. -- lower slopes and coves. (B, 5092).

Medeola virginiana L. Occasional. Raup: common. -- coves and lower slopes. (B, 5714).

**Ornithogalum umbellatum* L. Uncommon. Raup: not found. -- trail near the Chlorinator. (B, 5085).

Polygonatum biflorum (Walt.) Ell. Occasional. Raup: common. -- upper slopes and hilltops. (B, 4922).

Polygonatum pubescens (Willd.) Pursh Uncommon. Raup: occasional. -- upper and lower slopes. (C, 4348).

Streptopus roseus Michx. Uncommon. Raup: rare. -- lower slopes and coves. (B, 5713).

Trillium erectum L. Uncommon. Raup: rare. -- lower slopes. (B, 5022).

Uvularia perfoliata L. Occasional. Raup: common. -- in cove woods. (B, 5246).

Uvularia sessilifolia (L.) Wats. (*Oakesiella sessilifolia* (L.) Small) Occasional. Raup: common. -- slopes and coves.

Veratrum viride Ait. Occasional. Raup: common (local). -- swampy woods and along streams. (B, 5986).

Iridaceae

Iris versicolor L. Occasional. Raup: occasional-common (local). -- near ponds, reservoirs and in swampy woods. (C, 4393).

Sisyrinchium angustifolium Mill. (*S. graminoides* Bickn.) Occasional. Raup: occasional. -- damp disturbed sites, especially roadsides. (B, 5082).

Smilacaceae

Smilax herbacea L. Uncommon. Raup: occasional. -- damp, disturbed sites in coves.

Smilax rotundifolia L. Uncommon. Raup: occasional. -- damp roadsides. (B, 4974).

Dioscoreaceae

Dioscorea villosa L. Not found. Raup: occasional. -- damp, roadside thickets.

Orchidaceae

Corallorrhiza maculata (Raf.) Raf. Occasional. Raup: occasional. -- moist to wet, lower slopes. (B, 4851).

Cypripedium acaule Ait. Uncommon. Raup: common. -- lower and upper slopes.

Cypripedium parviflorum Salisb. Not found. Raup: rare. -- swampy woods.

**Epipactis heleborine* (L.) Crantz Uncommon. Raup: not found. -- roads and roadsides. (B, 5500).

Goodyera repens (L.) R. Br. Uncommon. Raup: not found. -- hemlock coves. (B, 4869).

Malaxis bayardii Fern. (*M. unifolia* sensu Raup) Not found. Raup: rare. NYSM: E. NYNHP: G2? S1. -- dry woods south of Jim's Pond. (R, 7575 (NY)).

Platanthera flava (L.) Lindl. (*Habenaria flava* (L.) Gray) Not found. Raup: occasional. -- damp thickets. (R, 7426 (NY)).

Platanthera lacera (Michx.) G. Don Uncommon. Raup: Not found. -- old clearing across from the Stone House. (B, 5425).

Platanthera psycodes (L.) Lindl. (*Habenaria psychodes* (L.) Sw.) Not found. Raup: rare. -- old fields

Spiranthes cernua (L.) L. Rich. Not found. Raup: occasional. -- disturbed sites, found just outside the Forest at the Upper Reservoir.

Table 1. Summary

	Total	Raup	Now	Not found by Raup (gained)	Not found now (lost)	Change	% Change	% Disimilarity	x2	P
All plants	713	576	600	137	113	24	4.2%	4.1%	2.50	0.113846
Native	567	491	475	76	92	-16	-3.3%	-3.3%	1.34	0.247160
79.5%	85.2%	79.2%								
Introduced	146	85	125	61	21	40	47.1%	38.1%	20.50	0.000006
20.5%	14.8%	20.8%								
Rare plants	17	9	14	8	2	5	55.6%	43.5%	4.90	0.026857
Hilltop	62	61	54	1	8	-7	-11.5%	-12.2%	4.00	0.045500
Upper slope	94	87	76	7	18	-11	-12.6%	-13.5%	4.00	0.045500
Lower slope	131	116	117	15	14	1	0.9%	0.9%	0.14	0.710347
Swamp and fen	135	113	123	22	12	10	8.8%	8.5%	3.56	0.059230
Aquatic	30	24	26	6	4	2	8.3%	8.0%	0.90	0.342782
Limestone erratics	6	5	6	1	0	1	20.0%	18.2%	4.00	0.045500
Disturbed ground	362	280	298	82	64	18	6.4%	6.2%	2.47	0.115846
Cultivated	10	6	8	4	2	2	33.3%	28.6%	1.50	0.220671
Trees	74	62	66	12	8	4	6.5%	6.3%	1.25	0.263553
Shrubs	74	65	58	9	16	-7	-10.8%	-11.4%	1.44	0.230139
Perennial herbs	457	374	383	83	74	9	2.4%	2.4%	0.64	0.424820
Annual herbs	110	77	94	33	16	17	22.1%	19.9%	6.61	0.010128
Forest size (acres)		3200	3750	550						
Forest size (hectares)		1290	1520							
per 1000 hectare	469.079	446.5116	394.7368							

Table 2. Rarities

Species	1938	2000	Rank
<i>Aristolochia serpentaria</i>	not found	uncommon	G5 S1
<i>Aster pilosus</i> var. <i>pringlei</i>	occasional - common	occasional	G4G5 S2S3
<i>Aster schreberi</i>	occasional	occasional	G4 S3
<i>Carex albicans</i> var. <i>emmonsii</i>	occasional	uncommon	G5T5 S3
<i>Carex argyrantha</i>	occasional	occasional	G5 S3
<i>Carex lupuliformis</i>	not found	uncommon	G3G4 S3
<i>Carex seorsa</i>	not found	uncommon	G4 S2
<i>Corydalis flavula</i>	not found	uncommon	G5 S3
<i>Cunila origanoides</i>	occasional	occasional	G5 S3
<i>Juncus debilis</i>	occasional	not found	G5 S1
<i>Lespedeza violacea</i>	occasional	not found	G5 S3
<i>Malaxis bayardii</i>	rare	not found	G2? S1
<i>Pinus banksiana</i>	not found	uncommon	G5 S3
<i>Ranunculus micranthus</i>	not found	uncommon	G5 S2
<i>Rotala ramosior</i>	not found	uncommon	G5 S2
<i>Utricularia inflata</i>	not found	uncommon	G5 S1
<i>Utricularia minor</i>	rare	uncommon	G5 S2S3

Table 3. Location of Rarities

	S1	S2	S2S3	S3	Total
Hilltop	0	0	0	3	3
Upper slope	2	1	0	3	6
Lower slope	0	0	1	0	1
Swamp and fen	1	1	0	1	3
Aquatic	1	1	1	0	3
Limestone erratics	0	0	0	0	0
Disturbed ground	1	0	1	3	5
Cultivated	0	0	0	0	0

Table 4. Summary by class

	Families	Genera	Native Species	Introduced Species	Total Species
Lycopodophyta	6	4	5	0	5
Equisetophyta	1	1	3	0	3
Pteridophyta	8	15	25	0	25
Pinophyta	2	5	5	6	11
Magnoliophyta	81	228	372	113	485
Dicotyledonae					
Magnoliophyta	18	76	157	27	184
Monocotyledonae					
Total	116	329	567	146	713

	Native	Introduced
Hilltop	61	1
Upper Slope	93	1
Lower Slope	129	2
Swamp and Fen	127	8
Aquatic	30	0
Limestone erratics	6	0
Disturbed ground	237	134
Cultivated	0	10

	Native	Introduced
Hilltop	7	1
Upper Slope	18	0
Lower Slope	14	0
Swamp and Fen	11	1
Aquatic	4	0
Limestone erratics	0	0
Disturbed ground	55	18
Cultivated	0	0