

Botanical Inventory
Mason Quarry Conservation Area
Mason, New Hampshire



Erin Schaeffer New England Wild Flower Society © 2013

Prepared by

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Conducted in 2013

This report was produced for the Town of Mason, Conservation Commission

This project was made possible by a generous donation from Catherine Schwenk

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INTRODUCTION

The Mason Quarry Conservation Area is comprised of over 232 acres of contiguous conservation land in the heart of Mason, New Hampshire (Appendix A). The 110-acre parcel containing the quarry was generously gifted to the Town by its owners, George Schwenk and Richard Morley. This parcel is an important historical site, popular recreation destination and a central and valuable new component to the Mason Quarry Conservation Area



Historic Mason Quarry (left); foundation remains (right); Erin Schaeffer New England Wild Flower Society © 2013

The Quarry operated from 1857 until 1908 and, at its height, employed 200 workers. During that period the area was a center of population with its own train stop and post office. Decreasing demand for granite and two devastating fires (1893 and 1908) eventually decommissioned quarry operations and left the site abandoned (Jones and Anderson 1968). This now wild valley in the center of Mason remains a special place with the beauty of the old quarry, its rich history evident in the many old stone foundations, and the natural qualities of the rugged landscape that forms the headwaters of Rocky Brook (one of the source streams of the Squannacook River).

The assemblage of the Mason Quarry Conservation Area began with Jeffs and Beck lots in 1968, the Coyne Wildlife Sanctuary in 1972, and Downs Forest in 2008. The final parcel, the quarry itself, was added in 2013 after a conservation easement held by the Society for the Protection of NH Forests (SPNHF) was finalized. The town now plans to proceed with a similar conservation easement to cover the four surrounding parcels; permanently protecting the entire Mason Quarry Conservation Area. Long range plans are to extend this Conservation Area to include further abutting parcels, including lot E-10, home of Mason's historic Wolf Rock.

The area has long been known for its unusual abundance of wildflowers as noted by Catherine Schwenk (Master Gardener; graduate of New England Wild Flower Society Native Plant Studies Program; graduate of the Arnold Arboretum Gardening Arts Program), SPNHF field-staff, and many local residents. The purpose of this botanical inventory was to establish a vital baseline to help guide the Town of Mason Conservation Commission to protect and conserve the botanical heritage of this newly acquired conservation easement.



In 2013, the New England Wild Flower Society conducted a botanical inventory of the Mason Quarry Conservation Area for the Town of Mason. The inventory covered the quarry parcel (E-26 and E-27), Downs Forest (E-36), Beck lot (E-38), Jefts lot (E-28), the Coyne Wildlife Sanctuary (E-22), plus two small triangular parcels East of the railroad tracks on Scripps Lane (Appendix A).

The primary objectives of the inventory and were to:

- 1) Conduct a thorough inventory of the Area's vascular plants,
- 2) Document any rare plant species,
- 3) Document any rare natural communities, and
- 4) Document any invasive plant species.

This botanical report includes the results of the inventory, a discussion of the findings, visual aids such as maps and photographs, and management recommendations for the Area.



METHODS

New England Wild Flower Society (NEWFS) staff and volunteers spent four days surveying the flora of the Mason Quarry Conservation Area. Field days were spread throughout the growing season, from May to September, to observe the majority of plants during peak bloom for clear identification. Field days we conducted on May 15th, July 2nd, August 15th, and September 17th. Surveyors included NEWFS staff John Burns, Amanda Weise, and Erin Schaeffer; Conservation Fellows Luke Davis, Tom Groves, and Chris Schorn; and Plant Conservation Volunteers Barbara and Charlie Grunden, Jim Wickis, and Joan Gorga.

During each visit, the group was divided into two teams to cover the area as completely as possible. Teams listed all trees, shrubs, subshrubs, woody vines, graminoids (grasses, sedges, and rushes), herbaceous plants (wildflowers), and non-flowering herbaceous plants (ferns and fern allies) observed in the field. To the fullest extent possible, plants were identified in the field using technical references and field guides which included Newcomb (1977), Cobb et al. (2005), and Haines (2011).



John Burns and Tom Groves (Conservation Fellow) in the field
Erin Schaeffer New England Wild Flower Society © 2013

Rare species identified in the field were documented on New Hampshire Natural Heritage Inventory Rare Plant Forms, photographed, and mapped with a GPS unit. Invasive species

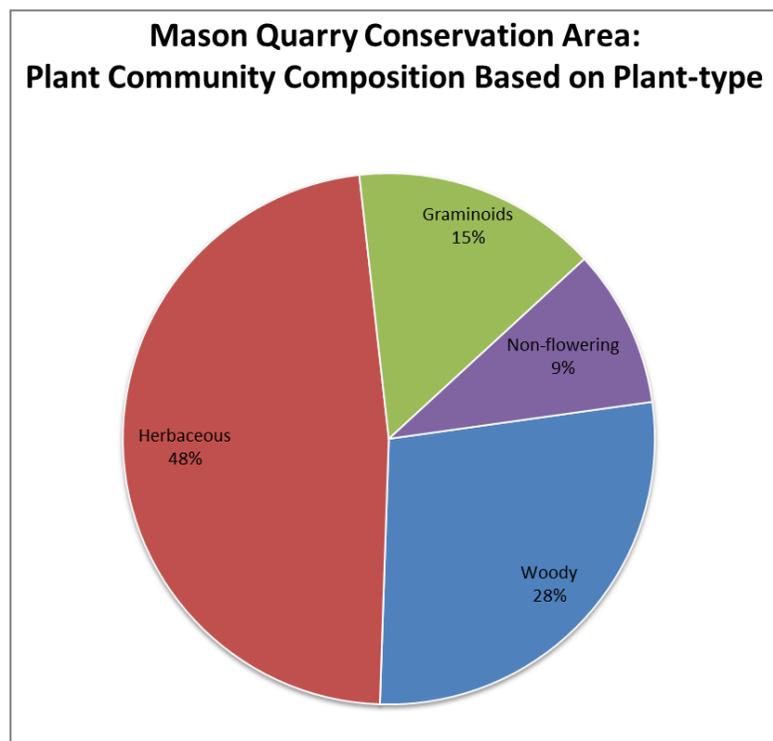


observed in the field were also mapped with a GPS. In cases where in-the-field identification was not possible, plants were photographed and/or collected for later identification in the office. This report, including the florist list (Appendix B), follows the nomenclature of Haines (2011). Plants were considered threatened or endangered based on the *Rare Plant List for New Hampshire* (New Hampshire Natural Heritage Bureau 2013). Plants were considered invasive if listed as “invasive,” “prohibited,” or “watch listed” in *New Hampshire Prohibited Invasive Species List* and *Invasive Species Watch List* (Cygan 2013).

RESULTS

Plant Species

A total of 281 plant species were observed within the Mason Quarry Conservation Area. Appendix B provides a list of these species by growth habit (tree; shrub; subshrub; woody vine; herbaceous plant; non-flowering plant; graminoid). The list includes 134 herbaceous plants, 27 non-flowering plants, 78 woody plants (trees, shrubs, subshrubs and woody vines), and 42 graminoids. Of these, 246 are native species (88%), 23 are non-native species (8%), and the remainder are of unknown or undetermined origin. Four of these non-native species are state-listed invasive (1%). One invasive insect species was documented as well.



* Percent values were rounded to the nearest percent.

Twenty-five species are new county records, one species (*Juglans cinerea*) is watch listed and three are listed as threatened or endangered (*Carex baileyi*, *Equisetum palustre*, *Sparganium androcladum*) in New Hampshire. Six species of orchids were documented, of which none are rare.

Plant Identifications

Nine species require further in-the-field examination for identification. Two herbaceous plants, two woody plants, and one graminoid were keyed out to the genus level only due to lack of flowering structures essential for identification. These species can be found in Appendix B with



“*sp.*” following the genus name. Four plants require were identified to the species level, but require further examination for complete confirmation (*Equisetum palustre*, *Platanthera clavellata*, *Sparganium androcladum*, and *Veronica anagallis-aquatica*). The species can be found in Appendix B with “*cf.*” between the genus and specific epithet.

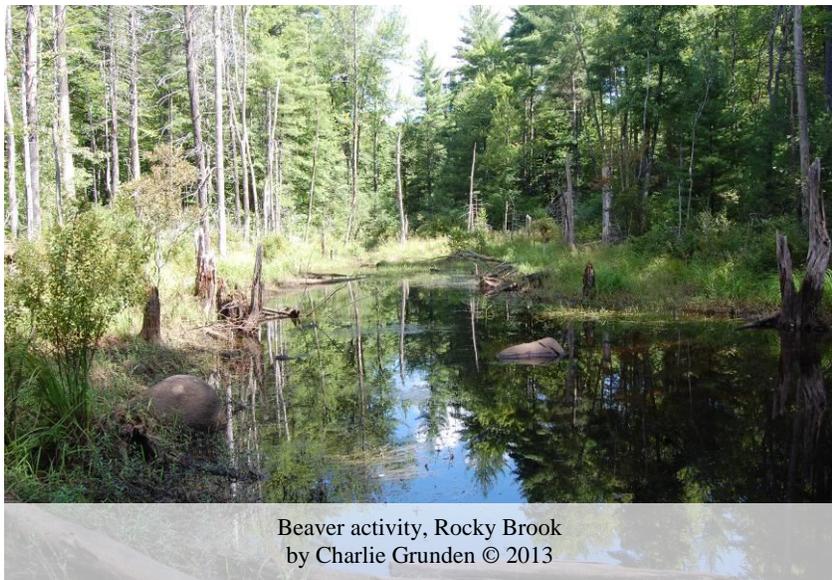
Natural Communities

The dominant forest types of the Mason Quarry Conservation Area include Appalachian-oak-pine forest and Hemlock-hardwood-pine forest. Forested natural communities include an *Oak - mountain laurel forest* which is characterized by its “dense and sometime impenetrable understory layer of mountain laurel” and is known for a variable canopy of oaks, hemlock, white pine, birches, and red maple (Sperduto & Kimball 2011).

Basin swamps, marshes, fens and vernal pools were encountered throughout the Area. Beaver activity was observed in the majority of the large wetlands and has heavily influenced drainage of Rocky Brook. New dams were created within the inventory period, changing the Area’s hydrology significantly between field visits.

Notable wetland communities can be

classified as *Sedge meadow marsh*, *Mixed tall graminoid - scrub-shrub marsh*, and potentially *Black gum - red maple basin swamp*.



Beaver activity, Rocky Brook
by Charlie Grunden © 2013

The ravine near the west boundary of the Quarry parcel semi-enriched, as evidenced by the presence of sugar maple (*Acer saccharum*), mountain maple (*Acer spicatum*), shagbark hickory (*Carya ovata*) and white ash (*Fraxinus americana*) in the canopy.

DISCUSSION

Results of the botanical inventory provide evidence of the area’s diversity of plants as well as habitats (Appendix C). The site is home to a high proportion of native plants and very few invasives. Relatively pristine areas, such as the Mason Quarry Conservation Area, are justly conserved in perpetuity.



County Records

The comparison of the inventory list with state country records indicates many species have not been documented in Hillsborough County. A portion of the new records may be due to lack of botanical surveys in the county and, as a result, species like blackberry (*Rubus allegheniensis*) and mullein (*Verbascum thapsus*) have not been documented despite their widespread distribution and commonality. In contrast, some records indicate the Area's botanical quality and richness and may be of interest to the state's Natural Heritage Program (Bailey's sedge (*Carex baileyi*) and Branched bur-reed (*Sparganium androcladum*)).

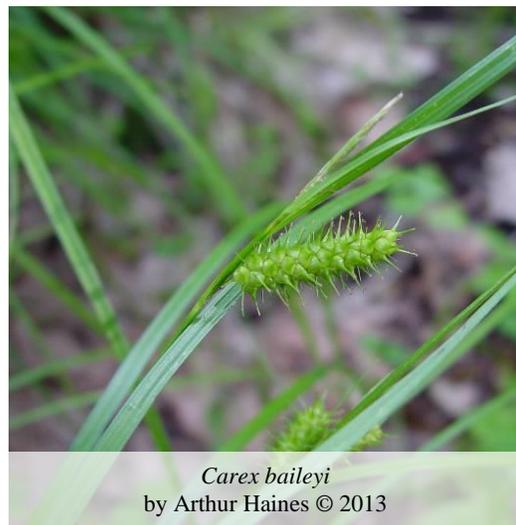
Rare Plants

Bailey's sedge (*Carex baileyi*) was identified in a wooded swamp in Beck lot (Appendix C). This species of sedge is rather rare throughout New England, and only commonly found in Vermont. Preferring wet soils and often co-occurring with the common sallow sedge (*Carex lurida*), this species can be easily overlooked. In New Hampshire, *C. baileyi* is listed as rare (S2) and threatened. See Appendix E for an explanation of state rarity ranks and codes.

Branched bur-reed (*Sparganium androcladum*) was identified in an emergent sedge marsh with still or slow moving water. Bur-reeds are distinct aquatic plants with flowers borne in round "spikey" heads. As this rare species can be misidentified as the common American bur-reed (*Sparganium americanum*), confirmation of this identification is essential. *S. androcladum* is listed as historic (SH) and endangered in New Hampshire.

Marsh horsetail (*Equisetum palustre*) is known from populations scattered in southern New England and is often found in or along lake and stream shores, marshes, seeps and pools. It was identified streamside in Downs Forest and in a basin swamp located in Jefts lot (Appendix C). This species is considered extremely rare (S1) and endangered in New Hampshire. Confirmation of this identification is essential due to its rarity.

Butternut or white walnut (*Juglans cinerea*) is rich site indicator often found on wet soils. This species was identified at southern end of the semi-rich ravine



Carex baileyi
by Arthur Haines © 2013



Sparganium androcladum
by Donald Cameron © 2013

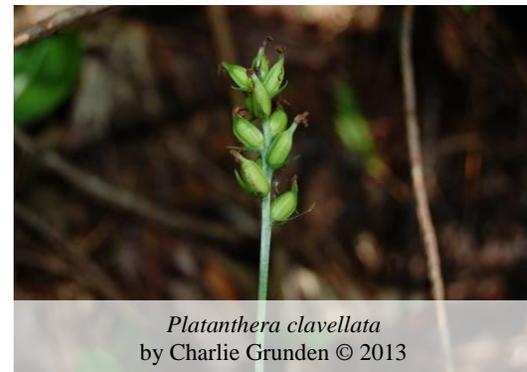
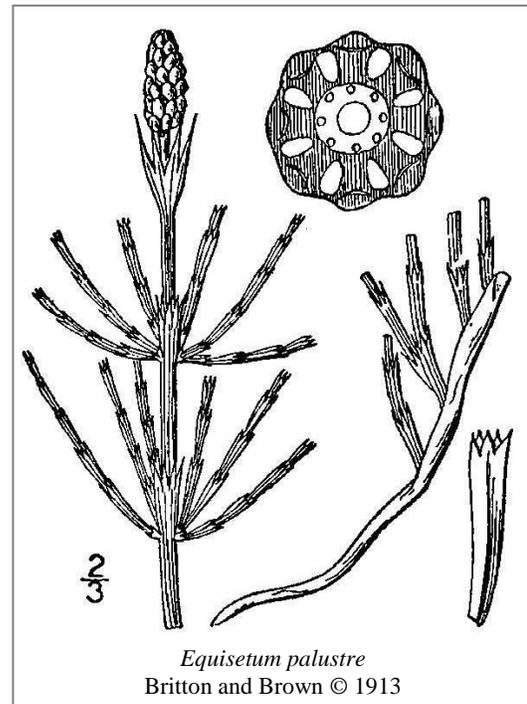


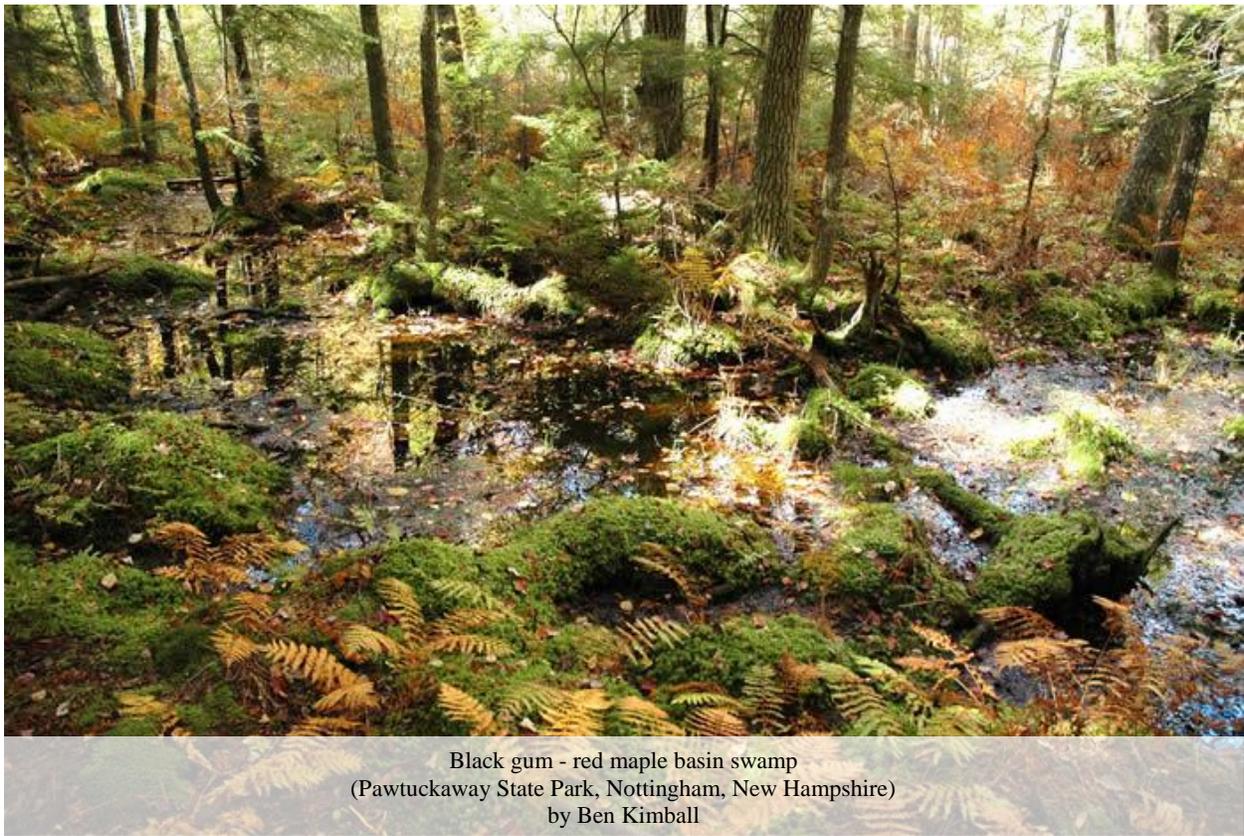
area (located along the eastern border of the quarry parcel). This species is not rare, but “watch listed” in New Hampshire because of its likelihood of becoming rare in the future (Appendix E).

Several species of orchids were noted during the inventory, including early coral-root (*Corallorhiza trifida*), pink lady's-slipper (*Cypripedium acaule*), rattlesnake-plantain (*Goodyera repens* and *G. pubescens*), broad-leaved helleborine (*Epipactis helleborine*), and little club-spur bog orchid (*Platanthera clavellata*). None of these species are listed as rare in the state, but native orchids are, generally, of conservation concern given over half of all North American orchids are listed as threatened or endangered (North American Orchid Conservation Center). Location of the two “less common” orchids, *C. trifida* and *P. clavellata* are documented in along with the Area’s rare plants in Appendix C.

Natural Communities

Black gum trees (*Nyssa sylvatic*) were noted throughout wetlands located in Downs Forest and Jefts lot with the largest specimen documented in the Southeast corner of Jefts lot (Appendix C). Mature trees and saplings were scattered along the Eastern edge of Rocky Brook, along a small unnamed stream connecting the two parcels, and around the perimeter of the basin swamp found in Jefts Lot. The later location may constitute a *Black gum - red maple basin swamp* community which is uncommon in the state (S3). This community typically occurs in acidic, nutrient poor, basins with poor drainage and very little seepage. As such, activities that influence hydrology (development, timber harvesting, beaver activity, etc.) have the potential to the shift species composition and community function (Sperduto et al. 2000). Given the rarity of this community, type further assessment and classification is required.





Black gum - red maple basin swamp
(Pawtuckaway State Park, Nottingham, New Hampshire)
by Ben Kimball

Invasive Species

Oriental bittersweet (*Celastrus orbiculatus*), autumn olive (*Elaeagnus umbellata*), Glossy buckthorn (*Frangula alnus*), and multiflora rose (*Rosa multiflora*), all of which are state listed as “prohibited invasive” species, were documented in the Mason Quarry Conservation Area. Invasives were found in relatively low abundances (< 10 individuals of each) and were primarily found along skid roads, log landings, roadside edges, and wetland borders. The majority of plants were seedlings with the exception of *R. multiflora* which was found as a few well established individuals along wetlands edges. A number of small seedlings were pulled as they were encountered; large plants that could not be easily hand pulled were documented with a GPS and mapped (Appendix D).

Hemlock woolly adelgid (*Adelges tsugae*), an invasive insect species, was noted in hemlocks growing throughout the Conservation Area. This insect feeds “primarily on the young hemlock branches causing loss of sap. This feeding retards or prevents tree growth, causes needles to discolor and drop prematurely, kills branches, generally weakens, disfigures and can ultimately cause the death of infested trees”(Hemlock Woolly Adelgid Quarantine 2012). New Hampshire requires “any persons believed to have hemlock woolly adelgid on his or her premises shall notify the Department of Agriculture, Markets and Foods, Division of Plant Industry or Department of Resources and Economic Development, Division of Forests and Lands” (New Hampshire Division of Forests and Lands 2005).



RECOMMENDATIONS

Plants and Natural Community Assessments

Two rare plants documented during this inventory require further field assessment to confirm their identification ((Marsh horsetail (*Equisetum palustre*) and Branched bur-reed (*Sparganium androcladum*)). Lack of florist structures, essential for identification, were absent at the time of survey. To ensure the protection of these plants, New England Wild Flower Society staff would like to complete this field assessment during the 2014 growing season.

New England Wild Flower Society recommends the southern portion of the Conservation Area be assessed by New Hampshire Natural Heritage Bureau staff during the 2014 growing season for the presence of a *Black gum - red maple basin swamp* community. During the botanical inventory black gum trees and a basin swamps were documented, but the community type could not be positively identified because of the complexity of the community classification system as well as the natural variability of the community type.

Forest Management

Based on the findings of this botanical inventory, New England Wild Flower Society recommends forestry activities not be conducted within 100 feet of wetland areas as well as the semi-enriched ravine (Appendix C). By avoiding this “buffer” area, both rare species as well as the majority of black gum trees noted during the inventory will be protected. Forestry activities, if conducted in a sustainable and environmentally sound way, can increase habitat, and potentially plant diversity throughout the remainder of the Area.

Forestry activities are not predicted to negatively impact the lady's-slipper and Trillium populations, and may even increase local population densities over time. Both species of wild flower are moderately shade tolerant, so dramatic increases in light may negatively impact individuals, but post-harvest forest conditions will likely provide more suitable habitat (in terms of light conditions) for these species over the developing closed canopy forest. Hand-thinning or selective cutting should be used in areas where individuals of these species wish to be protected (i.e. the population of pink lady's slipper known from the Quarry) as well as promoted.

Invasive Species Management

New England Wild Flower Society recommends the Mason Conservation Commission address invasive plants within the Area. Young plants can be hand pulled as they are encountered. Larger plants can be removed by 1) weed wrenching; 2) careful hand digging with a shovel (as to limit soil disturbance) or; 3) an application of wetland permitted systemic herbicide (Accord, Rodeo, etc.). New England Wild Flower Society also recommends the Mason Conservation Commission collaborate work with SPNHF as well as the New Hampshire Division of Forest and Lands to document the hemlock wooly adelgid infestation and ensure onsite activities meet state quarantine regulations.

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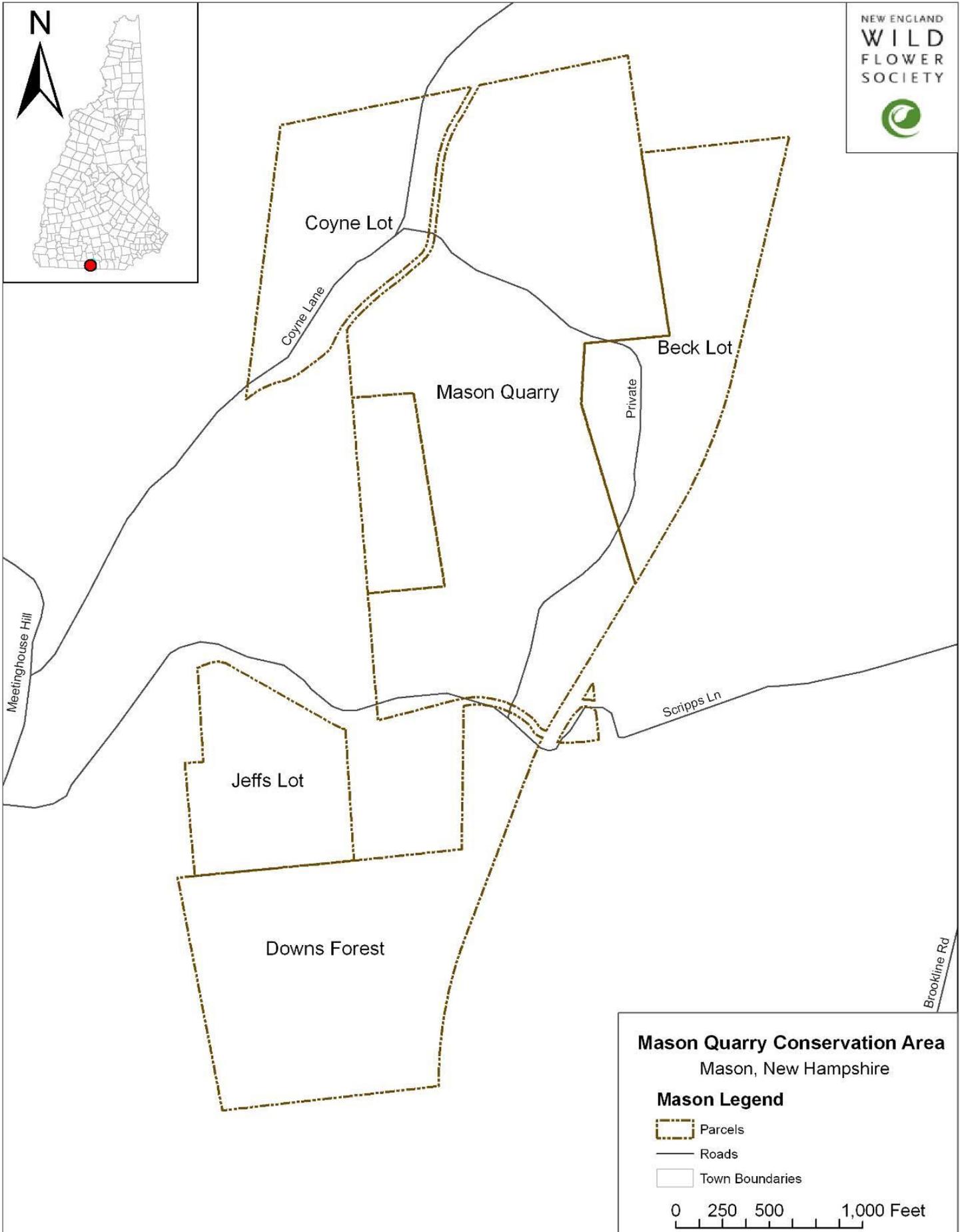
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Appendix A. Mason Quarry Conservation Area



Appendix B. Species list.

<i>Scientific Name</i>	<i>Common Name</i>	<i>Family</i>	<i>Family Common Name</i>
<i>Acer pensylvanicum</i>	striped maple	Sapindaceae	soapberry family
<i>Acer rubrum</i>	red maple		
<i>Acer saccharinum</i>	sugar maple		
<i>Acer spicatum</i>	mountain maple		
<i>Achillea millefolium</i>	common yarrow	Asteraceae	composite family
<i>Ageratina altissima</i>	white snakeroot		
<i>Agrostis perennans</i>	autumn bentgrass	Poaceae	grass family
<i>Agrostis scabra</i>	rough bentgrass		
<i>Alnus incana</i>	speckled alder	Betulaceae	birch family
<i>Amelanchier sp.</i>	shadbush, serviceberry	Rosaceae	rose family
<i>Amphicarpaea bracteata</i>	American hog-peanut	Fabaceae	legume family
<i>Anemone quinquefolia</i>	wood anemone, wood windflower	Ranunculaceae	buttercup family
<i>Apocynum androsaemifolium</i>	spreading dogbane	Apocynaceae	milkweed family
<i>Aralia hispida</i>	bristly sarsaparilla	Apiaceae	celery family
<i>Aralia nudicaulis</i>	wild sarsaparilla		
<i>Aralia racemosa</i>	American spikenard		
<i>Arisaema triphyllum</i> ssp. <i>stewardsonii</i>	Jack-in-the-pulpit	Araceae	arum family
<i>Arisaema triphyllum</i> ssp. <i>triphyllum</i>	Jack-in-the-pulpit		
<i>Asclepias syriaca</i>	common milkweed	Apocynaceae	milkweed family
<i>Asplenium trichomanes</i>	maidenhair spleenwort	Aspleniaceae	spleenwort family
<i>Athyrium angustum</i>	northern lady fern	Woodsiaceae	lady fern family
<i>Betula alleghaniensis</i>	yellow birch	Betulaceae	birch family
<i>Betula lenta</i>	cherry birch, black birch		
<i>Betula papyrifera</i>	paper birch		
<i>Betula populifolia</i>	gray birch		
<i>Bidens connata</i>	purple-stemmed beggar-ticks	Asteraceae	composite family
<i>Bidens frondosa</i>	Devil's beggar-ticks		

<i>Scientific Name</i>	<i>Common Name</i>	<i>Family</i>	<i>Family Common Name</i>
<i>Boehmeria cylindrica</i>	small-spiked false nettle	Urticaceae	nettle family
<i>Brachyelytrum erectum</i>	southern long-awned wood grass	Poaceae	grass family
<i>Brasenia schreberi</i>	water-shield	Nymphaeaceae	water-lily family
<i>Calamagrostis canadensis</i>	Canada reed grass, bluejoint	Poaceae	grass family
<i>Capnoides sempervirens</i>	pink-corydalis	Papaveraceae	poppy family
<i>Cardamine pensylvanica</i>	Pennsylvania bitter-cress	Brassicaceae	mustard family
<i>Carex baileyi</i> * (S2)	Bailey's sedge	Cyperaceae	sedge family
<i>Carex communis</i>	fibrous-rooted sedge		
<i>Carex crinita</i>	fringed sedge		
<i>Carex debilis</i>	white-edged sedge		
<i>Carex disperma</i>	soft-leaved sedge		
<i>Carex flava</i>	yellow-green sedge		
<i>Carex folliculata</i>	northern long sedge		
<i>Carex gracillima</i>	graceful sedge		
<i>Carex gynandra</i>	nodding sedge		
<i>Carex intumescens</i>	greater bladder sedge		
<i>Carex lupulina</i>	hop sedge		
<i>Carex lurida</i>	sallow sedge		
<i>Carex normalis</i>	greater straw sedge		
<i>Carex pensylvanica</i>	Pennsylvania sedge		
<i>Carex platyphylla</i> *	broad-leaved sedge		
<i>Carex pseudocyperus</i>	cypress-like sedge		
<i>Carex radiata</i>	eastern star sedge		
<i>Carex scoparia</i>	Canadian single-spike sedge		
<i>Carex swanii</i>	Swan's sedge		
<i>Carex trisperma</i>	three-seeded sedge		
<i>Carex vulpinoidea</i>	common fox sedge		
<i>Carpinus caroliniana</i>	American hornbeam	Betulaceae	birch family

<i>Scientific Name</i>	<i>Common Name</i>	<i>Family</i>	<i>Family Common Name</i>
<i>Carya ovata</i>	shagbark hickory	Juglandaceae	walnut family
<i>Castanea dentata</i>	American chestnut	Fagaceae	beech family
<i>Celastrus orbiculatus</i> (I)	Asian bittersweet	Celastraceae	bittersweet family
<i>Cephalanthus occidentalis</i>	common buttonbush	Rubiaceae	madder family
<i>Cerastium fontanum</i>	mouse-ear chickweed	Caryophyllaceae	pink family
<i>Chamaepericlymenum canadense</i>	bunchberry, Canada dwarf-dogwood	Cornaceae	dogwood family
<i>Chelone glabra</i>	white turtlehead	Plantaginaceae	snapdragon family
<i>Chrysosplenium americanum</i>	golden-saxifrage	Saxifragaceae	saxifrage family
<i>Circaea canadensis</i>	broad-leaved enchanter's-nightshade	Onagraceae	evening-primrose family
<i>Clematis virginiana</i>	Virginia virgin's-bower	Ranunculaceae	buttercup family
<i>Comptonia peregrina</i>	sweet-fern	Myricaceae	bayberry family
<i>Coptis trifolia</i>	three-leaved goldthread	Ranunculaceae	buttercup family
<i>Corallorhiza trifida</i>	early coral-root	Orchidaceae	orchid family
<i>Crataegus</i> sp.	hawthorn	Rosaceae	rose family
<i>Cypripedium acaule</i>	pink lady's-slipper	Orchidaceae	orchid family
<i>Danthonia spicata</i>	poverty oatgrass	Poaceae	grass family
<i>Decodon verticillatus</i>	swamp-loosestrife	Lythraceae	loosestrife family
<i>Dendrolycopodium hickeyi</i>	Hickey's tree-clubmoss	Lycopodiaceae	clubmoss family
<i>Dendrolycopodium obscurum</i>	flat-branched tree-clubmoss		
<i>Dennstaedtia punctilobula</i>	eastern hay-scented fern	Dennstaedtiaceae	hay-scented fern family
<i>Deschampsia flexuosa</i>	wavy hair grass	Poaceae	grass family
<i>Dichanthelium clandestinum</i>	deer-tongue rosette-panicgrass		
<i>Dichanthelium latifolium</i>	broad-leaved rosette-panicgrass		
<i>Diervilla lonicera</i>	bush-honeysuckle	Caprifoliaceae	honeysuckle family
<i>Diphasiastrum digitatum</i>	southern ground-cedar	Lycopodiaceae	clubmoss family
<i>Doellingeria umbellata</i>	tall white-aster	Asteraceae	composite family
<i>Dryopteris campyloptera</i> *	mountain wood fern	Dryopteridaceae	wood fern family
<i>Dryopteris carthusiana</i>	spinulose wood fern		

<i>Scientific Name</i>	<i>Common Name</i>	<i>Family</i>	<i>Family Common Name</i>
<i>Dryopteris cristata</i>	crested wood fern	Dryopteridaceae	wood fern family
<i>Dryopteris intermedia</i>	evergreen wood fern		
<i>Dryopteris marginalis</i>	marginal wood fern		
<i>Dryopteris x uliginosa</i>	woodfern hybrid (<i>D. carthusiana</i> x <i>D. cristata</i>)		
<i>Dulichium arundinaceum</i>	three-way sedge	Cyperaceae	sedge family
<i>Elaeagnus umbellata</i> (I)	autumn-olive	Elaeagnaceae	oleaster family
<i>Eleocharis obtusa</i>	blunt spikesedge	Cyperaceae	sedge family
<i>Epifagus virginiana</i>	beech-drops	Orobanchaceae	broom-rape family
<i>Epigaea repens</i>	trailing-arbutus	Ericaceae	heath family
<i>Epilobium coloratum</i>	eastern willow-herb	Onagraceae	evening-primrose family
<i>Epipactis helleborine</i> *	broad-leaved helleborine	Orchidaceae	orchid family
<i>Equisetum cf. palustre</i> (S1)	marsh horsetail	Equisetaceae	horsetail family
<i>Equisetum sylvaticum</i>	wood horsetail		
<i>Erechtites hieraciifolius</i>	American burnweed	Asteraceae	composite family
<i>Erigeron canadensis</i>	Canada fleabane		
<i>Erythronium americanum</i>	American trout-lily	Liliaceae	lily family
<i>Eupatorium perfoliatum</i>	boneset thoroughwort	Asteraceae	composite family
<i>Eurybia divaricata</i>	white wood-aster		
<i>Euthamia graminifolia</i>	common grass-leaved-goldenrod		
<i>Eutrochium dubium</i>	coastal plain Joe-Pye weed		
<i>Eutrochium maculatum</i>	spotted Joe-Pye weed		
<i>Fagus grandifolia</i>	American beech	Fagaceae	beech family
<i>Fallopia cilinodis</i>	fringed bindweed	Polygonaceae	knotweed family
<i>Fragaria virginiana</i>	common strawberry	Rosaceae	rose family
<i>Frangula alnus</i> * (I)	glossy false buckthorn	Rhamnaceae	buckthorn family
<i>Fraxinus americana</i>	white ash	Oleaceae	olive family
<i>Fraxinus pennsylvanica</i>	green ash		
<i>Galium mollugo</i>	whorled bedstraw	Rubiaceae	madder family

<i>Scientific Name</i>	<i>Common Name</i>	<i>Family</i>	<i>Family Common Name</i>
<i>Galium tinctorium</i>	stiff three-petaled bedstraw	Rubiaceae	madder family
<i>Galium triflorum</i>	fragrant bedstraw		
<i>Gaultheria procumbens</i>	eastern spicy-wintergreen	Ericaceae	heath family
<i>Gaylussacia baccata</i>	black huckleberry		
<i>Glyceria canadensis</i>	rattlesnake manna grass	Poaceae	grass family
<i>Glyceria striata</i>	fowl manna grass		
<i>Gnaphalium uliginosum</i>	brown cudweed	Asteraceae	composite family
<i>Goodyera pubescens</i>	downy rattlesnake-plantain	Orchidaceae	orchid family
<i>Goodyera repens</i>	dwarf rattlesnake-plantain		
<i>Gratiola aurea</i>	golden hedge-hyssop	Plantaginaceae	snapdragon family
<i>Hamamelis virginiana</i>	American witch-hazel	Hamamelidaceae	witch-hazel family
<i>Hieracium caespitosum</i>	yellow hawkweed	Asteraceae	composite family
<i>Hieracium paniculatum</i>	panicled hawkweed		
<i>Hieracium scabrum</i>	rough hawkweed		
<i>Houstonia caerulea</i>	little bluet	Rubiaceae	madder family
<i>Huperzia lucidula</i>	shining firmoss	Huperziaceae	firmoss family
<i>Hydrocotyle americana</i>	American marsh-pennywort	Apiaceae	celery family
<i>Hypericum mutilum</i> *	dwarf St. John's-wort	Hypericaceae	St. John's-wort family
<i>Hypericum punctatum</i> *	spotted St. John's-wort		
<i>Ilex verticillata</i>	common winterberry	Aquifoliaceae	holly family
<i>Impatiens capensis</i> *	spotted touch-me-not, jewelweed	Balsaminaceae	touch-me-not family
<i>Iris versicolor</i>	blue iris	Iridaceae	iris family
<i>Juglans cinerea</i> (SW)	white walnut, butternut	Juglandaceae	walnut family
<i>Juncus effusus</i>	common soft rush	Juncaceae	rush family
<i>Juncus tenuis</i>	path rush		
<i>Juniperus communis</i>	common juniper	Cupressaceae	cypress family
<i>Kalmia angustifolia</i>	sheep American-laurel	Ericaceae	heath family
<i>Kalmia latifolia</i>	mountain American-laurel		

<i>Scientific Name</i>	<i>Common Name</i>	<i>Family</i>	<i>Family Common Name</i>
<i>Lactuca biennis</i>	tall blue lettuce	Asteraceae	composite family
<i>Lactuca canadensis</i>	tall lettuce		
<i>Lechea intermedia</i> var. <i>intermedia</i>	round-fruited pinweed	Cistaceae	rockrose family
<i>Leersia virginica</i>	white cut grass	Poaceae	grass family
<i>Lindera benzoin</i>	northern spicebush	Lauraceae	laurel family
<i>Lobelia cardinalis</i> *	red lobelia, cardinal-flower	Campanulaceae	bellflower family
<i>Lobelia inflata</i>	bladder-pod lobelia, indian-tobacc		
<i>Lotus corniculatus</i>	garden bird's-foot-trefoil	Fabaceae	legume family
<i>Ludwigia palustris</i>	common water-primrose	Onagraceae	evening-primrose family
<i>Luzula multiflora</i>	common wood rush	Juncaceae	rush family
<i>Lycopodium clavatum</i>	common clubmoss	Lycopodiaceae	clubmoss family
<i>Lycopus uniflorus</i>	northern water-horehound	Lamiaceae	mint family
<i>Lyonia ligustrina</i>	maleberry	Ericaceae	heath family
<i>Lysimachia borealis</i>	starflower	Myrsinaceae	colicwood family
<i>Lysimachia terrestris</i>	swamp yellow-loosestrife		
<i>Maianthemum canadense</i>	Canada-mayflower	Ruscaceae	butcher's broom family
<i>Maianthemum racemosum</i>	feathery false Solomon's-seal		
<i>Medeola virginiana</i>	Indian cucumber root	Liliaceae	lily family
<i>Melampyrum lineare</i>	cow-wheat	Orobanchaceae	broom-rape family
<i>Mentha arvensis</i>	ginger-mint	Lamiaceae	mint family
<i>Micranthes virginiana</i>	early small-flowered-saxifrage	Saxifragaceae	saxifrage family
<i>Mimulus ringens</i>	Allegheny monkey-flower	Phrymaceae	lopseed family
<i>Mitchella repens</i>	partridge-berry	Rubiaceae	madder family
<i>Monotropa uniflora</i>	one-flowered Indian-pipe	Ericaceae	heath family
<i>Nabalus albus</i>	white rattlesnake-root	Asteraceae	composite family
<i>Nabalus altissimus</i>	tall rattlesnake-root		
<i>Nabalus trifoliolatus</i>	three-leaved rattlesnake-root		
<i>Nuphar variegata</i> *	bullhead pond-lily, yellow pond-lily	Nymphaeaceae	water-lily family

<i>Scientific Name</i>	<i>Common Name</i>	<i>Family</i>	<i>Family Common Name</i>
<i>Nyssa sylvatica</i>	black tupelo	Cornaceae	dogwood family
<i>Oclemena acuminata</i>	sharp-toothed nodding-aster	Asteraceae	composite family
<i>Onoclea sensibilis</i>	sensitive fern	Onocleaceae	fiddlehead fern family
<i>Oryzopsis asperifolia</i>	roughleaf ricegrass, white-grained	Poaceae	grass family
<i>Osmunda claytoniana</i>	interrupted fern	Osmundaceae	royal fern family
<i>Osmunda regalis</i>	royal fern		
<i>Osmundastrum cinnamomeum</i>	cinnamon fern		
<i>Ostrya virginiana</i>	hop-hornbeam	Betulaceae	birch family
<i>Oxalis stricta</i>	common yellow wood sorrel	Oxalidaceae	wood sorrel family
<i>Packera aurea</i>	golden groundsel, golden ragwort	Asteraceae	composite family
<i>Panax trifolius</i>	dwarf ginseng	Apiaceae	celery family
<i>Panicum</i> sp.	panicgrass	Poaceae	grass family
<i>Parathelypteris noveboracensis</i>	New York fern	Thelypteridaceae	marsh fern family
<i>Parthenocissus quinquefolia</i>	Virginia-creeper	Vitaceae	grape family
<i>Persicaria hydropiper</i>	water-pepper smartweed	Polygonaceae	knotweed family
<i>Persicaria sagittata</i>	arrow-leaved tearthumb		
<i>Phegopteris connectilis</i>	long beech fern	Thelypteridaceae	marsh fern family
<i>Pilea pumila</i>	Canada clearweed	Urticaceae	nettle family
<i>Pinus rigida</i>	pitch pine	Pinaceae	pine family
<i>Pinus strobus</i>	eastern white pine		
<i>Plantago lanceolata</i>	English plantain	Plantaginaceae	snapdragon family
<i>Plantago major</i> *	common plantain		
<i>Platanthera cf. clavellata</i>	little club-spur bog-orchid	Orchidaceae	orchid family
<i>Polygala polygama</i> *	racemed milkwort	Polygalaceae	milkwort family
<i>Polygonatum pubescens</i>	hairy Solomon's-seal	Ruscaceae	butcher's broom family
<i>Polypodium virginianum</i>	rock polypody	Polypodiaceae	fern family
<i>Polystichum acrostichoides</i>	Christmas fern	Dryopteridaceae	wood fern family
<i>Populus deltoides</i> *	eastern cottonwood	Salicaceae	willow family

<i>Scientific Name</i>	<i>Common Name</i>	<i>Family</i>	<i>Family Common Name</i>
<i>Populus grandidentata</i>	big-toothed poplar	Salicaceae	willow family
<i>Populus tremuloides</i>	quaking poplar		
<i>Potamogeton oakesianus</i>	Oakes' pondweed	Potamogetonaceae	pondweed family
<i>Potentilla argentea</i> *	silver-leaved cinquefoil	Rosaceae	rose family
<i>Potentilla canadensis</i>	dwarf cinquefoil		
<i>Potentilla simplex</i>	old-field cinquefoil		
<i>Prunella vulgaris</i>	common selfheal	Lamiaceae	mint family
<i>Prunus serotina</i>	black cherry	Rosaceae	rose family
<i>Prunus virginiana</i>	choke cherry		
<i>Pteridium aquilinum</i>	bracken fern	Dennstaedtiaceae	hay-scented fern family
<i>Pyrola chlorantha</i>	green-flowered shinleaf	Ericaceae	heath family
<i>Quercus alba</i>	eastern white oak	Fagaceae	beech family
<i>Quercus rubra</i>	northern red oak		
<i>Quercus velutina</i>	black oak		
<i>Rhus copallinum</i> var. <i>latifolia</i>	winged sumac	Anacardiaceae	cashew family
<i>Rhus hirta</i>	staghorn sumac		
<i>Robinia pseudoacacia</i>	black locust	Fabaceae	legume family
<i>Rosa multiflora</i> (I)	rambler rose, multiflora rose	Rosaceae	rose family
<i>Rubus allegheniensis</i> *	common blackberry		
<i>Rubus hispidus</i>	bristly blackberry		
<i>Rubus idaeus</i>	red raspberry		
<i>Rubus pubescens</i>	dwarf raspberry		
<i>Rumex acetosella</i>	sheep dock, common sheep sorrel	Polygonaceae	knotweed family
<i>Sambucus nigra</i> ssp. <i>canadensis</i>	black elderberry	Adoxaceae	elderberry family
<i>Sambucus racemosa</i>	red elderberry	Adoxaceae	elderberry family
<i>Sassafras albidum</i>	sassafras	Lauraceae	laurel family
<i>Scirpus cyperinus</i>	common wooldsedge	Cyperaceae	sedge family
<i>Scirpus expansus</i>	wood bulrush		

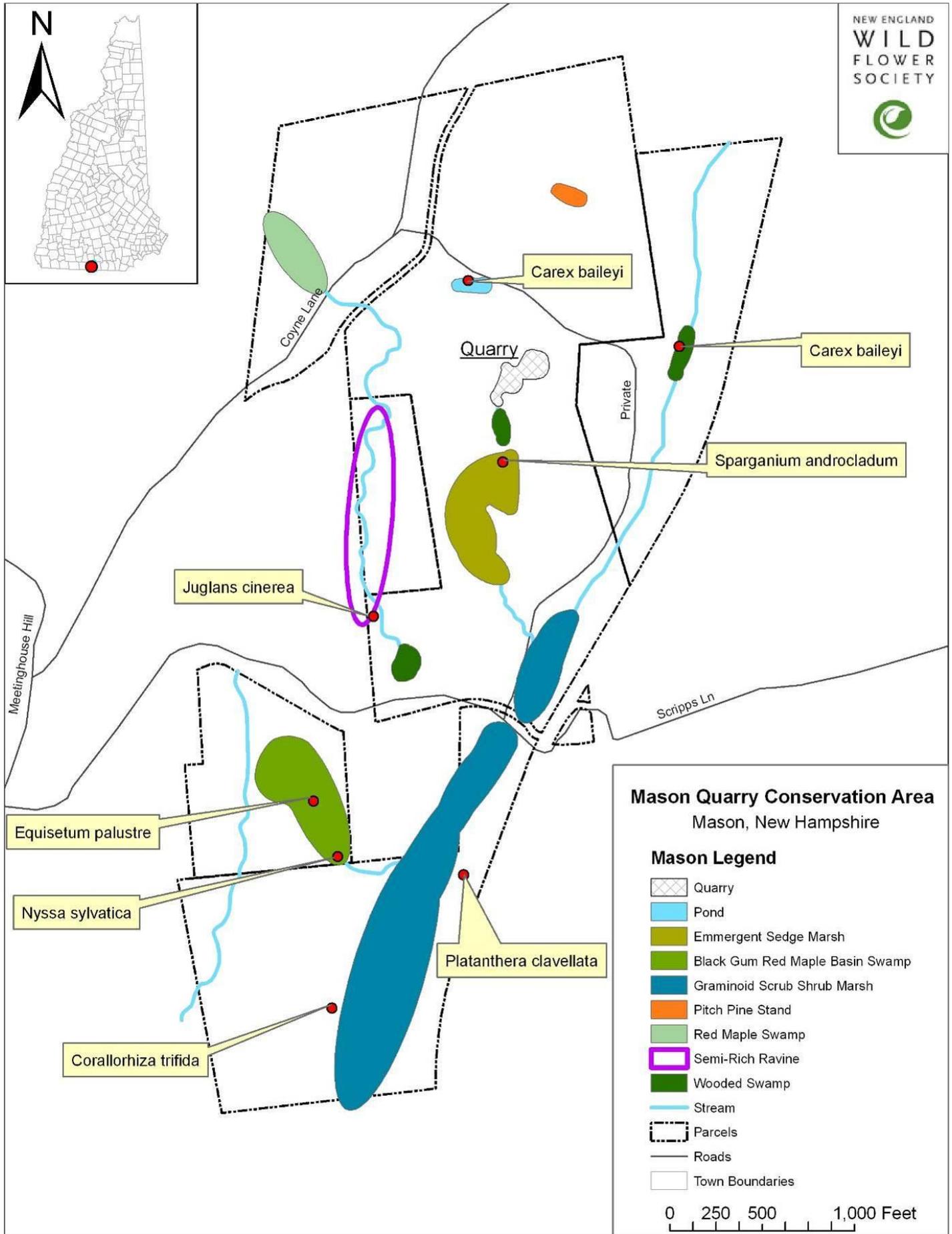
<i>Scientific Name</i>	<i>Common Name</i>	<i>Family</i>	<i>Family Common Name</i>
<i>Scirpus hattorianus</i>	mosquito bulrush	Cyperaceae	sedge family
<i>Scirpus microcarpus</i>	barber-pole bulrush		
<i>Scutellaria lateriflora</i>	mad dog skullcap	Lamiaceae	mint family
<i>Senecio</i> sp.	ragwort	Asteraceae	composite family
<i>Sisyrinchium angustifolium</i>	narrow-leaved blue-eyed-grass	Iridaceae	iris family
<i>Sium suave</i>	water-parsnip	Apiaceae	celery family
<i>Solidago altissima</i> *	tall goldenrod	Asteraceae	composite family
<i>Solidago bicolor</i>	white goldenrod		
<i>Solidago caesia</i>	axillary goldenrod		
<i>Solidago canadensis</i>	Canada goldenrod		
<i>Solidago gigantea</i>	smooth goldenrod		
<i>Solidago latissimifolia</i>	Elliott's goldenrod		
<i>Solidago puberula</i>	downy goldenrod		
<i>Solidago rugosa</i>	common wrinkle-leaved goldenrod		
<i>Sparganium</i> cf. <i>androcladum</i> * (SH,E)	branched bur-reed	Typhaceae	cattail family
<i>Spiraea alba</i> var. <i>latifolia</i> *	white meadowsweet	Rosaceae	rose family
<i>Spiraea tomentosa</i>	rosy meadowsweet	Rosaceae	rose family
<i>Swida alternifolia</i>	alternate-leaved dogwood	Cornaceae	dogwood family
<i>Symphotrichum boreale</i>	rush American-aster	Asteraceae	composite family
<i>Symphotrichum dumosum</i>	bushy American-aster		
<i>Symphotrichum lateriflorum</i>	calico American-aster		
<i>Symphotrichum novi-belgii</i>	New York American-aster		
<i>Symphotrichum puniceum</i>	purple-stemmed American-aster		
<i>Symphotrichum racemosum</i>	small white American-aster		
<i>Syringa vulgaris</i> *	common lilac	Oleaceae	olive family
<i>Taraxacum officinale</i>	common dandelion	Asteraceae	composite family
<i>Taxus canadensis</i>	American yew	Taxaceae	yew family
<i>Thalictrum pubescens</i>	tall meadow-rue	Ranunculaceae	buttercup family

<i>Scientific Name</i>	<i>Common Name</i>	<i>Family</i>	<i>Family Common Name</i>
<i>Thelypteris palustris</i> var. <i>pubescens</i>	marsh fern	Thelypteridaceae	marsh fern family
<i>Toxicodendron radicans</i>	poison-ivy	Anacardiaceae	cashew family
<i>Toxicodendron rydbergii</i>	western poison-ivy		
<i>Triadenum</i> sp.	marsh-St. John's-wort	Hypericaceae	St. John's-wort family
<i>Trifolium repens</i>	white clover	Fabaceae	legume family
<i>Trillium erectum</i>	red wakerobin	Melanthiaceae	death camas family
<i>Trillium undulatum</i>	painted wakerobin		
<i>Tsuga canadensis</i>	eastern hemlock	Pinaceae	pine family
<i>Typha latifolia</i>	broad-leaved cat-tail	Typhaceae	cat-tail family
<i>Utricularia</i> sp.	bladderwort	Lentibulariaceae	bladderwort family
<i>Uvularia sessilifolia</i>	sessile-leaved bellwort	Colchicaceae	colchicum family
<i>Vaccinium angustifolium</i>	common lowbush blueberry	Ericaceae	heath family
<i>Vaccinium corymbosum</i>	highbush blueberry		
<i>Vaccinium fuscatum</i>	black highbush blueberry		
<i>Vaccinium macrocarpon</i>	large cranberry		
<i>Veratrum viride</i>	American false hellebore	Melanthiaceae	death camas family
<i>Verbascum thapsus</i> *	common mullein	Scrophulariaceae	figwort family
<i>Veronica cf. anagallis-aquatica</i> *	blue water speedwell	Plantaginaceae	snapdragon family
<i>Veronica scutellata</i>	narrow-leaved speedwell		
<i>Viburnum acerifolium</i>	maple-leaved viburnum	Adoxaceae	elderberry family
<i>Viburnum dentatum</i>	smooth arrowwood		
<i>Viburnum lantanoides</i>	hobblebush		
<i>Viburnum nudum</i> var. <i>cassinoides</i>	withe-rod		
<i>Viola cucullata</i>	blue marsh violet	Violaceae	violet family
<i>Viola lanceolata</i> *	lance-leaved violet		
<i>Viola pallens</i>	smooth white violet		
<i>Viola primulifolia</i>	primrose-leaved violet		
<i>Viola sagittata</i>	arrowhead violet		

<i>Scientific Name</i>	<i>Common Name</i>	<i>Family</i>	<i>Family Common Name</i>
<i>Viola sororia</i>	woolly blue violet	Violaceae	violet family
<i>Vitis labrusca</i>	fox grape	Vitaceae	grape family

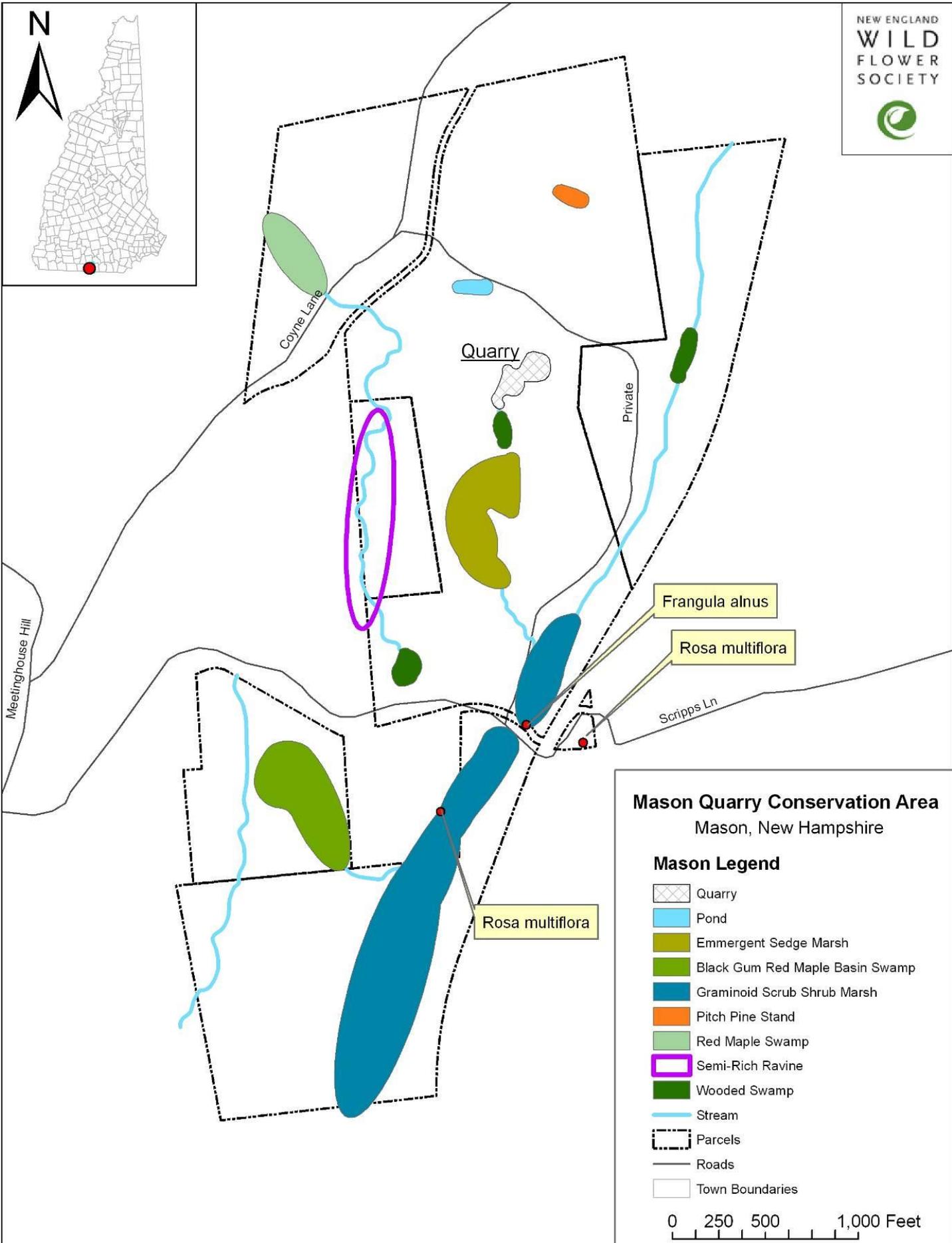
* = new county record; **sp.** = plant could not be identified to the species level as certain characteristic required for identification were absent at the time of survey; **ssp.** = subspecies; **var.** = variety; **cf.** = identification is not confirmed; **T** = threatened ; **E** = endangered; **S** = state rarity rank 1-5, 1 being the rarest; **SH** = historical; **SW** = watch; **I** = invasive

Appendix C. Natural Communities and Notable Plant Species



Appendix D. Natural Communities and Invasive Plant Species

NEW ENGLAND
WILD
FLOWER
SOCIETY



Appendix E. Explanation of State Rank Codes

Ranks describe rarity within New Hampshire (statewide or "S" rank).

Code Description

- S1 Critically imperiled because extreme rarity (generally one to five occurrences) or some factor of its biology makes it particularly vulnerable to extinction.
- S2 Imperiled because rarity (generally six to 20 occurrences) or other factors demonstrably make it very vulnerable to extinction.
- S3 Either very rare and local throughout its range (generally 21 to 100 occurrences), or found locally (even abundantly at some of its locations) in a restricted range, or vulnerable to extinction because of other factors.
- S4 Widespread and apparently secure, although the species may be quite rare in parts of its range, especially at the periphery.
- S5 Demonstrably widespread and secure, although the species may be quite rare in parts of its range, particularly at the periphery.
- SU Status uncertain, but possibly in peril. More information needed.
- SH Known only from historical records, but may be rediscovered.
- SX Believed to be extinct. May be rediscovered, but evidence indicates that this is less likely than for historical species.
- SW State Watch: native plants vulnerable to becoming threatened based on having 21-100 natural occurrences in the state observed within the last 20 years, or plants that are, in the judgment of experts, vulnerable to becoming threatened due to other important rarity and endangerment considerations (population size and trends, area of occupancy, overall viability, geographic distribution, habitat rarity and integrity, and/or degree of protection).

* In this list, ranks that are uncertain (e.g., span two categories) have been "rounded" to the most-at-risk category.

* This list is a modification of "Explanation of Global and State Rank Codes" published in *Rare Plant List for New Hampshire* (2013) and "State Watch" and "Indeterminate" Plant Species in NH, web published (2010).

Appendix F. Glossary of Terms

Ferns: flowerless and seedless vascular plants that reproduce by spore, have true roots from a rhizome, and fronds that uncurl upward.

Fern allies: All spore-bearing vascular plants that do not otherwise meet the definition of a fern. Example: horsetails.

Forbs: broad-leaved, non-grass-like herbaceous seed plants.

Graminoids: grasses or grass-like seed plants. Example: sedges.

Habitat: The environment in which a plant normally grows.

Herbaceous plants or herbs: vascular plants without significant woody tissue. This includes annuals, biennials, and perennial plants that lack significant thickening by secondary growth.

Invasive species: non-native species that invade and alter both natural and managed areas.

Native species: those species that occurred in the United States before Europeans arrived.

Natural community: a group of species that recur together without human intervention. These species interact with one another, form a functional unit, and are fairly consistent from one site to another.

Non-flowing plant: for this inventory, includes ferns and fern allies.

Non-native species: those species that began occurring in the United States after Europeans arrived.

Shrubs: perennial woody species that are generally less than 4 to 5 meters in height. Typically, shrubs are multi-stemmed.

Trees: perennial, woody species that are normally greater than 4 to 5 meters in height. Typically, trees are single-stemmed.

Vascular plants: plants with water and fluid conductive tissue (xylem and phloem). This includes seed plants, ferns, and fern allies.

Woody plants: plants with secondary growth, with stems that thicken each year by adding new tissue. The outermost layer of the main stem consists of a hard, nonliving tissue called bark. The living parts of woody plants, such as the inner bark and buds, remain alive.