



Stantec

June 20, 2008

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**Subject: Rare Plant Survey in response to NH Natural Heritage Bureau Review
at the Proposed Windpark in Coos County, New Hampshire**

Dear Pip:

As requested by Granite Reliable Power, LLC (GRP), Stantec Consulting (Stantec) conducted a reconnaissance-level rare plant survey within the area of the proposed Windpark in Coos County, New Hampshire (Project). The survey was conducted June 2-5, 2008. Surveys were initiated to ensure proper identification of flowering species and to catch any spring ephemerals still identifiable. This survey was in response to the New Hampshire Natural Heritage Bureau's (NHNHB) review of the Project (attached). The rare plant survey was completed to evaluate potential project impact to rare plants.

This survey was a follow up to the reconnaissance level investigation conducted in June and August of 2007, during the preliminary project facility planning phase, and a growing season confirmation of the natural community survey Stantec conducted in March of 2008. The NHNHB provided guidance on habitats and rare plant focus areas based on the natural community survey, rare species occurrence records, and the reconnaissance rare plant survey from 2007.

The focus areas were those high-elevation spruce-fir forests and any semi-rich and circumneutral slopes and seeps of areas within the Project's footprint. This included: Dixville Peak, Mount Kelsey, the peaks associated with Fish Brook Ridge, the semi-rich hardwood forest west of Kelsey Notch (which is no longer in the Project), the floodplains of Phillips Brook, and the West Branch of Clear Stream. Surveys of each area involved hiking and traversing the ridgelines and meandering along the forest slopes and floodplains using topography to find appropriate areas for closer investigation.

Confirmation of Natural Community Habitat Survey

Based on the recommendation of the NHNHB, the summit areas required confirmation of herbaceous vegetation to complement the cover type found/identified during the natural community survey conducted by Stantec in March 2008. During the current survey the herbaceous vegetation observed was consistent with the appropriate community mapped by Stantec in March. A complete plant list is included as Table 1 in this report. According to the description of Natural Communities of New Hampshire (Sperduto and Nichols, 2004) the high-elevation spruce-fir forest is a S4 community type meaning it is "widespread and apparently secure, although ... may be quite rare in parts of its range, especially at the periphery" (2004). Dominant vegetation observed includes: mountain holly (*Ilex mucronata*), goldthread (*Coptis trifoliata*), cinnamon fern (*Osmunda cinnamomea*), bluebead-lily (*Clintonia borealis*), bunchberry

(*Cornus canadensis*), showy mountain ash (*Sorbus decora*), three-seeded sedge (*Carex trisperma*), long beech fern (*Phegopteris connectilis*) and whorled aster (*Oclemena acuminata*). Some observed species more closely related to high elevation spruce-fir wetlands include: Canada bluejoint (*Calamagrostis canadensis*), northern white violet (*Viola pallens*), dwarf raspberry (*Rubus pubescens*), velvet-leaf blueberry (*Vaccinium myrtilloides*), three-seeded sedge (*Carex trisperma*), false hellebore (*Veratrum viride*), mountain holly (*Nemopanthus mucronatus*), cinnamon fern (*Osmunda cinnamomea*) and common wood-sorrel (*Oxalis montana*). These observations coincide with the natural community description in Sperduto and Nichols, 2004¹.

Rare Plant Survey

The locations of any rare plants were located using a Trimble Geo-X® Global Positioning System (GPS) receiver. Appropriate ecological and biological information regarding proximate population size, current condition, sex (if applicable), associated species, associated habitat characteristics, and surrounding land use was recorded. Photographs were taken as appropriate, which can be made available upon request. A standard NHHB plant survey form was completed for any rare plant population documented and is included with this report.

Target species for this survey included: heart-leaved twayblade (*Listera cordata*), lily-leaved twayblade (*L. convallarioides*) and northern comandra (*Geocaulon lividum*), which occur in the seep areas in the high-elevation spruce-fir forest; and Goldie's fern (*Dryopteris goldiana*), large yellow lady's slipper (*Cypripedium parviflorum var. pubescens*), Bebb's sedge (*Carex bebbii*), and Loesel's twayblade (*Liparis loeselii*) in the semi-rich hardwood forest and circumneutral seep.

The survey of June 2-5, 2008 produced no rare plant observations in the project area. Despite the timing of the survey being too early for three species' flowering time, no specimens in vegetative form lead us to believe those plants occur in the area. Areas searched included the areas on the mountain peaks within the project, areas along the road to be impacted Project (specifically those roads adjacent to streams), and an additional survey of the semi-rich hardwood slope that is no longer part of the Project. A concern in the review by the NHHB required that we review some areas surveyed in the reconnaissance-level rare plant survey in 2007 that were not included in the Natural Community Survey from March 2008. A map depicting those areas surveyed, which are now outside the Project footprint, is provided in this response. Stantec performed an additional survey of these areas for any rare plant occurrences, but none were observed.

Please contact our office if you have any questions related to the information presented in this report or if we can be of further assistance.

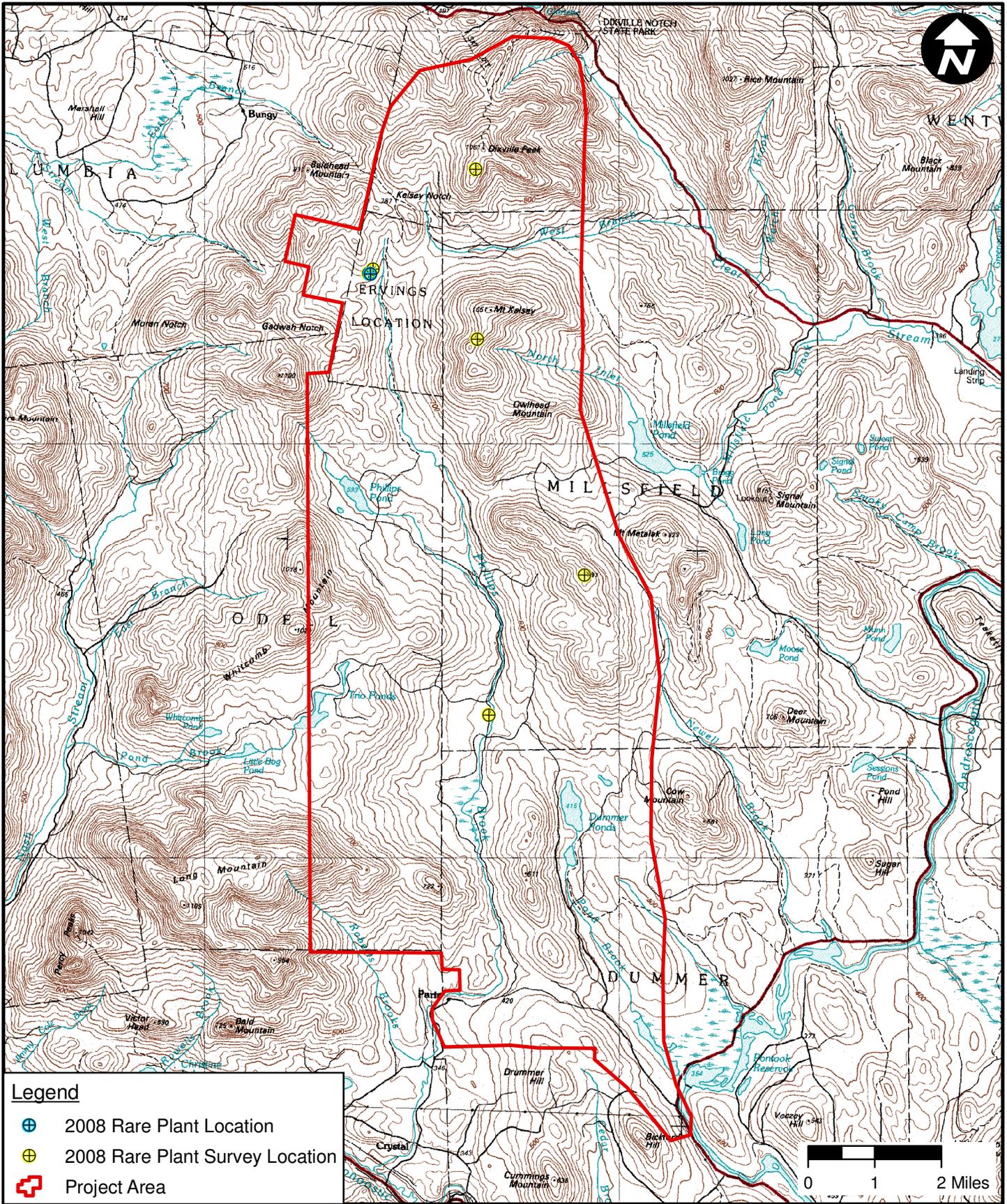
Sincerely,
Stantec Consulting

Adam Gravel

Adam Gravel
Project Manager

Enclosures: Figure 1. Rare Plant Survey Map
Table 1. Plant Species List
New Hampshire Natural Heritage Bureau (NHHB) review

¹ Sperduto, D. D. and W. F. Nichols 2004. Natural Communities of New Hampshire. NH Natural Heritage Bureau and The Nature Conservancy: Concord, NH.



Legend

- ⊕ 2008 Rare Plant Location
- ⊕ 2008 Rare Plant Survey Location
- ⊕ Project Area

Prepared By:



Stantec

19560066-F00-rareplant2008.mxd

Sheet Title: **Rare Plant Survey Map**

Project: **Granite Reliable Power Windpark
Proposed Project in Coos County, New Hampshire**

Date: 6/20/2008

Scale: 1:100,000

Proj. No.: 19560066

Figure: **1**

Table 1: Plant List June 2008

Kelsey Mountain

**Beech-birch-maple
sideslope**

Canada bluejoint	<i>Calamagrostis canadensis</i>
dwarf raspberry	<i>Rubus pubescens</i>
bristly black currant	<i>Ribes lacustre</i>
mountain wood fern	<i>Dryopteris campyloptera</i>
spring beauty	<i>Claytonia caroliniana</i>
trout lily	<i>Erythronium americanum</i>
foamflower	<i>Tiarella cordifolia</i>
purple trillium	<i>Trillium erectum</i>
tall meadow rue	<i>Thalictrum polygamum</i>
rosybells	<i>Streptopus roseus</i>
ostrich fern	<i>Matteuccia struthiopteris</i> var. <i>pennsylvanica</i>
northern white violet	<i>Viola pallens</i>
Pennsylvania bittercress	<i>Cardamine pennsylvanica</i>
water carpet	<i>Chrysosplenium americanum</i>
lady fern	<i>Athyrium filix-femina</i>
jewelweed	<i>Impatiens capensis</i>
dutchman's breeches	<i>Dicentra cucullaria</i>
red baneberry	<i>Actaea rubra</i>
false Solomon's seal	<i>Maianthemum racemosum</i>
large-leaved goldenrod	<i>Solidago macrophylla</i>
Canada mayflower	<i>Maianthemum canadensis</i>
American fly honeysuckle	<i>Lonicera canadensis</i>

High-elevation spruce-fir forest

showy mountain ash	<i>Sorbus decora</i>
three-seeded sedge	<i>Carex trisperma</i>
red spruce	<i>Picea rubens</i>
balsam fir	<i>Abies balsamea</i>
Canada bluejoint	
bunchberry	
whorled aster	<i>Oclemena acuminata</i>
long beech fern	<i>Phegopteris connectilis</i>
violet	<i>Viola</i> sp.
goldthread	<i>Coptis trifolia</i>
cinnamon fern	<i>Osmunda cinnamomea</i>
bunchberry	<i>Cornus canadensis</i>
mountain holly	<i>Ilex mucronata</i>
false hellebore	<i>Veratrum viride</i>
hobblebush	<i>Viburnum alnifolium</i>

South of Kelsey Notch

**Circumneutral hardwood
seep**

northern white violet	
Selkirk's violet	<i>Viola selkirkii</i>
jewelweed	
swamp buttercup	<i>Ranunculus septentrionalis</i>
water carpet	
water avens	<i>Geum rivale</i>
foamflower	
sensitive fern	<i>Onoclea sensibilis</i>
sugar maple	<i>Acer saccharum</i>
yellow birch	<i>Betula alleghenensis</i>
paper birch	<i>Betula papyrifera</i>
Eastern hemlock	<i>Tsuga canadensis</i>
dutchman's breeches	
Pennsylvania bittercress	

Semi-rich mesic forest

round-leaved violet	<i>Viola rotundifolia</i>
spring beauty	
pagoda dogwood	<i>Cornus alternifolia</i>
trout lily	
mountain wood fern	
false Solomon's seal	
rosybells	
sugar maple	
long beech fern	
christmas fern	<i>Polystichum acrostichoides</i>
rattlesnake root	<i>Nabalus</i> sp.
Braun's holly fern	<i>Polystichum braunii</i>
zig-zag goldenrod	<i>Solidago flexicaulis</i>
false hellebore	
red baneberry	
dwarf raspberry	

Fish Brook Ridge

Red spruce balsam fir wetland

Canada bluejoint	
northern white violet	
dwarf raspberry	
sensitive fern	
skunk currant	<i>Ribes glandulosum</i>
bunchberry	
creeping snowberry	<i>Gaultheria hispidula</i>
cinnamon fern	
sour-top blueberry	<i>Vaccinium myrtilloides</i>
goldthread	
blue-bead lily	<i>Clintonia borealis</i>
false hellebore	
mountain holly	
three seeded sedge	
showy mountain ash	
common wood sorrell	<i>Oxalis montana</i>
Canada mayflower	
red spruce	
balsam fir	
yellow birch	
melic mannagrass	<i>Glyceria mellicaria</i>
jewelweed	
rough bedstraw	<i>Galium asprellum</i>
New England aster	<i>Aster novae-angliae</i>
water carpet	
foamflower	
dwarf raspberry	
lady fern	
tall meadow rue	
rough-stemmed goldenrod	<i>Solidago rugosa</i>
bristly black currant	
Selkirk's violet	
pussywillow	<i>Salix discolor</i>
ostrich fern	
nodding sedge	<i>Carex gynandra</i>
water avens	

Dixville Peak

Mixed Wood Forest

hobblebush	
evergreen wood fern	<i>Dryopteris intermedia</i>
balsam fir	
sugar maple	
yellow birch	
foamflower	
false hellebore	
purple trillium	
painted trillium	<i>Trillium undulatum</i>
melic mannagrass	
long beech fern	
rosy bells	
false Solomon's seal	
wild oats	
mountain maple	<i>Acer spicatum</i>
striped maple	<i>Acer pennsylvanicum</i>
interrupted fern	
oak fern	<i>Gymnocarpium dryopteris</i>
silvery spleenwort	<i>Deparia acrostichoides</i>
lady fern	
blue-bead lily	
Canada mayflower	
whorled aster	
common winter-cress	<i>Barbarea vulgaris</i>
indian cucumber root	<i>Medeola virginiana</i>
Pennsylvania bittercress	
cow parsnip	
jewelweed	
coltsfoot	<i>Tussilago farfara</i>

Phillips Brook

Sugar maple floodplain forest

sugar maple	
false hellebore	
white baneberry	<i>Actaea pachypoda</i>
wood anemone	<i>Anemone quinquefolia</i>
blue cohosh	<i>Caulophyllum thalictroides</i>
broad leaved toothwort	<i>Cardamine diphylla</i>
jack in the pulpit	<i>Arisema atrorubens</i>
spring beauty	
tall meadow rue	
rattlesnake mannagrass	<i>Glyceria canadensis</i>
trout lily	
foamflower	
dwarf raspberry	
tall nettle	<i>Urtica procera</i>
purple trillium	
golden alexander	<i>Zizia aurea</i>
fringed bindweed	<i>Polygonum cilinode</i>
virgin's bowers	<i>Clematis virginiana</i>
cow parsnip	<i>Heracleum maximum</i>
dutchman's breeches	
bristly black currant	
ostrich fern	
brown ash	<i>Fraxinus nigra</i>
hooked crowfoot	<i>Ranunculus recurvatus</i>
false Solomon's seal	
wild oats	<i>Uvularia sessilifolia</i>
interrupted fern	<i>Osmunda claytoniana</i>
sensitive fern	
red baneberry	

Alder and red spruce wetland

speckled alder	<i>Alnus rugosa</i>
red spruce	
Bebb's willow	<i>Salix bebbiana</i>
rough-stemmed goldenrod	
Canada bluejoint	
jewelweed	
watercarpet	
New England aster	
dwarf raspberry	
goldthread	
cinnamon fern	
meadowsweet	<i>Spiraea alba var. latifolia</i>
bulrush	<i>Scirpus sp.</i>



New Hampshire Natural Heritage Bureau
DRED - Division of Forests & Lands
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To: Adam Gravel, Stantec
From: Melissa Coppola, Environmental Information Specialist
Through: Donald M. Kent, Ph.D., Administrator
CC: Josh Brown, Noble Power Environmental Coordinator
Date: June 2, 2008
Subject: Noble Wind Project - Rare Plants and Natural Communities

The Natural Heritage Bureau reviewed the Reconnaissance-Level Rare Plant Survey (October 2007) and the Natural Community Characterization-Coos County Windpark (April 2008) provided by Stantec Consulting. We have several recommendations for future rare plant surveys.

- Some community classifications rely on herbaceous plants to distinguish community type or variants within the community. We recommend verifying natural community information for the intact-forested areas during the summer growing season.
- *Listera cordata* (heart-leaved twayblade), *Listera convallarioides* (lily-leaved twayblade), and *Geocaulon lividum* (northern comandra) are protected species that may occur within the high elevation spruce-fir forest and high elevation balsam fir forest. *Listera* occur in seepy, mossy areas within spruce and balsam fir dominated forests. Seeps are often small and local, and only detectable during field visits. The northern comandra also occurs on mossy substrate, and is typically associated with small wind-throw gaps. Intact high elevation forests are limited to maps 1, 2, 6, and small portions of maps 9 and 14 according to the aerial photos provided with the Natural Community Characterization Report.
- The Reconnaissance-Level Rare Plant Survey document identified two communities - a semi-rich mesic forest and a circumneutral hardwood forest seep - not documented in the Natural Community Characterization Coos County Windpark Report. No map identified the community locations. Please target both communities for rare plant surveys. The semi-rich mesic forest has the potential for *Dryopteris goldiana* (Goldie's fern) and *Cypripedium parviflorum* var. *pubescens* (large yellow lady's slipper). The circumneutral hardwood forest seep community has the potential for three rare plants species: *Cypripedium*

parviflorum var. *pubescens* (large yellow lady's slipper), *Carex bebbii* (Bebb's sedge) and *Liparis loeselii* (Loesel's twayblade).

June and July are the best months to survey for the aforementioned rare species. Melissa Coppola (603.271.2215, Melissa.coppola@dred.state.nh.us) is available on a limited basis to assist with your survey efforts.