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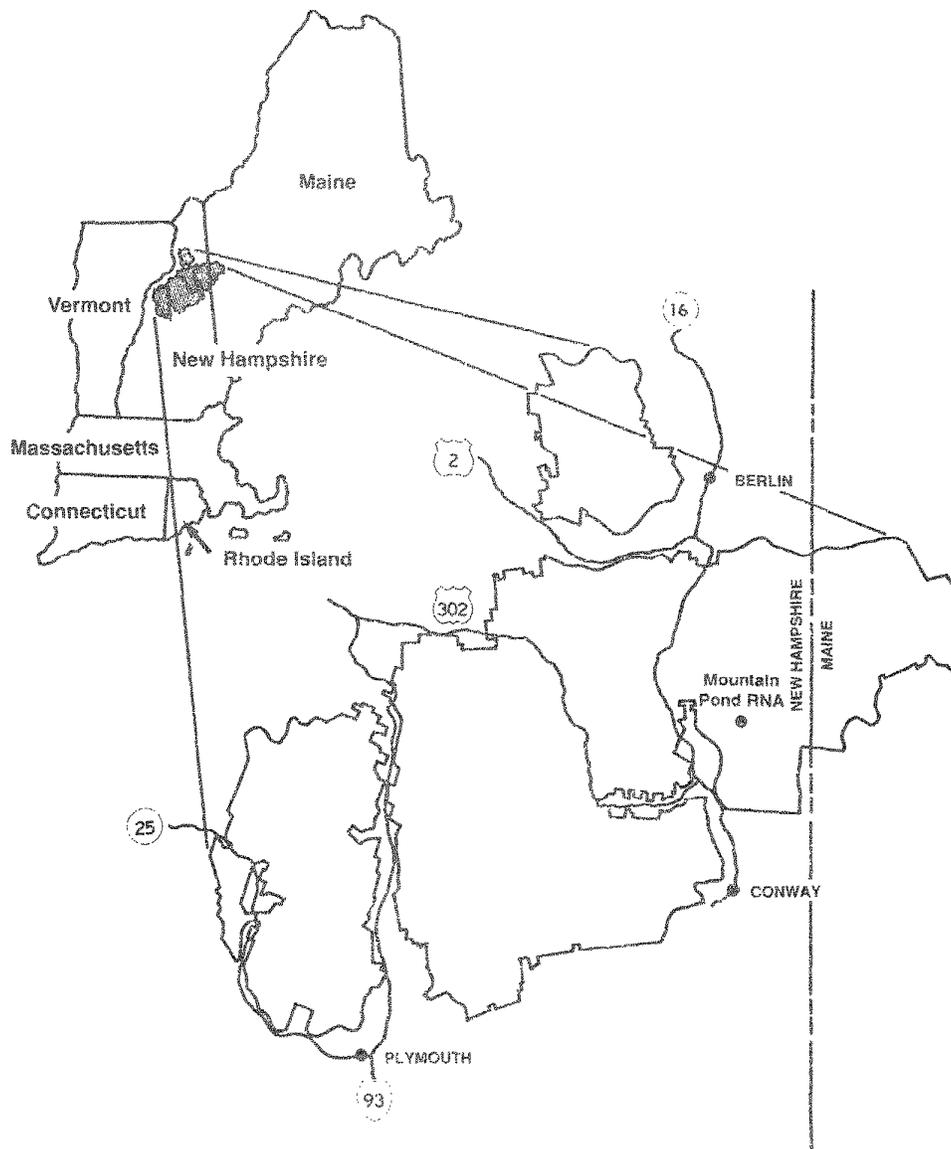
Northeastern Forest
Experiment Station

General Technical
Report NE-187



Botanical Reconnaissance of Mountain Pond Research Natural Area

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Abstract

A botanical survey of Mountain Pond Research Natural Area (RNA) in the White Mountain National Forest, New Hampshire, was conducted in 1991-92. A flora of vascular plants for 78 species representing 35 families was recorded. None of the species are protected under the "Endangered Species Act" and only one species is listed by the State of New Hampshire as having "special concern" status. The survey provides baseline information on plant biodiversity, plant communities, and relative abundance of vascular plants within the RNA.

The Authors

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Foreword

The Forest Service Research Natural Areas Program maintains a network of 289 established areas and more than 300 candidate areas representing typical and unique natural ecosystems on national forests in the United States. These areas are managed in minimally disturbed conditions for research, monitoring, and education, and to maintain natural diversity and ecological processes.

Within the 14-state territory of the Northeastern Forest Experiment Station, which includes seven national forests, six Research Natural Areas (RNA's) have been established and 29 candidate areas are being considered for establishment within the next few years. A few of these areas have been the scene of active field research for many years whereas others are virtually unstudied.

Although the RNA program began more than 65 years ago, research and monitoring on RNA's began only recently. As the Forest Service moves in the direction of ecological

management, information on RNA's will serve a vital role in forest management.

In an effort to encourage and expedite research on RNA's, the Northeastern Forest Experiment Station is commissioning a series of botanical reconnaissance surveys for each of the established and candidate RNA's. The program began in 1991 with funding support from the RNA Matching Grant Program sponsored by the Chief of the Forest Service.

The first three reports in the series are:

Botanical Reconnaissance of
Mountain Pond Research Natural Area

Botanical Reconnaissance of
The Bowl Research Natural Area

Botanical Reconnaissance of
Nancy Brook Research Natural Area

Introduction

Mountain Pond Research Natural Area (RNA) is located in the Town of Chatham, Carroll County, about 8.5 miles north-northeast of North Conway, New Hampshire. The site is accessed from the parking area on Slippery Brook Road by the trail to Mountain Pond. The greater portion of the area is located in the Saco Ranger District, with the northeastern portion (about 20 percent) located in the Evans Notch Ranger District. The boundaries are described by Carboneau and others.¹

Mountain Pond RNA is part of a low-elevation old-growth northern hardwood stand. Elevation ranges from 1,520 feet at the level of the pond to 1,900 feet at the ridge summit. The RNA occurs on a southeast facing slope that ranges from 8 to 40 percent. The RNA includes within its boundaries two Ecological Land Types: (1) ELT 105 - Hardwood Mid and Lower Mountain Side Slopes with Very Deep Tills--occurs on the upper to lower mid slopes, especially the steeper talus slopes and contains most of the large trees. It is characterized by deciduous hardwood species, with only an occasional scattered conifer. There is an especially deep layer of duff on the forest floor on the talus slopes. (2) ELT 105D - Hardwood-Softwood Mid and Lower Mountain Side Slopes with Deep Washed Tills--is located primarily on the lower slopes to lower mid slopes. It is characterized by a mixed forest of hardwoods, red spruce, and hemlock.

Methods

Field reconnaissance of the Mountain Pond RNA began with a single trip in September 1991 and continued May through September 1992. Throughout the field season an intensive survey of the vascular plants was conducted for each Ecological Land Type (ELT 105, ELT 105D) and Forest Cover Type (SAF Type No. 25, Sugar Maple--Beech--Yellow Birch, and Type No. 32, Red Spruce, with Hemlock) as described by Carboneau and others.¹ Transects were not used in order to avoid overlooking species that might not occur there. Instead, each area was carefully combed to assure that the checklist included plant species that were scattered or infrequent in the study area. A special effort was made to locate any species listed as federal or state threatened or endangered species.

Plant specimens were collected and pressed in the field, and notes were made on relative abundance, associated species, and site conditions. Species that can be taxonomically difficult to identify, for example, *Rubus* (blackberry, raspberry), were collected multiple times to

assist in identification and to assure that all species in that group were included in the checklist. Tentative identifications were made in the field, but identifications of all specimens were confirmed at the Hodgdon Herbarium, University of New Hampshire, using taxonomic manuals, including "Manual of Vascular Plants of Northeastern United States and Adjacent Canada" (Gleason and Cronquist 1991), "Gray's Manual of Botany" (Fernald 1950), and "Aquatic and Wetland Plants of the Northeastern North America" (Crow and Hellquist, in press). Additionally, identifications were confirmed by comparing specimens collected at Mountain Pond RNA with the reference specimens in the Hodgdon Herbarium collection.

During the study, 388 specimens were collected. Voucher specimens documenting the study were deposited in the Hodgdon Herbarium as a permanent record. The collection numbers cited with each species enumerated in the checklist are those of Garrett E. Crow (for example, *Crow 7849*), but specimen labels also include the names of the student assistants involved in collecting the specimens. The collection number, along with the botanical name of the species, is the key to locating each voucher specimen in the herbarium. The voucher specimens in the herbarium are available to the botanical community at large for other types of scientific studies. The Hodgdon Herbarium routinely loans specimens to other institutions for botanical studies.

In addition to the reconnaissance, many large trees were measured to gain a perspective of the old-growth forest (Table 1). However, no cores were taken to establish the age of these old trees.

Characterization of Vegetation Types

According to Kùchler's (1964) classification of potential natural vegetation of the United States, Mountain Pond RNA lies within the area designated as Type 106: Northern Hardwoods (Acer-Betula-Fagus-Tsuga), a tall, broadleaf deciduous forest with an admixture of needleleaf evergreen trees, with dominant tree species being sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), beech (*Fagus grandifolia*), and hemlock (*Tsuga canadensis*).

By comparison, the map presented in "Natural Forest Vegetation Zones of New England" (Westveld and others 1955) shows that the RNA lies in an area somewhat interdigitated with two forest types: (1) Spruce-Fir--Northern Hardwood Forest, with dominant tree species being red spruce (*Picea rubens*), balsam fir (*Abies balsamea*), sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), and white birch (*Betula papyrifera*), and (2) Northern Hardwoods--Hemlock--White Pine Forest, with dominant tree species being sugar maple (*Acer saccharum*), beech (*Fagus grandifolia*), yellow birch (*Betula alleghaniensis*), hemlock (*Tsuga canadensis*), and white pine (*Pinus strobus*).

The New Hampshire Natural Heritage Inventory Classification for Mountain Pond RNA is New England Mesic Hardwood Forest on Acidic Bedrock or Till (Carboneau and others).¹ However, two forest community types on the RNA,

¹Carboneau, Lee; Kacprzyński, Fred; Brackley, F. E. 1986. Establishment record for Mountain Pond Research Natural Area within the White Mountain National Forest, New Hampshire. On file at the White Mountain National Forest, Laconia, New Hampshire 03247.

Table 1.--Measurements of large trees

Tree species	Inches d.b.h.
AREA AT BASE OF TALUS SLOPE	
American Ash	13.5, 14.2, 14.3, 14.6, 14.7, 15.9, 16.2, 16.4, 16.6, 17.7, 22.6, 23.4, 26.6, 35.5
Basswood	7.5, 11.7, 14.3, 20.6, 21.4, 22.1, 22.7, 22.9, 23.4, 23.6, 26.4, 28.6
Basswood (3-clump)	15.9/18.1/20.0
Basswood (twin)	17.9/11.1
Basswood (twin)	18.4/13.7
Beech	9.3, 10.7, 13.1, 13.3, 13.4, 14.9, 15.3, 15.6, 15.6, 17.6, 18.4, 18.7, 19.1, 19.4, 19.5, 19.9, 20.7, 22.7, 26.0
Hop-Hornbeam	4.4, 5.5, 7.0
Red Spruce	13.6, 19.9, 22.4
Sugar Maple	16.5, 17.8, 20.3, 21.1, 22.2, 22.6, 24.3, 24.9, 25.1, 25.3, 25.8, 25.8, 26.3, 27.2, 27.6, 27.8, 28.2, 28.8, 29.5, 30.0, 30.6, 31.0, 31.2, 31.3, 31.5, 32.0, 32.1, 32.5, 32.8, 33.2, 34.5
Sugar Maple (twin)	26.8/15.5
Striped Maple	7.2, 10.3
Striped Maple (dead)	8.4
Yellow Birch	14.9, 17.0, 19.3, 24.0, 26.2, 28.8, 31.5, 32.6, 36.0, 37.5
HILLSIDE WITH LARGE CLUMP OF OLD WHITE BIRCH	
White Birch	9.8, 12.3, 12.7, 13.2, 13.5, 13.9, 14.1, 14.3, 14.5, 14.7, 15.1, 15.2, 15.3, 15.8, 15.9, 17.3, 17.6, 19.0, 19.5, 20.2
AREA ALONG TRAIL	
White Birch	20.3, 22.5
Yellow Birch	30.7

as mentioned previously, correspond to a similar classification for New England developed by the Nature Conservancy (Rawinski)² and applied to the Berkshires of Massachusetts by Weatherbee and Crow (1992): (1) Mesic Northern Conifer Forest Community and (2) Mesic Northern Hardwood Forest Community.

Description of Forest Cover Types

Topography, slope, and aspect have considerable influence on the composition of forest communities in the area, and it is appropriate that Carbonneau and others¹ mapped two Ecological Land Types for the Mountain Pond RNA: ELT 105 - ELT 105D.

The forest communities observed in this study nearly coincide with the Ecological Land Types. The two forest cover types recognized were: (1) Sugar Maple--Beech--Yellow Birch and (2) Red Spruce--Hemlock--Yellow Birch (Fig. 1).

² Rawinski, R. J. 1986. Classification of major natural communities of New England. On file at the Nature Conservancy, Boston, Massachusetts.

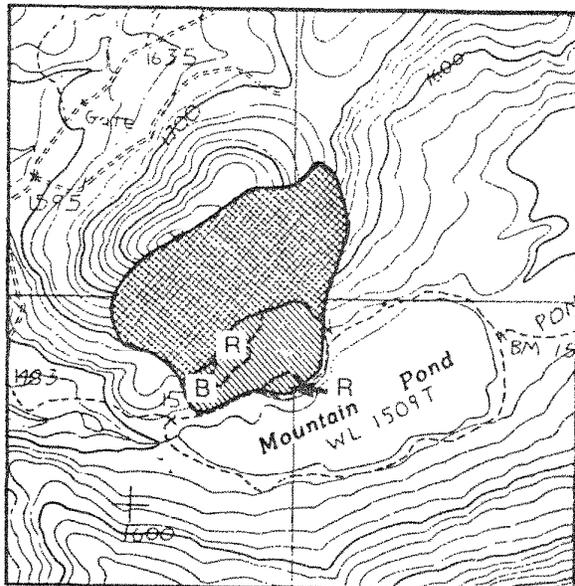
Sugar Maple--Beech--Yellow Birch

This forest cover type coincides with ELT 105--Hardwood Mid and Lower Mountain Side Slopes with Very Deep Tills (Northern Hardwoods--Hemlock--White Pine Forest or Mesic Northern Hardwood Forest Community).

The dominant tree species include sugar maple (*Acer saccharum*), beech (*Fagus grandifolia*), and yellow birch (*Betula alleghaniensis*). Other frequent tree species include red maple (*Acer rubrum*), American ash (*Fraxinus americana*), and the understory tree striped maple (*Acer pensylvanica*). Two areas near the base of the steep talus slope near the summit ridge have localized concentrations of a number of large basswood (*Tilia americana*) (Table 1).

The understory is rather open, and shrub growth is relatively sparse. Hobblebush (*Viburnum alnifolium*) is the most common shrub, whereas fly-honeysuckle (*Lonicera canadensis*) and red-berried elder (*Sambucus pubens*) occur occasionally. Mountain maple (*Acer spicatum*) occurs locally at the westward end of the talus slope.

The common species of the forest floor include whorled aster (*Aster acuminatus*), wild sarsaparilla (*Aralia nudicaulis*), sweet-scented bedstraw (*Galium triflorum*), round-leaved yellow violet (*Viola rotundifolia*), wild white violet (*Viola mackloskeyi* var. *pallens*), Jack-in-the-pulpit (*Arisaema*



-  Sugar Maple – Beech – Yellow Birch
-  Red Spruce – Hemlock – Yellow Birch
- B approximate area of stand of old White Birch
- R area with little or no Hemlock present, Red Spruce conspicuous

Figure 1.--Forest cover types on Mountain Pond RNA.

triphyllum), bellwort (*Uvularia sessilifolia*), Indian cucumber-root (*Medeola virginiana*), and the fern species spinulose wood-fern (*Dryopteris carthusiana*). Virginia beechdrops (*Epifagus virginiana*) emerges late in the summer and is very abundant, especially where beech is most frequent, because it is parasitic on beech. Seedlings of tree species were in great abundance, especially beech, red maple, sugar maple, and striped maple. Carolina spring-beauty (*Claytonia caroliniana*) was found in abundance in the deep, rich soil/duff of the upper portion of the talus slope.

Although the vegetation along the ridge at the summit of the slope is clearly related to the cover type occupying the mid slopes and upper slopes, Sugar Maple--Beech--Yellow Birch, the soils are clearly thinner and drier. Several plants are noteworthy. It was only along the ridge that red oak (*Quercus rubra*) was found in the canopy. Several of the trees were of considerable size; one measured 26 inches d.b.h. Several other species were associated primarily with the ridge community. Black cherry (*Prunus serotina*) was frequent but shrubby in stature. Hop-hornbeam (*Ostrya virginiana*) was also more common on top. Several small red spruce (*Picea rubens*) were encountered there as well.

Red-berried elder (*Sambucus pubens*), a shrubby species, was primarily found on the upper portion of the talus slope and on the ridge. Blackberry (*Rubus pensilvanicus*), red raspberry (*Rubus idaeus*), and blackfringe knotweed (*Polygonum cilinode*) were also common at the summit. Solomon's seal (*Polygonatum pubescens*) and false solomon's seal (*Smilacina racemosa*) were more frequent on the ridge than elsewhere. *Carex arctata*, a grass-like woodland sedge, was abundant. There was considerable disturbance of the forest on the northward side of the slope (outside the RNA), but several stumps were also seen on the summit ridge, within the RNA.

Red Spruce--Hemlock--Yellow Birch

This forest cover type coincides with ELT 105D--Hardwood-Softwood Mid and Lower Mountain Side Slopes with Deep Washed Tills (Spruce-Fir--Northern Hardwood Forest or Mesic Northern Hardwood Forest Community)--and occupies the lower lying areas adjacent to the pond and the lower slopes of the RNA. The soils are much wetter and less well drained.

The dominant tree species include red spruce (*Picea rubens*), red maple (*Acer rubrum*), yellow birch (*Betula alleghaniensis*), white birch (*Betula papyrifera*), sugar maple (*Acer saccharum*), and striped maple (*Acer pensylvanica*). Other tree species frequent in this forest type include balsam fir (*Abies balsamea*) and hemlock (*Tsuga canadensis*). Although red spruce was much more abundant than hemlock, hemlock was much larger.

The understory is more densely vegetated than the deciduous cover type and hobble-bush (*Viburnum alnifolium*) is very abundant. Saplings of red maple (*Acer rubrum*), striped maple (*Acer pensylvanica*), red spruce (*Picea rubens*), and balsam fir (*Abies balsamea*) are also conspicuous.

The common species of the forest floor include wild sarsaparilla (*Aralia nudicaulis*), starflower (*Trientalis borealis*), blue bead-lily (*Clintonia borealis*), Canada mayflower (*Maianthemum canadense*), wood sorrel (*Oxalis acetocella* ssp. *montana*), bellwort (*Uvularia sessilifolia*), purple trillium (*Trillium erectum*), painted trillium (*Trillium undulatum*), Indian cucumber-root (*Medeola virginiana*), and the ferns spinulose wood-fern (*Dryopteris carthusiana*) and hay-scented (*Dennstaedtia punctiobula*). Rosy twisted-stalk (*Streptopus roseus*), and shining clubmoss (*Lycopodium lucidulum*) are primarily found in this vegetation type but occur less frequently.

One hillside on the westward portion of the RNA at the edge between this forest type and the deciduous type had a large stand of old white birch (*Betula papyrifera*). Twenty large trees were measured and nearly all of them were larger than 12 inches d.b.h. (Table 1). Sugar maple (*Acer saccharum*) was noted as codominate in this stand, but the trees were much younger than the white birch. Young beech (*Fagus grandifolia*) and striped maple (*Acer pensylvanica*) were in the understory, but white birch was not noted in the understory.

Near the trail and pond shore a low lying wet area that extends somewhat into the RNA was the only locality within the RNA where pink lady-slippers (*Cypripedium acaule*) were found. They were the relatively uncommon white color, whereas most of the plants around the pond were pink. Some sphagnum moss was present in this wet area, the only place in the RNA where sphagnum was seen. Other plants at this wet area that were also common in the cool, wet, low woods elsewhere around the pond were twinflower (*Linnaea borealis*), bunchberry (*Cornus canadensis*), dwarf red blackberry (*Rubus pubescens*), and one-sided shinleaf (*Pyrola secunda*).

Adjacent Vegetation

Mountain Pond

The aquatic vegetation in Mountain Pond is very sparse. Species observed include yellow waterlily (*Nuphar variegatum*), floating heart (*Nymphoides cordata*), pickerel-weed (*Pontederia cordata*), pipewort (*Eriocaulon aquaticum*) (synonym *E. septangulare*), narrowleaf bur-reed (*Sparganium angustifolium*), American waterlily (*Nymphaea odorata*), and water-lobelia (*Lobelia dortmanna*).

Along the shore a number of woody species were encountered, including rhodora (*Rhododendron canadense*), leatherleaf (*Chamaedaphne calyculata*), sheep-laurel (*Kalmia angustifolia*), laborador-tea (*Ledum groenlandicum*), creeping snowberry (*Gaultheria hispida*), narrowleaf meadowsweet (*Spiraea alba* var. *latifolia*), sweet gale (*Myrica gale*), speckled alder (*Alnus incana* ssp. *rugosa*), black chokeberry (*Aronia melanocarpa*), mountain-holly (*Nemopanthus mucronatus*), withe-rod (*Viburnum cassinoides*), and velvetleaf-blueberry (*Vaccinium myrtilloides*).

White pine (*Pinus strobus*) was not seen within the RNA. Only three scattered individuals were seen along the shore adjacent to the RNA, and other individuals were scattered elsewhere in the general vicinity around the pond.

Along Mountain Pond Trail

A number of collections were made along the trail adjacent to the Mountain Pond RNA so the vegetation of the area was adequately characterized. Plants that were relatively common along the trail but infrequent or absent from the RNA included bunchberry (*Cornus canadensis*), falseviolet (*Dalibarda repens*), creeping snowberry (*Gaultheria hispida*), twinflower (*Linnaea borealis*), beaked hazel-nut (*Corylus cornuta*), common elderberry (*Sambucus canadensis*), speedwell (*Veronica officinalis*), grove bluegrass (*Poa alsodes*), velvetleaf-blueberry (*Vaccinium myrtilloides*), and white turtlehead (*Chelone glabra*). The purple fringed orchis (*Platanthera grandiflora*) was seen in a wet sphagnum area along the trail approaching the RNA.

Taxa of Special Interest

A special effort was made to locate any species that might be listed under the "Endangered Species Act" or included in the

state list "Protected Plants of New Hampshire" or regionally endangered/threatened³ (Storks and Crow 1978; Crow and others 1981; N.H. Dep. Resour. Econ. Develop. 1987).

Species Protected by the "Endangered Species Act"

No species in the RNA is listed under the "Endangered Species Act."

Species Protected by New Hampshire State Law

Pink lady-slipper (*Cypripedium acaule* Aiton)

This plant is on the special concern list. Although this orchid is a very common plant of acid woods throughout the state, it is vulnerable to commercial exploitation. It is noteworthy that plants in the RNA were albinos.

Noteworthy Plants

Lance-leaved grape-fern (*Botrychium lanceolatum* ssp. *angustisegmentum* (Pease & Moore) Clausen)

Although not protected, this plant is very uncommon in New Hampshire. Only two plants were seen in the RNA.

Spring-beauty (*Claytonia caroliniana* Michx.)

Although not a rare species, this plant is indicative of very rich forests.

Round-leaved orchis (*Platanthera orbiculata* (Pursh) Lindl.)

This is a plant found in rich deciduous woods. Only three plants were seen in the RNA; none produced flowers this season.

Three-birds orchid (*Triphora trianthophora* (Sw.) Rydb.)

This plant was not found in the RNA. However, hardwood forests with a considerable presence of beech are potential habitat for this state-listed rare species. It was carefully searched for, but is a difficult species to "catch" in bloom. The entire population in a woods blooms in concert, and with only 2 to 3 flowers per inflorescence there are only 3 days per year to readily catch the plants in bloom. In a Vermont population, blooms consistently appear in late summer (August) 48 hours after a significant drop in temperature (Williams, personal communication). This species should be looked for in subsequent years.

³ Storks, I. M.; Crow, G. E. 1979. Endangered, threatened and rare plants of the White Mountain National Forest, New Hampshire. Report prepared for the White Mountain National Forest, USDA Forest Service, in cooperation with the New Hampshire Agricultural Experiment Station, Durham, New Hampshire.

Acknowledgments

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Checklist of Vascular Plants at Mountain Pond RNA

PTERIDOPHYTES (Ferns and Fern Allies)

LYCOPODIACEAE (Clubmoss Family)

Lycopodium clavatum L. Running pine
Occasional on ridge at summit.
Crow 7732.

Lycopodium lucidulum Michx. Shining Clubmoss
Plants chiefly present in forest dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*), where they may be locally abundant, especially on talus; frequent on the moist upper talus slope and summit ridge associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus americana*).
Crow 7674, 7704, 7734, 7771, 7814, 7851.

Lycopodium obscurum L. Ground-pine
Very uncommon, occasionally occurring in mixed evergreen-deciduous forest dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*) and in the deciduous forest dominated by sugar maple (*Acer saccharum*), American beech (*Fagus americana*), and yellow birch (*Betula alleghaniensis*).
Crow 7706, 7783, 7822, 7915.

ASPLENIACEAE (Spleenwort Family)

Dryopteris carthusiana (Vill.) H. P. Fuchs Spinulose Wood-fern (Synonym: *D. spinulosa*)
Common throughout the RNA, often locally abundant.
Crow 7680, 7682, 7705, 7826, 7844, 7846, 7874, 7884.

Dryopteris intermedia (Muhl.) A. Gray Fancy Wood-fern
Local on uppermost talus slopes at the summit.
Crow 7785.

Dryopteris marginalls (L.) A. Gray Marginal Wood-fern
Primarily occurring on the uppermost talus slopes and the summit ridge, associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus americana*).
Crow 7882.

Thelypteris noveboracensis (L.) Nieuwl. New York Fern
Growing in forest dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*); occasional.
Crow 7942, 7961.

DENNSTAEDTIACEAE (Bracken Family)

Dennstaedtia punctilobula (Michx.) Moore Hay-scented Fern
Locally abundant in forest dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow

birch (*Betula alleghaniensis*).
Crow 7964.

OPHIOGLOSSACEAE (Adder's Tongue Family)

Botrychium lanceolatum ssp. *angustisegmentum* (Pease & Moore) Clausen Lance-leaved grape-fern
Only two plants were seen growing on mid slope in forest dominated by sugar maple (*Acer saccharum*), American beech (*Fagus americana*), and yellow birch (*Betula alleghaniensis*).
Crow 7959.

OSMUNDACEAE (Royal Fern Family)

Osmunda claytoniana L. Interrupted Fern
Few plants growing in wet woods near trail, dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*).
Crow 7867.

GYMNOSPERMS (Conifers)

PINACEAE (Pine Family)

Abies balsamea (L.) Miller Balsam Fir
A common tree species of the mixed evergreen-deciduous forest dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*); young plants occasionally occur on the summit ridge.
Crow 7687, 7752.

Picea rubens Sarg. Red Spruce
An important tree of the mixed evergreen-deciduous forest dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*).
Crow 7688, 7694, 7729.

Tsuga canadensis (L.) Carrière Eastern Hemlock
An important tree in the mixed evergreen-deciduous forest dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*).
Crow 7707.

ANGIOSPERMS (Flowering Plants)

ACERACEAE (Maple Family)

Acer pensylvanicum L. Striped Maple
A common understory tree occurring throughout the RNA.
Crow 7683, 7724, 7765, 7791, 7834, 7873, 7896.

Acer rubrum L. Red Maple
A common tree throughout the RNA, especially important in the forest dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*).
Crow 7708, 7720, 7735.

Acer saccharum Marshall Sugar Maple

A common tree throughout the RNA, especially important in the deciduous forest dominated by sugar maple (*Acer saccharum*), American beech (*Fagus americana*), and yellow birch (*Betula alleghaniensis*). Most of the really large trees of the old-growth forest are sugar maple.
Crow 7685, 7715, 7721, 7755, 7794, 7936.

Acer spicatum Lam. Mountain Maple

An understory tree, occurring in the RNA on the upper slopes of the talus near the summit, particularly on the west side.
Crow 7849.

ARACEAE (Arum Family)

Arisaema triphyllum (L.) Schott var. *triphyllum*

Jack-in-the-Pulpit

(Synonym: *A. atrorubens* (Ait.) Blume)

An herbaceous plant occurring as scattered plants widely throughout the forest dominated by sugar maple (*Acer saccharum*), American beech (*Fagus americana*), and yellow birch (*Betula alleghaniensis*).
Crow 7716, 7778, 7790, 7827, 7839, 7875.

ARALIACEAE (Ginseng Family)

Aralia nudicaulis L. Wild Sarsaparilla

Abundant throughout the RNA.
Crow 7773, 7818, 7841, 7876, 7889.

BETULACEAE (Birch Family)

Betula alleghaniensis Britton Yellow Birch

(Synonym: *Betula lutea* Michx.)

A dominant component of both forest types of the RNA.
Crow 7689, 7726, 7762, 7808.

Betula papyrifera Marshall White Birch, Paper Birch

An important component of the forest dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*).
Crow 7759, 7766.

Ostrya virginiana (Miller) K. Koch Hop-hornbeam

An understory tree that primarily occurs on the upper talus slope and summit ridge, associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus americana*).
Crow 7699, 7728, 7904.

CAPRIFOLIACEAE (Honeysuckle Family)

Linnæa borealis L. Twinflower

This trailing herb primarily occurs along the trail in sites outside the study area. It was seen only in a small area of wet woods inside the study area near the trail, but never seen in the major portion of the RNA.
Crow 7869.

Lonicera canadensis Marshall Canada Fly-honeysuckle

A small shrub occurring relatively frequently in the mixed evergreen-deciduous forest dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and

yellow birch (*Betula alleghaniensis*); also occurred on the uppermost talus and summit ridge but was infrequent, and was only occasional in the deciduous forest dominated by sugar maple (*Acer saccharum*), American beech (*Fagus americana*), and yellow birch (*Betula alleghaniensis*).

Crow 7677, 7701, 7711, 7824, 7845, 7893.

Sambucus pubens Michx. Red-berried Elder

(Synonym: *S. racemosa* ssp. *pubens* (Michx.) House)

Low shrub occurring occasionally in the mixed evergreen-deciduous forest dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*); also occurred on the uppermost talus and summit ridge, associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus americana*).

Crow 7723, 7753, 7804, 7850.

Viburnum acerifolium L. Mapleleaf Viburnum

Uncommon in the RNA; few shrubs seen on the uppermost talus near the summit ridge associated with red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus americana*).

Crow 7853, 7946.

Viburnum alnifolium Marshall Hobble-bush

Small shrub common throughout the RNA.

Crow 7686, 7702, 7712, 7733, 7768.

Viburnum cassinoides L. Withe-rod

(Synonym: *V. nudum* var. *cassinoides* (L.) T. & G.)

This shrub was abundant along the shore of Mountain Pond. Within the RNA only very small, weak stems with an almost herbaceous, viny habit were seen within the wetter woods near the trail at the east end of the study area in the shade of red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*). These were never large enough to become reproductive.

Crow 7756.

COMPOSITAE/ASTERACEAE (Aster Family)

Aster acuminatus Michx. Whorled Aster

An herbaceous plant occurring as scattered individuals widely in the RNA, most abundant on the upper talus slopes, associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus americana*).
Crow 7679, 7757, 7837, 7922, 7929, 7931.

Prenanthes altissima L. Tall Rattlesnake-root

A very uncommon herb within the RNA occurring as scattered individuals. This species primarily occurs along the trail.

Crow 7949.

Solidago flexicaulis L. Zigzag Goldenrod

A very uncommon herb occurring as scattered individuals within the RNA. This species primarily

occurs along the trail.
Crow 7939, 7963.

CORNACEAE (Dogwood Family)

Cornus canadensis L. Bunchberry

This low stoloniferous plant occurs almost exclusively along the trail. It was found at only one site within the RNA in a wet area of woods near the trail, associated with red spruce (*Picea rubens*) and red maple (*Acer rubrum*) near the trail.
Crow 7868.

Cornus alternifolia L.f. Pagoda-dogwood

Only one small shrub was seen in the area dominated by sugar maple (*Acer saccharum*), American beech (*Fagus americana*), and yellow birch (*Betula alleghaniensis*).
Crow 7934.

CYPERACEAE (Sedge Family)

Carex arctata Boott Drooping Wood-sedge

Occasional herb primarily at the summit ridge, associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus americana*), and scattered plants on the talus slopes. Also found in the RNA near the trail, associated with red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*), but uncommon there.
Crow 7714, 7739, 7763, 7796, 7901.

Carex brunnescens var. **sphaerostachya** (Tuckerm.)

Kükenth. Brownish Sedge

Occasional herb chiefly on the summit ridge associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus americana*).
Crow 7902.

Carex communis Bailey Colonial Sedge

Occasional herb in deciduous forest dominated by sugar maple (*Acer saccharum*), American beech (*Fagus americana*), and yellow birch (*Betula alleghaniensis*).
Crow 7741.

FAGACEAE (Beech Family)

Fagus grandifolia Ehrh. American Beech

A common tree throughout the RNA, but especially important as a dominant of the deciduous forest along with sugar maple (*Acer saccharum*) and yellow birch (*Betula alleghaniensis*).
Crow 7684, 7703, 7719, 7770, 7779, 7781, 7898, 7927.

Quercus rubra L. Northern Red Oak

Mature trees occur only on the summit ridge, several of which are quite large. Occasional seedlings or very small saplings are scattered elsewhere in the RNA.
Crow 7731, 7795, 7830, 7843, 7897, 7951.

FUMARIACEAE (Fumatory Family)

Corydalis sempervirens (L.) Pers. Pale Corydalis

Found growing only at the uppermost portion of the talus slope at the summit ridge. Uncommon.
Crow 7950.

GROSSULARIACEAE (Gooseberry Family)

Ribes glandulosum Grauer Skunk-currant

Found growing only as an occasional shrub: sprawling at rocky sites, sometimes forming fairly large patches. The species was not restricted to a particular forest cover type, but was more conspicuous on the summit ridge, associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus americana*).
Crow 7725, 7775, 7809, 7895.

HAMAMELIDACEAE (Witch-hazel Family)

Hamamelis virginiana L. Witch-hazel

A tall, slender shrub with only two plants located in the RNA near the trail in wet woods dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*).
Crow 7872.

LILIACEAE (Lily Family)

Clintonia borealis (Alton) Raf. Blue Bead-lily

A common plant of the mixed evergreen-deciduous forest dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*).
Crow 7764, 7806.

Maianthemum canadense Desf. Canada Mayflower

Very abundant plant, primarily occurring in the mixed evergreen-deciduous forest dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*); frequent on the summit ridge associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus americana*).
Crow 7760, 7797, 7810.

Medeola virginiana L. Indian Cucumber-root

A frequent plant occurring scattered throughout the RNA.
Crow 7673, 7835, 7856, 7878.

Polygonatum pubescens (Willd.) Pursh Solomon's Seal

Uncommon herb, located primarily on the uppermost portion of talus slope and summit ridge associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus americana*); sporadic elsewhere.
Crow 7691, 7727, 7788, 7817, 7831, 7840.

Smilacina racemosa (L.) Desf. False Solomon's Seal

An herbaceous plant occurring infrequently in the RNA, chiefly in the mixed evergreen-deciduous forest dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*), and growing on the uppermost talus and summit ridge, associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer*

rubrum), and white ash (*Fraxinus americana*).
Crow 7816, 7820, 7855, 7903.

Streptopus roseus Michx. Rosy Twisted Stalk

An uncommon herb occurring primarily in mixed evergreen-deciduous forest nearest the trail dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*), and individuals located at the summit ridge associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus americana*).

Crow 7743, 7801, 7815, 7925.

Trillium erectum L. Purple Trillium

An herbaceous plant occurring as scattered individuals throughout the RNA.

Crow 7710, 7767, 7819, 7880, 7933.

Trillium undulatum (Willd.) Painted Trillium

An herbaceous species occurring throughout the RNA as scattered individuals.

Crow 7700, 7709, 7736, 7754, 7804, 7838.

Uvularia sessilifolia L. Bellwort

A common herbaceous plant occurring widely throughout the RNA, sometimes forming very dense stands.

Crow 7678, 7713, 7738, 7821, 7833, 7887.

MONATROPACEAE (Indian-pipe Family)

Monatropa uniflora L. Indian-pipe

An achlorophyllous, saprophytic herb occurring frequently throughout the RNA, emerging from the duff primarily in mid to late summer.

Crow 7857, 7676, 7926.

OLEACEAE (Olive Family)

Fraxinus americana L. White Ash

Scattered individuals occur widely throughout the RNA, but the larger trees occur primarily on the upper talus slopes dominated by sugar maple (*Acer saccharum*), American beech (*Fagus americana*), and yellow birch (*Betula alleghaniensis*) and the summit ridge associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus americana*).

Crow 7698, 7772, 7782, 7807, 7848, 7905, 7937.

ONAGRACEAE (Evening Primrose Family)

Circaea alpina L. Alpine Enchanter's Nightshade

An occasional herb associated primarily with the deciduous forest of sugar maple (*Acer saccharum*), American beech (*Fagus americana*), and yellow birch (*Betula alleghaniensis*).

Crow 7919.

ORCHIDACEAE (Orchid Family)

Cypripedium acaule Aiton Pink Lady-slipper

This is a common plant along the trail around Mountain Pond. It occurs in the RNA only in a wet wooded area near the trail dominated by red spruce (*Picea rubens*),

red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*). The plants seen here were white whereas most plants seen elsewhere around the pond were pink. This plant is listed in "Protected Plants of New Hampshire" under the category of "Special Concern Plant Species" for those species that are not necessarily rare but are vulnerable to exploitation.

Crow 7866.

Platanthera cf. orbiculata (Pursh) Lindl. Round-leaved Orchid

(Synonym: *Habenaria orbiculata* (Pursh) Torr.)

Only three plants were seen in the RNA, located in a deciduous forest site dominated by sugar maple (*Acer saccharum*), American beech (*Fagus americana*), and yellow birch (*Betula alleghaniensis*). All three plants were sterile. So, a firm identification could not be made, since without flowers identification could be confused with a similar species, *P. hookeri*. This plant should be observed in future years.

Crow 7928.

OROBANACEAE (Broom-rape Family)

Epifagus virginiana (L.) Bart. Beechdrops

An herbaceous plant parasitic on beech: this species is abundant throughout the RNA.

Crow 7675.

OXALIDACEAE (Wood Sorrel Family)

Oxalis acetocella ssp. *montana* (Raf.) D. Löve Northern Wood-sorrel

(Synonym: *O. montana* Raf.)

An herbaceous plant locally abundant at scattered sites throughout the RNA.

Crow 7681, 7780, 7885.

POACEAE/GRAMINEAE (Grass Family)

Brachyelytrum erectum (Schreb.) Beauv.

An uncommon grass with scattered plants in the RNA.

Crow 7774.

Schizachne purpurascens (Torr.) Swallen

An uncommon grass observed on the summit ridge associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus americana*).

Crow 7799.

Oryzopsis asperifolia Michx. Mountain-rice

An uncommon grass, observed in the mixed evergreen-deciduous forest dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*).

Crow 7813, 7815a.

Cinna latifolia L. Wood Reedgrass

An uncommon grass, primarily occurring on the summit ridge, dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*).

Crow 7917, 7955.

POLYGONACEAE (Smartweed Family)

Polygonum ciliinode Michx. Climbing Buckwheat
A common, low, trailing vine, occurring almost exclusively in light shade at the uppermost portion of talus slopes and summit ridge, associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus americana*).
Crow 7793, 7900, 7916.

PORTULACACEAE (Purslane Family)

Claytonia caroliniana Michx. Carolina Spring-beauty
This ephemeral herb was found exclusively on the uppermost portion of the talus slopes associated chiefly with sugar maple (*Acer saccharum*), American beech (*Fagus americana*), and yellow birch (*Betula alleghaniensis*).
Crow 7798, 7722.

PRIMULACEAE (Primrose Family)

Trientalis borealis Raf. American Starflower
A common herb of the RNA occurring primarily in the mixed evergreen-deciduous forest dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*), and likewise frequent on the summit ridge and adjacent talus slopes, associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus americana*).
Crow 7744, 7758, 7789, 7811, 7842, 7891.

PYROLACEAE (Shinleaf Family)

Pyrola elliptica Nutt. Elliptic Shinleaf
Only seen once, in evergreen-deciduous forest dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*).
Crow 7825.

Pyrola secunda L. One-sided Shinleaf
(Synonym: *Pyrola chlorantha* Sw.)
Only seen twice, both were moist sites located near the trail, dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*).
Crow 7870, 7962.

RANUNCULACEAE (Buttercup Family)

Actaea pachypoda Ell. Doll's Eyes
(Synonym: *A. alba* (L.) Miller)
An infrequent herb occurring as widely scattered individuals throughout the RNA.
Crow 7692, 7786, 7829, 7877, 7932.

ROSACEAE (Rose Family)

Prunus serotina Ehrh. Black Cherry
Small trees or shrubby plants of infrequent occurrence on summit ridge, associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus*

americana).
Crow 7787, 7847, 7906.

Rubus idaeus L. Red Raspberry
Nearly exclusively occurring in disturbed sites on the summit ridge, associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus americana*).
Crow 7776, 7883, 7886, 7890.

Rubus pensilvanicus Poir. Pennsylvania Blackberry
Trailing herb growing in shallow soil on uppermost talus slope and adjacent summit ridge, associated with northern red oak (*Quercus rubrum*), sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), and white ash (*Fraxinus americana*).
Crow 7792, 7881, 7888, 7892, 7894, 7947.

Rubus pubescens Raf. Dwarf Red Blackberry
Trailing herb growing in mixed forest dominated by red spruce (*Picea rubens*), red maple (*Acer rubrum*), and yellow birch (*Betula alleghaniensis*). Uncommon in the RNA, primarily occurring along the trail.
Crow 7812, 7871.

Sorbus americana Marshall American Mountain-ash
Very uncommon, occurring only as scattered saplings up to about 1 m tall, primarily near trail and on summit ridge. No mature specimens seen in the RNA, nor in adjacent sites.
Crow 7769, 7899.

RUBIACEAE (Madder Family)

Galium triflorum Michx. Sweet-scented Bedstraw
Low, scrambling herb occurring on rich talus in deciduous forest dominated by sugar maple (*Acer saccharum*), American beech (*Fagus americana*), and yellow birch (*Betula alleghaniensis*). Locally common but not occurring throughout the RNA.
Crow 7740, 7836, 7879.

Mitchella repens L. Partridge-berry
A creeping evergreen herb occurring very occasionally as widely scattered patches in the RNA.
Crow 7693, 7761, 7823, 7907.

TILIACEAE (Basswood Family)

Tilia americana L. Basswood
Two areas near the base of the steep talus slope near the summit ridge have rather localized concentrations. Many of the trees were large specimens.
Crow 7742, 7854, 7930.

UMBELLIFERAE/APIACEAE (Carrot Family)

Osmorhiza claytoni (Michx.) Clarke Bland Sweet Cicely
An infrequent herb observed only on the uppermost portion of the rich talus slope adjacent to the summit ridge.
Crow 7918.

VIOLACEAE (Violet Family)

***Viola macloskeyi* var. *pallens* (Banks) C.L. Hitch.** Wild White Violet

(Synonym: *Viola pallens* (Banks) Brainerd)

A common plant of the deciduous forest, dominated by sugar maple (*Acer saccharum*), American beech (*Fagus americana*), and yellow birch (*Betula alleghaniensis*).

Crow 7717, 7777, 7800, 7828, 7852, 7935.

***Viola rotundifolia* Michx.** Round-leaved Yellow Violet

A common plant of the deciduous forest, that blooms very early, dominated by sugar maple (*Acer saccharum*), American beech (*Fagus americana*), and yellow birch (*Betula alleghaniensis*).

Crow 7718, 7784, 7832, 7938.

Collection numbers cited are those of Garrett E. Crow.

Voucher specimens are deposited in the Hodgdon Herbarium, Department of Plant Biology, University of New Hampshire, Durham, New Hampshire 03824.



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