A Floristic Survey for Rare, Threatened, and Endangered Plant Species and Invasive Plants on the

Windham Mountain Sporting Club Site Town of Windham, Greene County, New York

1 Introduction

As part of the State Environmental Quality Review process, a survey was conducted at the Windham Mountain Sporting Club site in search of plant species that are listed by the New York State and Federal governments as rare, threatened, or endangered. In addition, the search included invasive plants that disrupt natural communities. The project site encompasses 464.6 acres on the northeast flank of Cave Mountain, immediately south of the hamlet of Windham. The survey was conducted by Dr. Richard Futyma of the LA group, P.C., in late summer of 2010.

2 METHODS

2.1 Preparation

In preparation for the survey, information was gathered on known occurrences of rare, threatened, and endangered species in the vicinity of the site. A search of the records of the New York Natural Heritage Program did not reveal any known occurrences of such species on or in the immediate vicinity of the project site. The only detailed information that could be found was at the county level. Table 1 lists the species known to be found, or which historically were found in Greene County, that are designated as rare, threatened or endangered under New York State law. The data in this table were obtained from the New York Flora Atlas¹ and the New York Rare Plant Status Lists published by the New York Natural Heritage Program². Each species was then reviewed for it likelihood of occurring on the site. Some of these, such as *Bidens hyperborea*, are found only in or near the Hudson River, and were eliminated from consideration. For the remaining species, drawings, photographs, and descriptions in field manuals were reviewed in order to make it easier to identify them if found in the field and to obtain information on their preferred habitats.

2.2 Fieldwork

Field surveys took place on August 26 and 27, and September 8, 2010. On each of those dates, between 6½ and 7 hours were spent searching the site. A specific part of the site was concentrated on during each visit, and was walked in a zig-zag pattern, or parallel linear paths spaced about 100 feet apart, in order to maximize the amount of ground viewed. An attempt was

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¹ http://newyork.plantatlas.usf.edu/Default.aspx

Young, Stephen M. 2010. New York Rare Plant Status Lists. New York Natural Heritage Program, New York State Department of Environmental Conservation, Albany, NY. June 2010. 97 pp. (available on the internet at http://www.dec.ny.gov/docs/fish_marine_pdf/2010rareplantstatus.pdf).

made to make at least one pass through each proposed house lot. Closer scrutiny was given to wetlands, stream courses, and rock outcrops. Less attention was paid to steep slopes and other areas where houses, roads, and other facilities are unlikely to be constructed. A GPS device was used to help keep track of the locations visited and to record the locations of plant specimens collected.

As the site was traversed, any plant species that was not seen during previous fieldwork on the site was noted. If a plant was not identifiable in the field, enough material was collected to allow for identification at a later time, with the aid of hand-lenses and identification manuals. Collected materials were carefully folded and tied with at piece of vinyl flagging tape on which was written a serial number, and placed in a plastic bag. Upon return from the field site, the plant samples were refrigerated until they could be examined, which took place a day or two after their collection.

3 RESULTS AND DISCUSSION

3.1 General Flora; Threatened and Endangered Species

In the course of the three field visits, 21 plant specimens were collected and identified. Twelve of these plants were species that had not been noted during previous work involving wetland delineation and vegetation mapping on the site. Other plants not previously noted on the site were identified during the fieldwork, but were not collected. Table 2 is a list of all plant species found on the site during work by LA group personnel since the beginning of work on this project, in 2008. The species added during this survey for rare, threatened or endangered species are indicated by their scientific names in bold type. The species that are considered to be invasive and those that are not native to New York state are also indicated.

This work resulted in a total of 34 new species added to the flora list, resulting in a total of 214 vascular plant species identified growing on the site. None of these plants is on the New York State or Federal lists of rare, threatened, or endangered species.

3.2 Invasive species

Nine of the species found are on the interim list of invasive plant species in New York State recently promulgated by the NYS Dept. of Environmental Conservation³: *Berberis thunbergii*, *Elaeagnus umbellata, Rosa multiflora, Alliaria petiolata, Artemisia vulgaris, Centaurea jacea, Centaurea stoebe* ssp. *micranthos, Cirsium vulgare*, and *Phalaris arundinacea*. Most of these are found in small numbers and are limited to small parts of the site.

The most abundant invasive species is Japanese barberry (*Berberis thunbergii*). It has taken over the shrub understory of a large area within the forest in the northern part of the site, mainly at elevations below 2,200 feet. It is also found in small to large patches within the successional shrubland and successional northern hardwood vegetation communities in the northernmost part of the site. Scattered individuals of Japanese barberry have also been found in the successional old field vegetation on the site's northern edge and in the successional shrubland on its eastern side.

³ See http://www.dec.ny.gov/animals/65408.html.

Multiflora rose (*Rosa multiflora*) is another shrubby invasive, but it was found only as scattered individuals in the successional old field and successional shrubland vegetation of the northern part of the site. A few individuals have also been found in the forested part of the site, along the woods road that is called "Upper Panorama Lane."

The third shrubby invasive species found on the site, autumn olive (*Elaeagnus umbellata*) was found in only one location, along Upper Panorama Lane, a short distance from the gate at its lower end.

Most of the invasive plant species that are herbaceous have been found mainly within the more open vegetation units such as the successional old field and successional shrubland. Some have also been found along Upper Panorama lane and along the ski trails in the southwestern part of the site. Spotted knapweed (*Centaurea stoebe* ssp. micranthos), which may be the most widespread herbaceous invasive on the site, was found in all of these places. In contrast, brown knapweed (*Centaurea jacea*) was found only in the successional shrubland on the eastern edge of the site.

Mugwort (*Artemisia vulgaris*), was also found in only one location, in the successional old field in the northwestern part of the site, close to Trailside Road. Bull thistle (*Cirsium vulgare*) was also found in this part of the site, as well as in the adjacent successional shrubland.

Garlic mustard (*Alliaria petiolata*) was mainly found along parts of Upper Panorama Lane and along trails in the successional shrubland and successional northern hardwoods of the eastern part of the site. The reason for this is likely to be that its small seeds tend to be dispersed more easily along these trails.

Reed canary grass (*Phalaris arundinacea*) is the only of these invasive species that tends to prefer wetland habitats. It was found within a few locations in wetlands in the northwestern part of the site. In addition, it was found in a few wet spots within the ski trails in the southwestern part of the site.

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 Table 1. Rare, Threatened, and Endangered Plants Reported to Occur in Greene County

| Scientific Name | Common Name | NYS Status [†] |
|--------------------------------------|---|----------------------------|
| Acalypha virginica | three-seeded mercury | Е |
| Adoxa moschatellina | musk-root | Е |
| Bidens bidentoides | Delmarva Beggar-ticks | R |
| Bidens hyperborea | estuary beggar-ticks | Е |
| Bidens laevis | smooth beggartick, bur-marigold | Т |
| Blephilia ciliata | downy woodmint | Е |
| Boechera grahamii | Purple Rock-cress | R |
| Boechera stricta | Drummond's Rock-cress | Е |
| Botrychium oneidense | blunt-lobe grape-fern | Е |
| Botrychium rugulosum | rugulose grape-fern, St. Lawrence grape-fern | Е |
| Cardamine longii | Long's bitter-cress | Т |
| Carex amphibola | narrow-leaved sedge | Е |
| Carex cumulata | Clustered Sedge | Т |
| Carex davisii | Davis' sedge | Т |
| Carex glaucodea | blue sedge | Е |
| Carex lupuliformis | False Hop Sedge | R |
| Carex merritt-fernaldii | Fernald's sedge | Т |
| Carex retroflexa | reflexed sedge | Е |
| Carex schweinitzii | Schweinitz's sedge | Т |
| Carex straminea | Straw Sedge | Е |
| Cynoglossum virginianum var. boreale | northern wild comfrey | Е |
| Diphasiastrum complanatum | Northern Running-pine | Е |
| Dryopteris fragrans | fragrant cliff wood-fern | Е |
| Elatine americana | American water-wort | Е |
| Eleocharis ovata | Ovate Spikerush | Е |
| Geum virginianum | cream avens | Е |
| Huperzia appressa | Appalachian fir-clubmoss, mountain firmoss, mountain fir-clubmoss | Т |
| Huperzia selago | fir clubmoss | Е |
| Hydrastis canadensis | golden-seal, orange-root, yellow- puccoon | Т |
| Isoetes lacustris | Large-spored Quillwort | R |
| Isoetes riparia | Riverbank Quillwort | Е |
| Limosella australis | Mudwort | R |

| Scientific Name | Common Name | NYS Status [†] |
|---|--|----------------------------|
| Liparis liliifolia | lily-leaved twayblade, large twayblade, mauve sleekwort, brown widelip orchid | E |
| Lycopus rubellus | taperleaf bugleweed | Е |
| Lygodium palmatum | climbing fern, American climbing fern | Е |
| Minuartia glabra | Appalachian sandwort | Т |
| Najas guadalupensis ssp. muenscheri | Hudson River Waternymph | Е |
| Oligoneuron rigidum var. rigidum | stiff-leaf goldenrod, prairie goldenrod | Т |
| Orontium aquaticum | golden club | Т |
| Pedicularis lanceolata | swamp lousewort | Т |
| Plantago cordata | heart-leaved plantain | Т |
| Platanthera hookeri | Hooker's orchid | Е |
| Polygonum erectum | erect knotweed | Е |
| Polygonum tenue | Slender Knotweed | R |
| Pyrola asarifolia ssp. asarifolia | pink wintergreen | Т |
| Rhodiola rosea | roseroot stonecrop | E |
| Sagittaria montevidensis ssp. spongiosa | tidal arrowhead, hooded arrowhead | Т |
| Scirpus georgianus | Georgia Bulrush | Е |
| Southern Dodder | Cuscuta obtusiflora var. glandulosa | Е |
| Sporobolus heterolepis | Northern Dropseed | Т |
| Symphyotrichum laeve var. concinnum | Smooth Blue Aster | Е |
| Trichomanes intricatum | filmy-fern | Е |
| Ulmus thomasii | rock elm | Т |
| Valerianella umbilicata | navel-shape corn-salad | E (SH) |
| Woodsia glabella | smooth woodsia | Е |

†NYS Status:

E = endangered R = rare

T = threatened

SH = state historical, no existing sites found in New York State in past 20-30 years.

 Table 2. Flora of the Windham Mountain Sporting Club Site

| Scientific Name [‡] | Common Name | Notes* |
|------------------------------|-------------------------|--------|
| Trees | | |
| Acer rubrum | red maple | |
| Acer saccharum | sugar maple | |
| Betula alleghaniensis | yellow birch | |
| Betula lenta | sweet birch | |
| Betula papyrifera | paper birch | |
| Betula populifolia | gray birch | |
| Carpinus caroliniana | American hornbeam | |
| Fagus grandifolia | American beech | |
| Fraxinus americana | white ash | |
| Fraxinus pennsylvanica | green ash | |
| Ostrya virginiana | eastern hop-hornbeam | |
| Picea abies | Norway spruce | NN |
| Picea rubens | red spruce | |
| Pinus resinosa | red pine | |
| Pinus strobus | white pine | |
| Pinus sylvestris | Scotch pine | NN |
| Populus grandidentata | bigtooth aspen | |
| Populus tremuloides | quaking aspen | |
| Prunus pensylvanica | pin-cherry | |
| Prunus serotina | black cherry | |
| Quercus rubra | northern red oak | |
| Quercus velutina | black oak | |
| Salix nigra | black willow | |
| Tilia americana | American basswood | |
| Tsuga canadensis | eastern hemlock | |
| Ulmus americana | American elm | |
| Shrubs and Vines | | |
| Acer pensylvanicum | striped maple | |
| Acer spicatum | mountain maple | |
| Alnus incana ssp. rugosa | speckled alder | |
| Amelanchier sp. | shadbush | |
| Berberis thunbergii | Japanese barberry | I, NN |
| Clematis virginiana | Virginia virgin's-bower | |

| Scientific Name [‡] | Common Name | Notes* |
|-------------------------------------|---------------------------|--------|
| Cornus foemina | stiff dogwood | |
| Crataegus sp. | hawthorn | |
| Elaeagnus umbellata | autumn olive | I, NN |
| Hamamelis virginiana | American witch-hazel | |
| Juniperus communis | common juniper | |
| Prunus virginiana | choke cherry | |
| Rhus hirta | staghorn sumac | |
| Ribes lacustre | bristly black currant | |
| Rosa canina | dog rose | NN |
| Rosa multiflora | multiflora rose | I, NN |
| Rubus allegheniensis | old-field blackberry | |
| Rubus idaeus | common red raspberry | |
| Rubus occidentalis | black raspberry | |
| Rubus odoratus | pink thimbleberry | |
| Salix bebbiana | Bebb willow | |
| Salix petiolaris (?) | meadow willow | |
| Salix sericea | silky willow | |
| Sambucus canadensis | American elder | |
| Sambucus racemosa | red elderberry | |
| Spiraea alba | narrow-leaf meadow-sweet | |
| Spiraea tomentosa | steeple-bush | |
| Vaccinium corymbosum | highbush blueberry | |
| Viburnum dentatum var. lucidum | northern arrow-wood | |
| Vitis sp. | wild grape | |
| Herbaceous plants, Low Woody Plants | | |
| Achillea millefolium | common yarrow | NN |
| Acorus americanus | American sweetflag | |
| Actaea pachypoda | white baneberry | |
| Adiantum pedatum | northern maiden-hair fern | |
| Ageratina altissima | white snakeroot | |
| Agrimonia gryposepala | tall hairy groovebur | |
| Agrostis gigantea (= A. alba) | redtop | NN |
| Agrostis hyemalis | winter bentgrass | |
| Agrostis stolonifera | spreading bentgrass | NN |
| Alliaria petiolata | garlic mustard | I, NN |
| Ambrosia artemisiifolia | annual ragweed | |

| Scientific Name [‡] | Common Name | Notes* |
|---|--------------------------|--------|
| Anaphalis margaritacea | pearly everlasting | |
| Anthoxanthum odoratum | sweet vernal grass | NN |
| Arisaema triphyllum | swamp jack-in-the-pulpit | |
| Artemisia vulgaris* | mugwort | I, NN |
| Asclepias syriaca | common milkweed | |
| Athyrium filix-femina | lady-fern | |
| Bidens frondosa | devil's beggar-ticks | |
| Brachyelytrum erectum | bearded shorthusk | |
| Bromus inermis | smooth brome | NN |
| Caltha palustris | common marsh marigold | |
| Carex appalachica | Appalachian sedge | |
| Carex arctata | drooping woodland sedge | |
| Carex baileyi | Bailey's sedge | |
| Carex crinita | fringed sedge | |
| Carex cristatella | crested sedge | |
| Carex debilis | white-edge sedge | |
| Carex gracillima | graceful sedge | |
| Carex hirsutella | hirsute sedge | |
| Carex intumescens | bladder sedge | |
| Carex laxiflora | loose-flowered sedge | |
| Carex lurida | sallow sedge | |
| Carex pensylvanica | Pennsylvania sedge | |
| Carex scoparia | pointed broom-sedge | |
| Carex vulpinoidea | fox sedge | |
| Caulophyllum thalictroides | blue cohosh | |
| Centaurea jacea | brown knapweed | I, NN |
| Centaurea stoebe ssp. micranthos (= Centaurea maculosa) | spotted knapweed | I, NN |
| Cinna latifolia | slender wood-reedgrass | |
| Cirsium vulgare | bull thistle | I, NN |
| Clinopodium vulgare | field basil | NN |
| Dactylis glomerata | orchard grass | NN |
| Danthonia compressa | flattened oatgrass | |
| Daucus carota | Queen Anne's Lace | NN |
| Dendrolycopodium obscurum (= Lycopodium obscurum) | tree clubmoss | |

| Scientific Name [‡] | Common Name | Notes* |
|---|-----------------------------|--------|
| Dennstaedtia punctilobula | hay-scented fern | |
| Deparia acrostichoides (= Athyrium thelypteroides) | silvery spleenwort | |
| Dianthus armeria | Deptford pink | |
| Diphasiastrum digitatum (= Lycopodium complanatum var. flabelliforme) | running pine | |
| Doellingeria umbellata var. umbellata (= Aster umbellatus) | flat-top white aster | |
| Dryopteris cristata | crested shield-fern | |
| Dryopteris intermedia | evergreen woodfern | |
| Dryopteris marginalis | marginal woodfern | |
| Eleocharis obtusa | blunt spikerush | |
| Eleocharis sp. | Spikerush | |
| Elymus repens (= Agropyron repens) | quackgrass | NN |
| Epilobium coloratum | purple-leaf willow-herb | |
| Epipactis helleborine | helleborine | NN |
| Equisetum arvense | field horsetail | |
| Equisetum sylvaticum | woodland horsetail | |
| Erigeron annuus | white-top fleabane | |
| Erigeron sp. | Fleabane | |
| Eupatorium maculatum | spotted Joe-Pye weed | |
| Eurybia divaricata (= Aster divaricatus) | white wood aster | |
| Eurybia macrophylla (= Aster macrophyllus) | large-leaf aster | |
| Euthamia graminifolia | flat-top fragrant goldenrod | |
| Festuca filiformis | hair fescue | NN |
| Fragaria virginiana | Virginia strawberry | |
| Galeopsis tetrahit | hemp-nettle | NN |
| Galium mollugo | white bedstraw | NN |
| Galium triflorum | sweet-scent bedstraw | |
| Geranium robertianum | herb-Robert | |
| Geum canadense | white avens | |
| Glyceria melicaria | melic manna grass | |
| Glyceria striata | fowl manna grass | |
| Gymnocarpium dryopteris | oak fern | |
| Hieracium umbellatum | Canada hawkweed | |
| Huperzia lucidula (= Lycopodium lucidulum) | shining clubmoss | |
| Hypericum sp. | St. John's-wort | |

| Scientific Name [‡] | Common Name | Notes* |
|--|-------------------------|--------|
| Impatiens capensis | spotted touch-me-not | |
| Juncus brevicaudatus | rush | |
| Juncus effusus | soft rush | |
| Juncus tenuis | slender rush | |
| Laportea canadensis | Canada wood-nettle | |
| Leontodon autumnalis | autumn hawkbit | NN |
| Leucanthemum vulgare | ox-eye daisy | NN |
| Linaria vulgaris | butter-and-eggs | NN |
| Lotus corniculatus | bird's-foot trefoil | NN |
| Lycopodium clavatum | running pine | |
| Lycopus americanus | American bugleweed | |
| Lycopus uniflorus | northern bugleweed | |
| Lysimachia ciliata | fringed loosestrife | |
| Lysimachia nummularia | moneywort | NN |
| Maianthemum canadense | wild lily-of-the-valley | |
| Medeola virginiana | Indian cucumber-root | |
| Milium effusum var. cisatlanticum | tall millet-grass | |
| Mitchella repens | partridge-berry | |
| Myosoton aquaticum | giant chickweed | NN |
| Nasturtium officinale | water-cress | NN |
| Onoclea sensibilis | sensitive fern | |
| Osmunda cinnamomea | cinnamon fern | |
| Osmunda claytoniana | interrupted fern | |
| Oxalis montana | white woodsorrel | |
| Packera paupercula (= Senecio pauperculus) | balsam ragwort | |
| Panicum sp. | panic grass | |
| Phalaris arundinacea | reed canary grass | I |
| Phegopteris connectilis | northern beech fern | |
| Phleum pratense | timothy | NN |
| Pilea pumila | Canada clearweed | |
| Pilosella aurantiaca | orange hawkweed | NN |
| Plantago lanceolata | ribgrass | NN |
| Plantago major | common plantain | NN |
| Poa pratensis | Kentucky bluegrass | NN |
| Polygonum cilinode | fringed bindweed | |
| Polygonum sagittatum | arrow-leaf tear-thumb | |

| Scientific Name [‡] | Common Name | Notes* |
|--|------------------------|--------|
| Polypodium virginianum | common polypody | |
| Polystichum achrostichoides | Christmas fern | |
| Potentilla canadensis | dwarf cinquefoil | |
| Potentilla simplex | old field cinquefoil | |
| Prenanthes alba | white rattlesnake-root | |
| Prunella vulgaris | heal-all | NN |
| Ranunculus acris | tall buttercup | NN |
| Ranunculus hispidus | bristly butter-cup | |
| Rubus pubescens | dwarf blackberry | |
| Rumex obtusifolius | bitter dock | NN |
| Scirpus atrovirens | green bulrush | |
| Scirpus cyperinus | wool-grass | |
| Scutellaria galericulata | hooded skullcap | |
| Scutellaria lateriflora | blue skullcap | |
| Solanum dulcamara | climbing nightshade | NN |
| Solidago bicolor | white goldenrod | |
| Solidago caesia | wreath goldenrod | |
| Solidago canadensis | Canada goldenrod | |
| Solidago flexicaulis | zig-zag goldenrod | |
| Solidago gigantea | giant goldenrod | |
| Solidago juncea | early goldenrod | |
| Solidago nemoralis | gray goldenrod | |
| Solidago patula | rough-leaf goldenrod | |
| Solidago rugosa | wrinkled goldenrod | |
| Stellaria media | common chickweed | NN |
| Symphyotrichum lateriflorum (= Aster lateriflorus) | calico aster | |
| Symphyotrichum lowrieanum(= Aster lowrieanus) | fall aster | |
| Symphyotrichum novae-angliae (= Aster novae- angliae) | New England aster | |
| Symphyotrichum prenanthoides (= Aster prenanthoides) | crooked-stem aster | |
| Symphyotrichum puniceum (= Aster puniceus) | swamp aster | |
| Symphyotrichum racemosum (= Aster racemosus) | small-headed aster | |
| Taraxacum officinale | common dandelion | NN |
| Thelypteris noveboracensis | New York fern | |
| Thymus pulegioides | wild thyme | NN |

| Scientific Name [‡] | Common Name | Notes* |
|------------------------------|-----------------------|--------|
| Tiarella cordifolia | heart-leaf foamflower | |
| Tragopogon pratensis | yellow goat's-beard | NN |
| Trifolium arvense | rabbit's-foot clover | NN |
| Trifolium aureum | hop-clover | NN |
| Trifolium pratense | red clover | NN |
| Trifolium repens | white clover | NN |
| Tussilago farfara | colt's-foot | NN |
| Verbena hastata | blue vervain | |
| Veronica chamaedrys | Germander speedwell | NN |
| Veronica officinalis | common speedwell | NN |
| Vicia cracca | cow-vetch | NN |
| Viola sagittata | arrow-leaf violet | |

[‡] The taxonomy used here follows the New York Flora Atlas (http://www.newyork.plantatlas.usf.edu/Default.aspx). Species names appearing in parentheses are synonyms that are still used by many people.

* I = invasive species NN = a species not native to New York State