



February 2, 2007

Mr. Charles Turlinski
Horizon Wind Energy
3 Columbia Place
Albany, NY 12207

**Subject: Rare Plant Assessment Report
Marble River Wind Farm
Clinton County, New York**

Dear Mr. Turlinski:

Tetra Tech EC, Inc. (TtEC) is pleased to provide this Rare Plant Assessment Report for the proposed Marble River Wind Farm. The purpose of this assessment is to determine what listed plant species or their habitat are present, or are likely to be present, at the proposed Marble River Wind Farm. The following provides the introduction, methods, results and summary of the assessment.

INTRODUCTION

This report presents the findings of a rare plant assessment for the proposed Marble River Wind Farm. This effort included the identification of rare plants that may occur within the project area, researching the habitat and plant associations of the potential plant species, and reviewing wetland and upland delineation data that were collected during the 2005 and 2006 wetland delineation effort to determine if these plants or their potential suitable habitat was encountered at the Site.

METHODS

This effort included the determination of rare plants that may occur within the project area, researching the habitat, plant associations and range of distribution of the potential rare plant species, and reviewing wetland delineation data that were collected during the wetland delineation effort to determine if these plants or their potential suitable habitats were encountered at the Site. While the wetland delineation effort is not a formal threatened and endangered species survey, it does constitute a plant survey of the potentially affected areas and provides an initial assessment of whether these plants are present in the project area.

Correspondence from the USFWS and the NYSDEC regarding the presence of rare plants or communities within the proposed Marble River Wind Farm project were reviewed to determine if there were any documented occurrences of rare plants or communities at the Site. In addition, the New York Natural Heritage Program (NYNHP) Rare Plant Lists and the USFWS Threatened and Endangered Species System (TESS) databases were reviewed to determine what rare plants have been documented in Clinton County, New

York. Specific habitats, plant associations and the distributions of the listed plant species documented in Clinton County were researched using readily available information including various internet sources. Wetland data from the 2005 and 2006 delineation effort at the proposed Marble River Wind Farm were reviewed to determine if any of these listed species, or their potential habitat and/or plant associations were observed during the wetland delineation field effort.

Areas with potential habitats or plant associations for listed species will be targeted for specific threatened and endangered species surveys that will be conducted by a qualified botanist, familiar with the flora of New York State, in the spring and fall of 2007. A letter report, identifying the findings of the survey, will be generated and provided to the USFWS and the NYSDEC for review upon the completion of the field effort.

RESULTS

Identification of Rare Plants within the Project Area

Results of the review of USFWS and NYSDEC correspondence (2004, 2005 and 2007), and the NYNHP Rare Plant List and the USFWS TESS databases are provided in the following sections.

State and Federal Correspondence Review. USFWS and the NYSDEC Division of Fish, Wildlife and Marine Resources correspondence from March 9 and April 15, 2004 (NYSDEC and USFWS, respectively), October 20 and November 3, 2005 (USFWS and NYSDEC, respectively) and January 30, 2007 (NYSDEC) regarding the presence of rare plants or communities within the proposed Marble River Wind Farm project area was reviewed. According to the USFWS and the NYSDEC, no federally or state-listed plant species or communities are documented within the proposed project area. An updated request regarding the presence of threatened and endangered species at the proposed Marble River Wind Farm was submitted to the USFWS on January 12, 2007. A response to this request was not received at the time of this report preparation. This correspondence will be reviewed prior to the commencement of the 2007 field surveys. Copies of the above listed correspondence are provided in Attachment 1.

Natural Heritage Program Database. The May 2006 NYNHP Rare Plant Status Lists identifies 32 confirmed state-listed plants as occurring in Clinton County. Sixteen of these plant species are state-listed endangered, 15 are state-listed threatened and one is identified as rare. The majority (16) of the plant species listed were, or were assumed to be, wetland plants, 13 were, or were assumed to be, upland plants, and three plant species were identified as occurring in either habitats. Eleven federally listed species were also identified by the NYNHP as occurring in New York State; however, there are no recorded occurrences of these federally listed species in Clinton County. Table 1 identifies the common and scientific name of the 32 state-listed species, the state status and the regional wetland indicator status.

USFWS Threatened and Endangered Species System. The USFWS TESS identifies ten plant species as potentially occurring in New York State. Of these ten species, the habitat

of one, the northern wild monk's-hood (*Aconitum noveboracense*), which includes cool streamsides, occurs within the project boundaries. However, according to the NYNHP Rare Plant Status Lists, this plant, listed as threatened, is not documented in Clinton County.

Habitat, Plant Association and Range Review

Based on a literature search of the habitat, plant association and range of the 32 confirmed state listed species, seven of these (Purple rock-cress, Rock-cress, Smooth rock-cress, Northern stickseed, Water milfoil, Dwarf sand-cherry and Low sand-cherry) require specific habitats that were not identified within the proposed Marble River Wind Farm project area. These habitats include rock ledges, overhangs and cliffs, talus slopes, limestone rock crevices, acid lakes, sandbars and rocky shores. Also, the range of six plant species (Champlain beachgrass, Back's sedge, Crawe's sedge, Emory's sedge, Handsome sedge and Cat-tail sedge) did not extend into the project area. Portions of the ranges of Cloud sedge, Northern wild comfrey and Veiny Meadow-rue extend into the project area. The range of Cloud sedge and Northern wild comfrey extends into the southern portion of the project area and the range of Veiny Meadow-rue extends into the northwestern portion of the project area. Therefore, of the 32 state-listed plant species that occur within Clinton County, 19 could potentially occur within at least a portion of the project area. Table 2 lists the common name, habitat and plant association of the 19 confirmed state-listed plant species, which could potentially occur at the proposed Marble River Wind Farm.

Wetland Data Review

None of the 32 state-listed threatened or endangered plant species documented in Clinton County were observed in the 384 wetlands or 80 streams that bisect the proposed Marble River Wind Farm during the 2005 and 2006 wetland delineation effort. Table 3 lists the 384 wetland crossings delineated at the proposed Marble River Wind Farm by coartype. Based on coartype, all of the project's wetlands could potentially provide habitat for one or more of the 19 state-listed plant species that have ranges which overlap the project area. The locations of the 384 wetland and 80 stream crossings associated with the proposed Marble River Wind Farm are provided on Figure 1.

SUMMARY

According to USFWS and NYSDEC correspondence from 2004 and 2005 and NYSDEC correspondence from 2007, there are no documented occurrences of listed plant species within the project area. Also, threatened or endangered plant species were not observed at the proposed Marble River Wind Farm site during the 2005 and 2006 wetland delineation effort. Coartypes that could support the habitat and/or plant associations of 19 state-listed plant species (11 wetland, six upland and two facultative) were identified within the project area. These areas will be surveyed in the spring and fall of 2007 for the presence of any listed plant species. Suitable upland habitats for state-listed plant species in those portions of the project area other than at the delineated wetland crossings will be identified and surveyed during the 2007 field survey.

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Thank you for the opportunity to support you on this project. Should you have any questions or comments regarding this submittal, please call me at (973) 630-8402.

Very truly yours,

Richard Delahunty
Project Manager

Figure 1- Wetland Delineation Map

(Refer to the Figure 1, provided in the following supplement to this document)

Table 1
State-Listed Species in Clinton County, New York

Common Name	Scientific Name	State Status	Regional Indicator status ¹
Champlain beachgrass	<i>Ammophila champlainensis</i>	endangered	WET*
Purple rock-cress	<i>Arabis divaricarpa</i>	rare	FACU
New England northern reedgrass	<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>	threatened	WET*
Northern reedgrass	<i>Calamagrostis stricta</i> ssp. <i>stricta</i>	endangered	WET*
Back's sedge	<i>Carex backii</i>	threatened	UPL*
Crawe's sedge	<i>Carex crawei</i>	threatened	FACW
Clustered sedge	<i>Carex cumulata</i>	threatened	FACU
Emory's sedge	<i>Carex emoryi</i>	endangered	OBL
Handsome sedge	<i>Carex formosa</i>	threatened	FAC
Cloud sedge	<i>Carex haydenii</i>	endangered	OBL
Houghton's sedge	<i>Carex houghtoniana</i>	threatened	UPL*
Cat-tail sedge	<i>Carex typhina</i>	threatened	FACW+
Prairie redroot	<i>Ceanothus herbaceous</i>	endangered	UPL*
Golden corydalis	<i>Corydalis aurea</i>	threatened	UPL*
Northern wild comfrey	<i>Cynoglossum virginianum</i> var. <i>boreale</i>	endangered	UPL*
Ram's head lad's slipper	<i>Cypripedium arietinum</i>	threatened	FACW+
Northern tansy mustard	<i>Descurainia pinnata</i> ssp. <i>brachycarpa</i>	endangered	UPL*
Rock-cress	<i>Draba arabisans</i>	threatened	UPL*
Smooth rock-cress	<i>Draba glabella</i>	endangered	UPL*
Ovate spikerush	<i>Eleocharis ovata</i>	endangered	OBL
Marsh horsetail	<i>Equisetum palustre</i>	threatened	FACW
Meadow horsetail	<i>Equisetum pratense</i>	threatened	FACW
Northern stickseed	<i>Hackelia deflexa</i> var. <i>americana</i>	endangered	UPL*
Spurred gentian	<i>Halenia deflexa</i>	endangered	FAC
American shore-grass	<i>Littorela uniflora</i>	endangered	OBL
Water milfoil	<i>Myriophyllum alterniflorum</i>	threatened	OBL
Riverweed	<i>Podostemum ceratophyllum</i>	threatened	OBL
Dwarf sand-cherry	<i>Prunus pumila</i> var. <i>depressa</i>	threatened	UPL*
Low sand-cherry	<i>Prunus pumila</i> var. <i>pumila</i>	endangered	UPL*
Slender bulrush	<i>Schoenoplectus heterochaetus</i>	endangered	WET*
Veiny meadow-rue	<i>Thalictrum venulosum</i>	endangered	WET*
Melic-oats	<i>Trisetum melicoides</i>	endangered	FAC

¹ Indicator Categories:

FAC = Facultative – Equally likely to occur in wetlands or non wetlands

FACU = Facultative upland – Usually occurs in non-wetlands

+ = More frequently found in wetlands

UPL* = not listed on Region 1 National List of Plant Species that Occur in Wetlands: Northeast (Region 1).

Presumed to be an upland species

WET* = not listed on Region 1 National List of Plant Species that Occur in Wetlands: Northeast (Region 1).

Presumed to be a wetland species

FACW = Facultative wetland – Usually occurs in wetlands

OBL = Obligate wetland – In natural conditions, occurs almost always in wetlands

Table 2
State-Listed Species That Could Potentially Occur at
The Marble River Wind Farm Site

Common Name	Habitat	Plant Association
<i>Wetland Plant Species</i>		
New England northern reedgrass	Wet meadows, along streams and lake shores	ND
Northern reedgrass	Wet meadows, along streams and lake shores	ND
Cloud sedge	Red maple-hardwood swamp, sedge meadow and shallow emergent marsh	Tussock sedge (<i>Carex stricta</i>), sheep laurel (<i>Kalmia angustifolia</i>), meadow-sweet (<i>Spirea alba</i>)
Ram's head lad's slipper	Coniferous swamps and bogs including northern white cedar swamp	Northern white cedar (<i>Thuja occidentalis</i>), balsam fir (<i>Abies balsamea</i>), tamarack (<i>Larix laricina</i>) and spruce (<i>Picea</i> sp.)
Ovate spikerush	Shallow waters, marshes and swamps	Tamarack, spruce and cattail (<i>Typha latifolia</i>)
Marsh Horsetail	Along stream and pond edges and in marshes and wooded swamps	Tamarack, spruce, white cedar, speckled alder (<i>Alnus incana</i>), bebb willow (<i>Salix bebbiana</i>) meadowsweet, sedges (<i>Carex</i> spp.) and sphagnum moss (<i>Sphagnum</i> sp.)
Meadow horsetail	Moist woods, thickets and meadows	ND
American shore-grass	Wet shores and shallows	ND
Riverweed	Shoals in rocky stream and riverbeds	Monospecific community dominated by Riverweed
Slender bulrush	Emergent aquatic	Cat-tails, bulrushes (<i>Schoenoplectus</i> spp.), bur-reeds (<i>Sparganium</i> spp.), giant reed (<i>Phragmites australis</i>), water-plantains (<i>Alisma</i> spp.), arrowheads (<i>Sagittaria</i> spp.), and spikerush (<i>Eleocharis</i> spp.)
Veiny Meadow-rue	Shores and along riverbanks in rocky gravelly soil	ND
<i>Upland PLant Species</i>		
Houghton's sedge	Sandy disturbed areas including roadsides and successional forests	Gray birch (<i>Betula populifolia</i>), quaking aspen (<i>Populus tremula</i>), big toothed aspen (<i>P. grandidentata</i>), black cherry (<i>Prunus serotina</i>), red maple (<i>Acer rubrum</i>) and white pine (<i>Pinus strobus</i>)
Prairie redroot	Northern upland forests	ND
Golden corydalis	Hillsides along streams and in open woods	Spruce, fir, maple, aspen, beech (<i>Fagus grandifolia</i>) and birch
Northern wild comfrey	Successional northern hardwoods	Sugar maple (<i>Acer saccharum</i>) and wild sarsaparilla (<i>Aralia nudicaulis</i>)
Northern tansy mustard	Waste ground, disturbed sites, open woods, and roadsides	Spruce, fir, aspen, maple, beech and birch
Clustered sedge	Open rocky habitats with shallow soil including shrub swamps	Hardhack spirea (<i>Spirea tomentosa</i>) and lowbush blueberry (<i>Vaccinium pallidum</i>)
<i>Facultative Plant Species</i>		
Spurred gentian	Northern lowland and upland forests, moist woods and riverside seeps	Joe-pye-weed (<i>Eupatorium maculatum</i>), boneset (<i>E. perfoliatum</i>), jewelweed (<i>Impatiens capensis</i>) and soft rush (<i>Juncus effusus</i>)
Melic-oats	Streambanks, gravelly shores, rock ledges and damp woods	ND

ND = not determined

Table 3
Wetland Crossings by Covertypes

Wetland Covertypes ¹	Number of Wetland Crossings
PFO1	108
PFO1/PEM	10
PFO1/PSS	23
PFO1/PSS/PEM	3
PFO1/PFO4	16
PFO1/PFO4/PEM	1
PFO1/PFO4/PSS	5
PFO1/PFO4/PSS/PEM	2
PFO4	9
PFO4/PSS	2
PFO4/PEM	1
PSS	67
PSS/PEM	38
PSS/PEM/POW	4
PEM	94
PEM/OW	1
Total	384

¹PFO = Palustrine Forested Deciduous
PFO4 = Palustrine Forested Coniferous
PSS = Palustrine Scrub Shrub
PEM = Palustrine Emergent
POW = Open water

ATTACHMENT 1
AGENCY CORRESPONDENCE

(Copies of US Fish and Wildlife (USFWS) and New York Natural Heritage Program (NYNHP) correspondences regarding the presence of threatened and endangered species at the proposed Marble River Wind Farm are provided in Exhibit H of the Joint Wetland Permit Application)

MARBLE RIVER WIND FARM SUPPLEMENT TO THE RARE PLANT SURVEY REPORT

Qualified Tetra Tech Biologists conducted surveys for rare plant species that might occur within or adjacent to the proposed Marble River Wind Farm project footprint. In addition to wetland delineation surveys, which were conducted by wetland biologists for the entire project footprint, targeted surveys were conducted for rare species which have been reported in Clinton County.

Records of previous sightings of rare species and the presence of habitats where rare species occur, in or near the project area were used to prepare field staff to identify species they might encounter. The following information was compiled for these species:

- detailed description and illustrations/photographs,
- preferred habitat and associated species,
- ecological information including phenology, and
- State and global status based on information reported in Young 2007¹.

Phenology of most of the potentially occurring rare plants indicated early to mid-summer and fall surveys. Based on this surveys were conducted between 18 to 23 June 2007 and between 1 to 5 October 2007. Either systematic or random meander search patterns were used to survey areas that appeared likely to support rare taxa based on habitat and the judgment of the investigator. Much of the project footprint is limited to relatively narrow rights-of-ways; many of which are currently used or have historically been used as access roads. For these areas a random meander search pattern was used. For the 200 foot radius turbine work areas a more systematic pattern was used to provide greater coverage of the area and minimize overlap.

A review of 2006 aerial photography was used to determine preliminary boundaries of plant communities to be surveyed and described in the field. Land use in most of the northeast portion of the project area is associated with silvicultural and forested tracts have existing logging roads and hunting trails. Much of the forested land within this portion has been previously subjected to silvicultural harvesting with either the whole canopy and shrub components removed or the canopy selectively cut. The project area does not contain any virgin timber or climax forest, and most of the forest stands has been harvested three times or more over the last 200 years. In the southwest portion of the project the area agricultural land uses are dominant. Plant communities identified during the 2005-2007 wetland delineation field effort² were also used to identify potential survey locations. Second growth red maple-hardwood swamp, shrub swamp and shallow emergent marsh communities occurred most frequently at the Site. Less

¹ Young, Stephen M. 2007. New York Rare Plant Status Lists. New York Natural Heritage Program, Albany, NY. June 2007. 105 pages.

² Plant communities were determined based on results of vegetation data collected during the wetland delineation on designations provided in Edinger, G.J., D.J. Evans, S. Gebauer, T.G. Howard, D.M. Hunt, and A.M. Olivero (editors). 2002. Ecological Communities of New York State. Second Edition. A revised and expanded edition of Carol Reschke's Ecological Communities of New York State. (Draft for review). New York Natural Heritage Program, New York State Department of Environmental Conservation, Albany, NY.

common wetland communities included Northern white cedar swamp, inland poor fen, deep emergent marsh, spruce-fir swamp, black spruce-tamarack bog, and red maple-tamarack peat swamp. Locations of these communities were selectively targeted to conduct the rare plant surveys. The attached figure shows those portions of the project footprint that was surveyed. Coordinates of all locations where plant material was collected were recorded with a GPS unit.

A total of 337 species were identified during the summer (124 species), fall (48 species) and wetland delineation effort (277). The presence of state listed threatened or endangered plant species was not detected within or adjacent to the proposed project footprint. However, 20 exploitably vulnerable species were determined to occur within the project footprint of disturbance. A number of these species are associated with wetland habitats. Impacts to these species would be minimized, since most wetland impacts will be temporary and wetland soils will be segregated and restored following construction, conserving existing seed banks. In addition, several early blooming species, in particular orchids, were noted within or adjacent to the project footprint. Since these observed plants were past bloom, diagnostic characteristics associated with reproductive elements were not available to conclusively identify these plants. It is recommended that areas where potential orchid species were noted be revisited in spring prior to the start of construction.

Surveys can confirm the presence of rare plants on a site, but negative results do not guarantee that rare plant species are absent. However, for practical purposes, surveys that adhere to standardized methods provide reasonable evidence that rare plants do not occur in the survey area. Based on the results of site surveys for wetlands and rare plants, combined with the proposed construction techniques employing best management procedures for wetlands and the noted recommendation for orchids, it is likely that construction and operation of the Marble River Wind Farm will have minimal effects on rare plant species.

TABLE 1
MARBLE RIVER WIND FARM
PLANT SPECIES DOCUMENTED DURING SITE SURVEYS

Species Name	Common Name	Wetland Delineation	June 2007 Surveys	October 2007 Surveys	Number of Surveys Documented	Status
<i>Abies balsamea</i>	Balsam Fir	x	x		2	
<i>Abies fraseri</i>	Fraser Fir	x			1	
<i>Abutilon theophrasti</i>	Velvetleaf	x			1	
<i>Acer negundo</i>	Box Elder	x			1	
<i>Acer pensylvanicum</i>	Striped Maple	x			1	
<i>Acer rubrum</i>	Red Maple	x	x		2	
<i>Acer saccharum</i>	Sugar Maple	x	x		2	
<i>Achillea millefolium</i>	Common Yarrow	x			1	
<i>Acorus calamus</i>	Sweet Flag	x			1	
<i>Adiantum pendatum</i>	Maiden Hair Fern		x		1	
<i>Agrostis gigantea</i>	Redtop	x			1	
<i>Agrostis stolonifera</i>	Spreading Bentgrass	x	x		2	
<i>Alisma subcordatum</i>	American Water Plantain	x			1	
<i>Alnus crispa</i>	Mountain Alder	x			1	
<i>Alnus rugosa</i>	Speckled Alder	x			1	
<i>Alopecurus pratensis</i>	Meadow Foxtail	x		x	2	
<i>Ambrosia artemisiifolia</i>	Annual Ragweed	x			1	
<i>Ambrosia trifida</i>	Great Ragweed			x	1	
<i>Amelanchier arborea</i>	Common serviceberry	x			1	
<i>Amelanchier canadensis</i>	Canadian serviceberry	x			1	
<i>Amelanchier laevis</i>	Shadbush Serviceberry	x			1	
<i>Anaphalis margaritacea</i>	Pearly Everlasting	x			1	
<i>Andromeda glaucophylla</i>	Bog Rosemary	x			1	
<i>Anemonella thalictroides</i>	Rue Anemone	x			1	
<i>Anthoxanthum odoratum</i>	Sweet Vernalgrass	x			1	
<i>Apocynum androsaemifolium</i>	Spreading Dogbane	x	x		2	
<i>Apocynum cannabinum</i>	Clasping-Leaf Dogbane	x			1	
<i>Aralia nudicaulis</i>	Wild Sarsapilla	x	x		2	
<i>Arctium lappa</i>	Great Burdock	x			1	
<i>Arctium minus</i>	Common Burdock		x		1	
<i>Arisaema triphyllum</i>	Jack-in-the-Pulpit		x		1	
<i>Asarum canadense</i>	Canadian Wildginger			x	1	
<i>Asclepias syriaca</i>	Common Milkweed	x	x		2	
<i>Aster acuminatus</i>	Whorled Wood Aster	x			1	
<i>Aster junciformis</i>	Rush Aster	x			1	
<i>Aster novi-belgii</i>	New York Aster	x			1	
<i>Aster puniceus</i>	Purple-Stemmed Aster	x			1	
<i>Aster umbellatus</i>	Flat-Top White Aster	x			1	
<i>Aster vimineus</i>	Small White Aster	x			1	
<i>Athyrium filix-femina</i>	Lady Fern	x	x		2	EV
<i>Barbarea verna</i>	Early Wintercress	x			1	
<i>Betula alleghaniensis</i>	Yellow Birch	x	x		2	
<i>Betula papyrifera</i>	Paper Birch	x			1	
<i>Betula populifolia</i>	Gray Birch	x	x		2	
<i>Bidens cernua</i>	Nodding beggartick			x	1	
<i>Brachyelytrum aristosum</i>	Long Awned Woodgrass	x	x		2	
<i>Brassica rapa</i>	Field Mustard	x			1	
<i>Calamagrostis canadensis</i>	Canadian blue-joint			x	1	
<i>Calla palustris</i>	Water Arum	x	x		2	
<i>Caltha palustris</i>	Yellow Marsh Marigold	x	x		2	
<i>Carex communis</i>	Fibrousroot Sedge		x		1	
<i>Carex crinita</i>	Fringed Sedge	x	x	x	3	

**TABLE 1
MARBLE RIVER WIND FARM
PLANT SPECIES DOCUMENTED DURING SITE SURVEYS**

Species Name	Common Name	Wetland Delineation	June 2007 Surveys	October 2007 Surveys	Number of Surveys Documented	Status
<i>Carex debilis</i> var. <i>rudgei</i>	White Edge Sedge		x		1	
<i>Carex disperma</i>	Softleaf Sedge		x		1	
<i>Carex flacca</i>	Heath Sedge		x		1	
<i>Carex flava</i>	Yellow sedge			x	1	
<i>Carex intumescens</i>	Greater bladder sedge	x	x	x	3	
<i>Carex lupulina</i>	Hop Sedge	x	x		2	
<i>Carex lurida</i>	Lurid Sedge	x	x		2	
<i>Carex magellanica</i>	Boreal Bog Sedge		x		1	
<i>Carex scoparia</i>	Pointed Broom Sedge	x	x	x	3	
<i>Carex spicata</i>	Spiked Sedge		x		1	
<i>Carex stipata</i>	Owlfruit Sedge		x		1	
<i>Carex stricta</i>	Tussock Sedge	x	x	x	3	
<i>Carex tribuloides</i>	Blunt Broom Sedge		x		1	
<i>Carex vulpinoidea</i>	Fox Sedge	x	x		2	
<i>Carpinus caroliniana</i>	American Hornbeam	x			1	
<i>Caulophyllum thalictroides</i>	Blue Cohosh	x			1	
<i>Centaurea maculosa</i>	Spotted Knapweed	x			1	
<i>Cerastium fontanum</i>	Mouse-ear Chickweed		x		1	
<i>Chamaedaphne cayculata</i>	Leatherleaf	x			1	
<i>Chamerion angustifolium</i>	Fireweed	x			1	
<i>Chelone glabra</i>	Turtlehead	x			1	
<i>Chenopodium album</i>	White Goosefoot	x			1	
<i>Chimaphilla umbellata</i>	Pipsissewa		x		1	EV
<i>Cinna arundinacea</i>	Wood Reed Grass	x			1	
<i>Cinna latifolia</i>	Wood Reedgrass	x			1	
<i>Circaea alpina</i>	Small Enchanter's Nightshade	x			1	
<i>Cirsium arvense</i>	Canada Thistle	x			1	
<i>Cirsium vulgare</i>	Bull Thistle	x			1	
<i>Cladium moriscoides</i>	Twig Rush	x			1	
<i>Claytonia caroliniana</i>	Carolina Springbeauty	x			1	
<i>Clementatis virginiana</i>	Virginia Virgins-Bower	x			1	
<i>Clintonia borealis</i>	Bluebeard	x	x		2	
<i>Convallaria majalis</i>	Lily of the valley			x	1	
<i>Coptis trifolia</i>	Threelobed Goldthread	x	x	x	3	
<i>Cornus amomum</i>	Silky Dogwood	x	x		2	
<i>Cornus canadensis</i>	Canadian Bunchberry	x	x		2	
<i>Cornus mas</i>	Cornelian Cherry	x			1	
<i>Cornus racemosa</i>	Gray Dogwood	x			1	
<i>Cornus rugosa</i>	Round-Leaved Dogwood	x			1	
<i>Cornus sericea</i>	Red-Osier Dogwood	x			1	
<i>Corylus americana</i>	American Hazelnut		x		1	
<i>Corylus cornuta</i>	Beaked Hazelnut	x	x		2	
<i>Crataegus</i> sp.	Hawthorn	x			1	
<i>Dactylis glomerata</i>	Orchard Grass	x	x		2	
<i>Dalibarda repens</i>	Robin Runaway / Dewdrop	x			1	
<i>Daucus carota</i>	Queen Anne's Lace	x			1	
<i>Dennstaedtia punctilobula</i>	Hayscented Fern		x		1	
<i>Drosera rotundifolia</i>	Round Leaved Sundew		x		1	
<i>Dryopteris carthusiana</i>	Spinulose Wood Fern	x			1	EV
<i>Dryopteris intermedia</i>	Common Wood Fern	x			1	EV
<i>Dryopteris spinulosa</i>	Spinulose Woodfern		x		1	EV
<i>Echinochloa crusgalli</i>	Barnyard Grass	x		x	2	

TABLE 1
MARBLE RIVER WIND FARM
PLANT SPECIES DOCUMENTED DURING SITE SURVEYS

Species Name	Common Name	Wetland Delineation	June 2007 Surveys	October 2007 Surveys	Number of Surveys Documented	Status
<i>Eleocharis acicularis</i>	Least Spikerush	x			1	
<i>Eleocharis obtusa</i>	Blunt spikerush			x	1	
<i>Eleocharis palustris</i>	Common Spikerush		x	x	2	
<i>Elymus repens</i>	Quack Grass	x			1	
<i>Epilobium coloratum</i>	Purple-Leaf Willow-Herb	x			1	
<i>Epilobium leptophyllum</i>	Linear-Leaf Willow-Herb	x			1	
<i>Epilobium strictum</i>	Downy Willow-Herb	x			1	
<i>Epipactis helleborine</i>	Helleborine	x			1	
<i>Equisetum arvense</i>	Field Horsetail	x	x	x	3	
<i>Equisetum palustre</i>	Swamp Horsetail		x		1	
<i>Equisetum sylvaticum</i>	Woodland Horsetail	x	x		2	
<i>Erigeron annuus</i>	White-Top Fleabane	x			1	
<i>Erigeron philadelphicus</i>	Common Fleabane		x		1	
<i>Eriophorum spissum</i>	Cotton Grass		x		1	
<i>Erysimum cheiranthoides</i>	Worm-Seed Wallflower	x			1	
<i>Erythronium americanum</i>	Trout Lily, Yellow	x			1	
<i>Eupatoriadelphus dubium</i>	Eastern Joepyeweed	x			1	
<i>Eupatorium maculatum</i>	Spotted Joepyeweed	x			1	
<i>Eupatorium perfoliatum</i>	Common Boneset	x		x	2	
<i>Euthamia graminifolia</i>	Lance-Leaf Goldenrod	x			1	
<i>Fagus grandifolia</i>	American Beech	x			1	
<i>Festuca arundinacea</i>	Giant Fescue	x			1	
<i>Festuca elatior</i>	Meadow Fescue	x			1	
<i>Fragaria vesca</i>	Strawberry	x			1	
<i>Fragaria virginiana</i>	Virginia Strawberry	x			1	
<i>Fraxinus americana</i>	White Ash	x			1	
<i>Fraxinus pennsylvanica</i>	Green Ash	x			1	
<i>Galium asprellum</i>	Rough Bedstraw	x		x	2	
<i>Galium mollugo</i>	Wild Madder	x	x		2	
<i>Galium tinctorium</i>	Stiff Marsh Bedstraw		x		1	
<i>Gaultheria procumbens</i>	Wintergreen	x			1	
<i>Geum canadense</i>	White Avens	x			1	
<i>Glyceria canadensis</i>	Rattlesnake Grass	x		x	2	
<i>Glyceria maxima</i>	Reed Mannagrass	x			1	
<i>Glyceria striata</i>	Fowl Mannagrass	x			1	
<i>Gymnocarpium dryopteris</i>	Oak Fern		x		1	EV
<i>Hamamelis virginiana</i>	Witch Hazel	x	x		2	
<i>Hepatica</i> sp.	Hepatica	x			1	
<i>Hieracium aurantiacum</i>	Devil's Paintbrush	x	x		2	
<i>Hieracium pratense</i>	Hawkweed	x	x		2	
<i>Hordeum vulgare</i>	Common Barley	x			1	
<i>Huperzia lucidula</i>	Shinning clubmoss	x		x	2	EV
<i>Hydrocotyle americana</i>	American Marsh Penny-Wort	x			1	
<i>Hylotelephium telephioides</i>	Allegheny Stonecrop	x			1	
<i>Hypericum boreale</i>	Northern St. Johnswort	x			1	
<i>Hypericum perforatum</i>	Common St. Johns Wort		x		1	
<i>Ilex mucronata</i>	Catberry / Mountain Holly	x			1	
<i>Ilex verticillata</i>	Common Winterberry	x			1	
<i>Impatiens capensis</i>	Spotted Touch-Me-Not	x	x		2	
<i>Iris versicolor</i>	Blue Flag	x	x		2	
<i>Isotria</i> sp.	Fiveleaf Orchid	x			1	
<i>Juncus canadensis</i>	Canada Rush	x		x	2	

TABLE 1
MARBLE RIVER WIND FARM
PLANT SPECIES DOCUMENTED DURING SITE SURVEYS

Species Name	Common Name	Wetland Delineation	June 2007 Surveys	October 2007 Surveys	Number of Surveys Documented	Status
<i>Juncus effusus</i>	Soft Rush	x	x	x	3	
<i>Juncus tenuis</i>	Path Rush	x		x	2	
<i>Juniperus communis</i>	Common Juniper	x			1	
<i>Kalmia angustifolia</i>	Sheep Laurel	x	x		2	
<i>Lactuca canadensis</i>	Wild Lettuce	x			1	
<i>Larix laricina</i>	Tamarack	x	x		2	
<i>Ledum groenlandicum</i>	Bog Labrador Tea	x	x		2	
<i>Ledum palustre</i>	Wild Rosemary		x		1	
<i>Leersia oryzoides</i>	Rice Cutgrass	x			1	
<i>Leersia virginica</i>	Whitegrass	x			1	
<i>Leerzia oryzoides</i>	Ricecut grass			x	1	
<i>Lemna</i> sp.	Duckweed	x			1	
<i>Leontodon autumnalis</i>	Fall Dandelion	x			1	
<i>Leucanthemum vulgare</i>	Oxeye Daisy	x	x		2	
<i>Leucobryum albidum</i>	Cushion Moss		x		1	
<i>Linaria vulgaris</i>	Butter And Eggs	x			1	
<i>Lobelia inflata</i>	Indian-tobacco	x			1	
<i>Lolium perenne</i>	Perennial Ryegrass	x			1	
<i>Lonicera morrowii</i>	Morrow's Honeysuckle	x			1	
<i>Lycopodiella inundata</i>	Northern Bog Clubmoss		x		1	EV
<i>Lycopodium annotinum</i>	Stiff Clubmoss	x			1	EV
<i>Lycopodium clavatum</i>	Running Pine	x			1	EV
<i>Lycopodium dendroideum</i>	Tree clubmoss	x	x		2	EV
<i>Lycopodium obscurum</i>	Ground Pine (Princess Pine)	x	x	x	3	EV
<i>Lycopus uniflorus</i>	Northern Bugleweed	x		x	2	
<i>Lyonia ligustrina</i>	Maleberry		x		1	
<i>Lythrum salicaria</i>	Purple Loosestrife	x			1	
<i>Maianthemum canadense</i>	Canada Mayflower	x	x	x	3	
<i>Maianthemum trifolium</i>	False Lily of the Valley		x		1	
<i>Malva moschata</i>	Musk Mallow		x		1	
<i>Malva neglecta</i>	Common Mallow	x			1	
<i>Matricaria chamomilla</i>	Wild Chamomile	x			1	
<i>Matteuccia struthiopteris</i>	Ostrich Fern	x			1	
<i>Medeola virginiana</i>	Indian Cucumber Root		x		1	
<i>Medicago sativa</i>	Alfalfa	x			1	
<i>Melilotus alba</i>	White Sweet Clover	x			1	
<i>Melilotus officinalis</i>	Yellow Sweet Clover	x			1	
<i>Mentha</i> sp.	Mint			x	1	
<i>Mimulus alatus</i>	Winged monkey flower			x	1	
<i>Mitchella repens</i>	Partridgeberry	x			1	
<i>Monotropa uniflora</i>	Ghost Pipe	x			1	
<i>Myosotis scorpioides</i>	True Forget-Me-Not		x		1	
<i>Oenothera biennis</i>	Common Evening-Primrose	x			1	
<i>Onoclea sensibilis</i>	Sensitive Fern	x	x		2	
<i>Osmunda cinnamomea</i>	Cinnamon Fern	x	x	x	3	EV
<i>Osmunda claytoniana</i>	Interrupted Fern	x	x		2	EV
<i>Osmunda regalis</i>	Royal Fern	x	x		2	EV
<i>Ostrya virginiana</i>	Hop Hornbeam	x			1	
<i>Oxalis corniculata</i>	Creeping Woodsorrel	x			1	
<i>Oxalis montana</i>	Common wood sorrel			x	1	
<i>Panax trifolius</i>	Dwarf Ginseng	x			1	
<i>Panicum clandestinum</i>	Deer-Tongue Grass	x		x	2	

TABLE 1
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Species Name	Common Name	Wetland Delineation	June 2007 Surveys	October 2007 Surveys	Number of Surveys Documented	Status
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	x			1	
<i>Phalaris arundinacea</i>	Reed Canary Grass	x	x	x	3	
<i>Phleum pratense</i>	Timothy	x	x	x	3	
<i>Photinia melanocarpa</i>	Black Chokecherry	x			1	
<i>Phragmites australis</i>	Common Reed	x			1	
<i>Picea abies</i>	Norway Spruce	x			1	
<i>Picea mariana</i>	Black Spruce	x	x		2	
<i>Picea rubens</i>	Red Spruce	x			1	
<i>Pilea pumila</i>	Canada Clearweed	x			1	
<i>Pinus rigida</i>	Pitch Pine	x			1	
<i>Pinus strobus</i>	Eastern White Pine	x			1	
<i>Pinus sylvestris</i>	Scotch Pine		x		1	
<i>Plantago lanceolata</i>	English Plantain	x			1	
<i>Plantago major</i>	Common Plantain	x		x	2	
<i>Poa palustris</i>	Fowl Meadow Grass	x			1	
<i>Polygonatum pubescens</i>	Hairy Solomon's Seal	x	x		2	
<i>Polygonum clinode</i>	Bindweed		x		1	
<i>Polygonum hydropiper</i>	Marshpepper Smartweed	x			1	
<i>Polygonum hydropiperoides</i>	Swamp Smartweed	x			1	
<i>Polygonum lapathifolium</i>	Curlytop Knapweed	x			1	
<i>Polygonum pensylvanicum</i>	Pennsylvania Smartweed	x			1	
<i>Polygonum persicaria</i>	Lady's Thumb	x			1	
<i>Polygonum sagittatum</i>	Arrow-Leaf Tearthumb	x		x	2	
<i>Polygonum scandens</i>	Climbing False Buckwheat	x			1	
<i>Polystichum acrostichoides</i>	Christmas Fern	x	x		2	EV
<i>Populus tremuloides</i>	Quaking Aspen	x			1	
<i>Potentilla simplex</i>	Common Cinquefoil	x	x		2	
<i>Prunella vulgaris</i>	Common Selfheal	x	x		2	
<i>Prunus pensylvanica</i>	Pin Cherry	x			1	
<i>Prunus serotina</i>	Black Cherry	x	x		2	
<i>Prunus virginiana</i>	Choke Cherry	x	x		2	
<i>Pseudotsuga menziessi</i>	Douglas Fir	x			1	
<i>Pteridium aquilinum</i>	Bracken Fern	x	x		2	
<i>Pyrus americana</i>	American Mountain Ash	x			1	
<i>Pyrus malus</i>	Apple	x			1	
<i>Quercus rubra</i>	Red Oak	x			1	
<i>Ranunculus acris</i>	Tall Buttercup	x	x	x	3	
<i>Ranunculus repens</i>	Creeping Buttercup	x			1	
<i>Ranunculus septentrionalis</i>	Swamp Buttercup		x		1	
<i>Rhinanthus crista-galli</i>	Yellow Rattle		x		1	
<i>Rhododendron viscosum</i>	Swamp Azalea	x			1	
<i>Rhus typhina</i>	Staghorn Sumac	x			1	
<i>Ribes glandulosum</i>	Skunk Currant	x			1	
<i>Rubus allegheniensis</i>	Allegheny Blackberry	x	x		2	
<i>Rubus hispidus</i>	Bristly Blackberry	x			1	
<i>Rubus idaeus</i>	Common Red Raspberry	x			1	
<i>Rubus orarius</i>	Blackberry	x			1	
<i>Rubus pubescens</i>	Dwarf Blackberry	x			1	
<i>Rumex acetosella</i>	Field Sorrel	x	x		2	
<i>Rumex crispus</i>	Curly Dock	x	x		2	
<i>Sagittaria latifolia</i>	Arrowhead			x	1	
<i>Salix bebbiana</i>	Beak Willow	x			1	

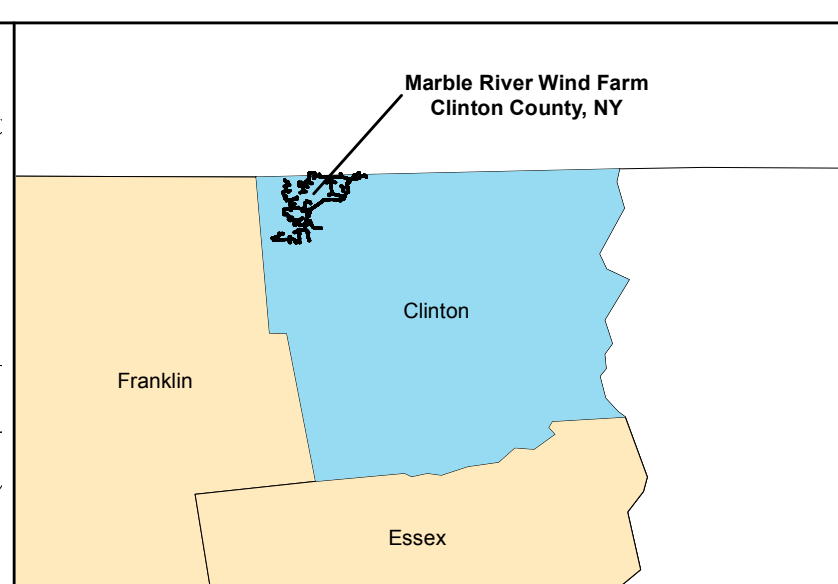
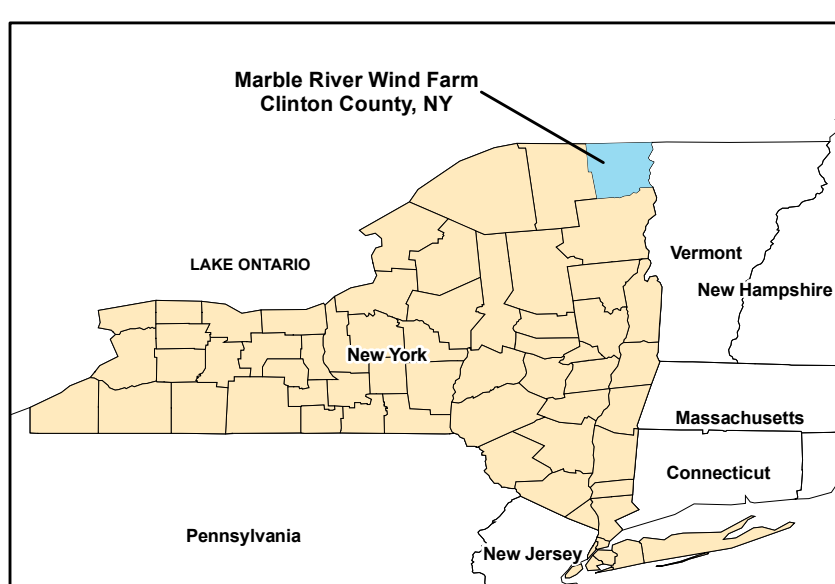
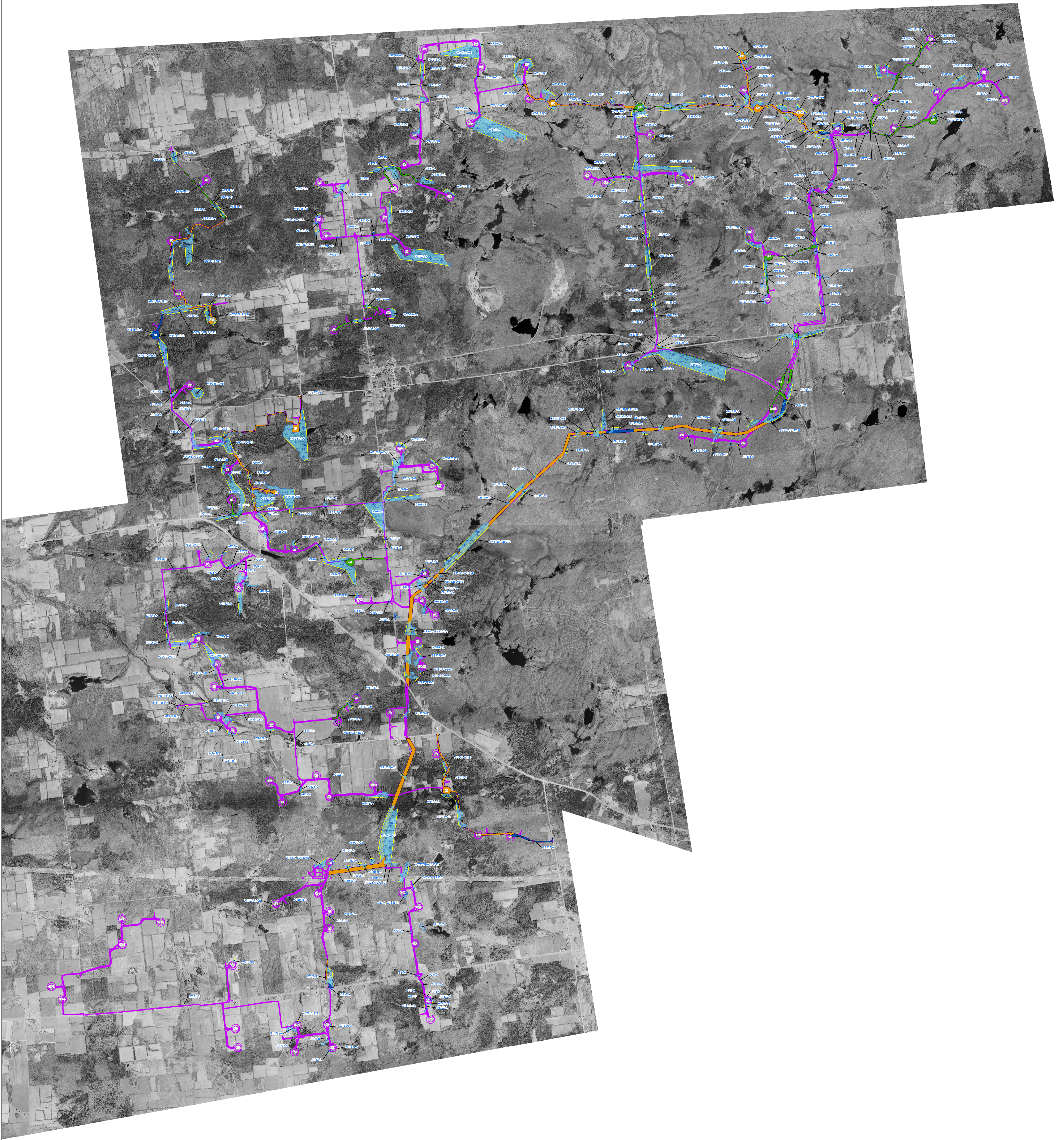
TABLE 1
MARBLE RIVER WIND FARM
PLANT SPECIES DOCUMENTED DURING SITE SURVEYS

Species Name	Common Name	Wetland Delineation	June 2007 Surveys	October 2007 Surveys	Number of Surveys Documented	Status
<i>Salix discolor</i>	Pussy Willow		x		1	
<i>Salix fragilis</i>	Crack Willow	x			1	
<i>Salix sericea</i>	Silky Willow	x	x		2	
<i>Sambucus canadensis</i>	American Elder	x			1	
<i>Sambucus nigra</i>	European Elderberry	x			1	
<i>Sanicula</i> sp.	Black Snakeroot	x			1	
<i>Scirpus atrovirens</i>	Green Bulrush	x	x	x	3	
<i>Scirpus cyperinus</i>	Woolgrass	x	x	x	3	
<i>Scirpus microcarpus</i>	Barberpole Bulrush	x	x		2	
<i>Selaginella rupestris</i>	Northern selaginella			x	1	
<i>Senecio</i> sp.	Ragwort			x	1	
<i>Sicyos angulatus</i>	Oneseed Burr Cucumber	x			1	
<i>Silene latifolia</i>	Bladder Champion		x		1	
<i>Sisyrinchium angustifolium</i>	Blue-Eyed Grass		x		1	
<i>Smilacina racemosa</i>	False Solomon's Seal	x			1	
<i>Smilacina trifolia</i>	Three-leaved Solomon's Seal	x			1	
<i>Solanum dulcamara</i>	Climbing Nightshade	x			1	
<i>Solidago altissima</i>	Tall Goldenrod	x			1	
<i>Solidago canadensis</i>	Canada Goldenrod	x			1	
<i>Solidago gigantea</i>	Late Goldenrod	x			1	
<i>Solidago hispida</i>	Hairy Goldenrod	x			1	
<i>Solidago rugosa</i>	Rough-Stemmed Goldenrod	x	x		2	
<i>Sonchus asper</i>	Spiny-Leaf Sow Thistle	x			1	
<i>Sonchus oleraceus</i>	Common Sowthistle	x			1	
<i>Sorbus americana</i>	American Mountain Ash	x			1	
<i>Sparganium americanum</i>	Lesser Burreed	x		x	2	
<i>Sphagnum</i> sp.	Sphagnum Moss	x	x		2	
<i>Spiraea alba</i>	Narrow-Leaf Meadowsweet	x	x		2	
<i>Spiraea latifolia</i>	Broad-Leaf Meadowsweet	x			1	
<i>Spiraea tomentosa</i>	Steeple-Bush	x			1	
<i>Stellaria graminea</i>	Grasslike Starwort	x			1	
<i>Symphyotrichum novae-angliae</i>	New England aster			x	1	
<i>Symphyotrichum novi-belgii</i>	New York aster			x	1	
<i>Symplocarpus foetidus</i>	Skunk Cabbage	x			1	
<i>Taraxacum officinale</i>	Common Dandelion	x			1	
<i>Thalictrum pubescens</i>	Tall Meadow Rue	x	x		2	
<i>Thelypteris noveboracensis</i>	New York Fern	x	x		2	EV
<i>Thelypteris palustris</i>	Eastern Marsh Fern	x	x		2	EV
<i>Thelypteris simulata</i>	Massachusetts Fern / Bog Fern	x			1	EV
<i>Thlaspi arvense</i>	Field Penny Cress	x			1	
<i>Thuja occidentalis</i>	Northern White Cedar	x	x		2	
<i>Tiarella cordifolia</i>	Foamflower	x			1	
<i>Tilia americana</i>	American Basswood / Linden	x			1	
<i>Tragopogon porrifolius</i>	Salsify		x		1	
<i>Triadenum virginicum</i>	Virginia Marsh St. Johnswort	x			1	
<i>Trientalis borealis</i>	Starflower	x	x	x	3	
<i>Trifolium arvense</i>	Rabbitfoot Clover	x			1	
<i>Trifolium campestre</i>	Clover, Hop		x		1	
<i>Trifolium dubium</i>	Least Hop Clover	x			1	
<i>Trifolium hybridum</i>	Alsike Clover	x	x		2	
<i>Trifolium pratense</i>	Red Clover	x	x	x	3	
<i>Trifolium repens</i>	White Clover	x			1	

TABLE 1
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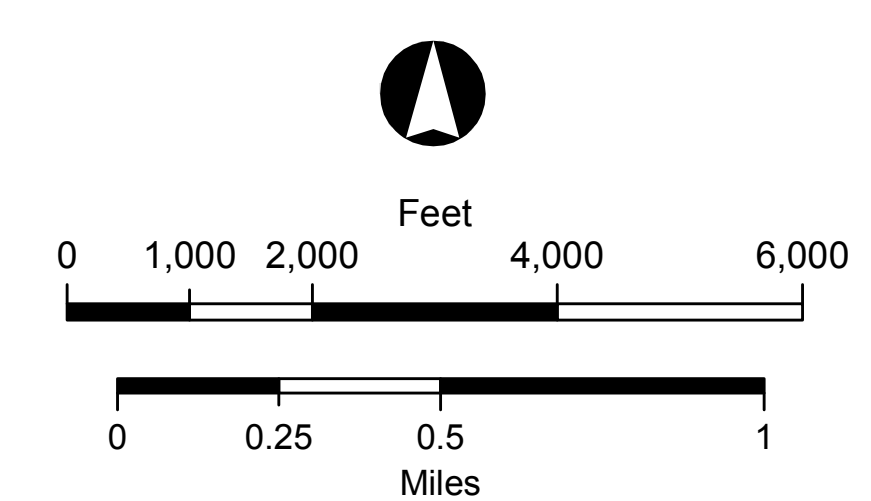
Species Name	Common Name	Wetland Delineation	June 2007 Surveys	October 2007 Surveys	Number of Surveys Documented	Status
<i>Trillium undulatum</i>	Painted Trillium	x	x		2	EV
<i>Tsuga canadensis</i>	Hemlock	x			1	
<i>Tussilago farfara</i>	Coltsfoot	x			1	
<i>Typha angustifolia</i>	Narrowleaf Cattail	x	x	x	3	
<i>Typha latifolia</i>	Broad-Leaf Cattail	x			1	
<i>Ulmus americana</i>	American Elm	x			1	
<i>Ulmus rubra</i>	Slippery Elm	x			1	
<i>Uvularia perfoliatum</i>	Perfoliate Bellwort	x			1	
<i>Vaccinium angustifolium</i>	Lowbush Blueberry	x	x		2	
<i>Vaccinium corymbosum</i>	Highbush Blueberry	x			1	
<i>Vaccinium macrocarpon</i>	Cranberry		x		1	
<i>Vaccinium myrtilloides</i>	Velvetleaf Huckleberry	x			1	
<i>Veratrum viride</i>	Green False Hellebore	x	x		2	
<i>Verbascum thapsus</i>	Common Mullein	x			1	
<i>Veronica officinalis</i>	Common Speedwell		x		1	
<i>Viburnum cassinoides</i>	Withe-rod	x	x		2	
<i>Viburnum lantanoides</i>	Hobblebush	x			1	
<i>Viburnum lentago</i>	Nannyberry	x			1	
<i>Viburnum nudum</i>	Possumhaw Viburnum	x			1	
<i>Viburnum rhytidophyllum</i>	Leatherleaf	x			1	
<i>Viburnum trilobum</i>	American Cranberrybush	x			1	
<i>Vicia cracca</i>	Cow Vetch	x	x		2	
<i>Viola canadensis</i>	Canada Violet	x			1	
<i>Viola triloba</i>	Three Leaved Violet		x		1	
<i>Vitis riparia</i>	Riverbank Grape	x			1	
Number of Species Identified during Survey		278	124	48		

MARBLE RIVER WIND FARM



- PROJECT FOOTPRINT
- DELINEATED WETLANDS
- WETLAND CONTINUATION LINES
- FALL 2007 SURVEY AREA
- SPRING 2007 SURVEY AREA
- SPRING AND FALL 2007 SURVEY AREA

MARBLE RIVER WIND FARM
FIGURE 1
RARE PLANT SURVEY AREA
2007



Marble River
Wind Farm

TETRA TECH EC, INC.

NAD 1983 StatePlane New York East (Feet)
 Projection: Transverse Mercator

Source:
 Project Footprint and Aerial Photography: URS
 Horizon Wind Energy and Tetra Tech EC, Inc.
 Field Delineated Wetlands and Stream, Tree Top EC Wetland Delineators
 using Trimble GeoXT™ Handheld units.

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