

Section 9
Unusual Natural Areas

1.0 INTRODUCTION

In advance of permitting for the proposed Oakfield Wind Project Amendment (Project) in Oakfield and T4R3 WELS, Aroostook County, Maine, Stantec Consulting (Stantec) completed evaluations of the project area to determine the presence of unusual natural areas within or in the vicinity of the project area. According to the Preservation of Unusual Natural Areas standard of the No Adverse Environmental Effect Standard of the Site Location of Development Law (06-096 CMR 375.12), an unusual natural area means “any land or water area, usually only a few acres in size, which is undeveloped and which contains natural features of unusual geologic, botanical, zoological, ecological, hydrological, other scientific, educational, scenic, or recreational significance.”

Part of the identification of unusual natural areas involved contacting state and federal agencies, including the Maine Natural Areas Program (MNAP) and the U.S. Fish and Wildlife Service (USFWS), to determine if there are any known occurrences of state or federally listed rare, threatened, or endangered (RTE) species or rare or exemplary natural communities present within or in the vicinity of the project area.

In addition to the inquiries to the state and federal agencies, Stantec ecologists and botanists completed a series of environmental field surveys in 2009 and 2010 that further identified and evaluated the presence of unusual natural areas within the project area. These environmental field surveys included:

- Spring 2009 vernal pool surveys;
- Spring, summer, and fall 2009 wetland and stream delineations;
- Spring 2010 wetland and stream delineations;
- Spring 2010 vernal pool surveys; and
- Summer 2010 rare plant surveys.

The field surveys were completed throughout the project summit generation area. The following discusses the results of these field efforts relative to unusual natural areas, including RTE plants and rare and exemplary natural communities. Discussions of RTE wildlife species and their associated habitats are presented in Section 7 of this application.

2.0 METHODOLOGY

2.1 AGENCY CORRESPONDENCE

To determine the presence of unusual natural areas, Stantec contacted MNAP to determine if there were any known occurrences of RTE plants, as well as rare or exemplary natural communities within the project area. The MNAP maintains a database that tracks the locations of RTE plant species in Maine. In total, there are 352 RTE plant species within Maine (i.e., plant species with state rarity ranks of S1, S2, or S3). The MNAP also maintains a database that tracks the occurrences of rare and exemplary natural communities and ecosystems throughout the state. According to MNAP, state rarity ranks are defined as follows.

- S1 - Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.
- S2 - Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
- S3 - Rare in Maine (20-100 occurrences).
- S4 - Apparently secure in Maine.
- S5 - Demonstrably secure in Maine.

2.2 FIELD SURVEYS

Field surveys that identified and evaluated the presence of unusual natural areas, including RTE plant species and rare and exemplary natural communities were largely completed concurrently with on-going environmental field surveys from spring 2009 through early summer 2010. These field surveys included spring 2009 and 2010 vernal pool surveys and 2009 and 2010 wetland delineations. Stantec ecologists and botanists completed systematic field surveys of the project area by walking evenly-spaced transects approximately 75 to 150 feet apart in order to provide thorough coverage of the project area.

Stantec ecologists and botanists also conducted seasonally-appropriate targeted field surveys in certain areas where previous field surveys were completed during inopportune times for locating RTE plant species (e.g., fall or early spring). In many instances, these areas were observed during the ongoing field surveys as containing intact forest or wetland communities or containing rare plant indicator species such as maidenhair fern (*Adiantum pedatum*), silvery spleenwort (*Deparia acrostichoides*), plantain-leaved sedge (*Carex plantaginea*), or sweet cicely (*Osmorhiza* spp.) and subsequently identified for a follow-up seasonally-appropriate field survey for RTE plants.

Appropriate data were recorded for all RTE plant species plants that were located within the project area. This included collecting data on population size, vigor, landscape setting, associated habitat, habitat condition, and location. RTE plant populations were located with a Trimble® Pro Series Global Positioning System (GPS) receiver and subsequently included on construction plans. Similarly, for rare and exemplary natural communities that were identified within the project area, appropriate data on community size, community condition, and species composition were recorded. The boundaries of the natural communities were located using a combination of GPS and aerial photography interpretation. Completed rare plant and natural community data forms are attached as Appendix 9-1.

3.0 RESULTS

3.1 AGENCY CORRESPONDENCE

The response from the USFWS indicated that there are no known locations of federally-listed species within the project area.

The response from MNAP (Appendix 9-2) indicated that there were no known occurrences of RTE plant species within the present project summit area. The MNAP response did indicate that an exemplary Beech-Birch-Maple Forest is located on Hunt Ridge in Oakfield.

The MNAP response noted an occurrence of an exemplary Red Oak – Northern Hardwoods Forest and a population of large toothwort (*Cardamine maxima*) on Robinson Mountain in Dyer Brook; however, this ridgeline is no longer included in the project area. The additional occurrences of RTE plants and exemplary natural communities noted by MNAP are located along the potential transmission line alignments and are not located within the proposed summit generation project area (Appendix 9-3).

3.2 FIELD SURVEYS

Field surveys completed by Stantec in 2008 and 2009 within the original Oakfield Wind Project area documented several populations of large toothwort, as well as a population of Goldie's fern (*Dryopteris goldiana*), in the vicinity of the amended project area. Both species are listed as Special Concern by MNAP. Special plant survey forms for MNAP are included as Appendix 9-1 and plant locations can be found on the natural resource maps in Section 7 of this application.

The proposed collector line crosses one location of the Goldie's fern observed in 2008. In 2010, the population of Goldie's fern was not observed due to the recent timber harvest and canopy removal. This species will likely not be observed again until the canopy returns to 100 percent closure.

In response to the known occurrences of RTE plants and an exemplary natural community within the vicinity of the project area, Stantec ecologists and botanists completed RTE plant surveys and natural community evaluations in 2009 and 2010 throughout the present project area. These surveys targeted large toothwort and Goldie's fern, as well as other RTE plant species that are known from the surrounding region.

As a result of Stantec's field surveys, populations of large toothwort were found in 2009 and 2010. The largest occurs south of the original project area in Oakfield, and another large population occurs in the southern part of the new project area. One location of large toothwort is not part of the project area and is therefore protected from development activity. While the other large population is adjacent to a proposed road, the plant's habitat has been avoided. Large toothwort is known from several locations in the vicinity and within project area. Large toothwort is ranked S3 and listed as Special Concern in Maine. The habitat is generally moist or seepy slopes, most often south-facing in a forested setting dominated by yellow birch (*Betula alleghaniensis*), sugar maple (*Acer saccharum*) and black ash (*Fraxinus nigra*) with American beech (*Fagus grandifolia*) components. More than half of the plants at these locations were flowering with over 1,000 plants at each location. Associated plants include ostrich fern (*Matteuccia struthiopteris*), spring beauty (*Claytonia caroliniana*), mad-dog skull-cap (*Scutellaria lateriflora*), and silvery spleenwort (*Deparia acrostichoides*). Four locations of the large toothwort are within the area proposed for development.

The dominant matrix forests present within the project area are Beech-Birch-Maple Forests with smaller inclusions of Spruce-Northern Hardwoods Forests. These forests are considered common communities in Maine according to MNAP. Most of the forests within the project area have been impacted from past timber harvests operations. Forest stands range from maturing second growth forests to recently harvested, regenerating forests throughout the eastern Oakfield Hills, Hunt Ridge, and portions of four ridges east of Outlet Mountain

In general, the Beech-Birch-Maple matrix forest is characterized by sugar maple, beech, yellow birch, paper birch (*Betula papyrifera*), white ash (*Fraxinus americana*), red spruce (*Picea rubens*), and balsam fir (*Abies balsamea*) in the forest canopy with an understory typically dominated by starflower (*Trientalis borealis*), wild sarsaparilla (*Aralia nudicaulis*), shining firmoss (*Huperzia lucidula*), Canada mayflower (*Maianthemum canadense*), wild oats (*Uvularia sessilifolia*), Christmas fern (*Polystichum acrostichoides*), and evergreen wood fern (*Dryopteris intermedia*). Recent and historic timber harvests have occurred throughout most of these communities within the Project area.

As identified by MNAP, an exemplary Beech-Birch-Maple forest is located on Hunt Ridge. This community is characterized by a canopy dominated by sugar maple, yellow birch American beech and varying components of paper birch and white ash. Dominant species average 18 inches in diameter at breast height. The understory is relatively undeveloped, with most trees over 20 feet tall. The herbaceous layer is made up of yellow violet (*Viola pubescens*), spring beauty, and Dutchman's breeches (*Dicentra cucullaria*) in the early spring and Indian cucumber root (*Medeola virginiana*) and mountain wood fern (*Dryopteris campyloptera*) throughout the year.

The Spruce-Fir Broom-moss Forests are located in small pockets within the project area. These communities are generally located on shallower and rockier soils than the Beech-Birch-Maple Forest. The forests are dominated by red spruce and balsam fir trees. The understory is less diverse than the hardwoods forests with evergreen wood fern, Canada mayflower, starflower, and painted trillium (*Trillium undulatum*) typically common in the understory. Each forest within the project area has been impacted from past timber harvests.

Small wetland communities, including forested, scrub-shrub, and emergent wetlands, are interspersed within the broader Beech-Birch-Maple forest. These wetland communities are located in topographic depressions and drainages within the ridgeline. A further discussion of the wetland communities, including vernal pool habitat present within the project area, is presented in Section 7 of this application. None of the wetland communities identified are rare or exemplary natural communities based on their overall size, species composition, and landscape position.

4.0 POTENTIAL IMPACTS AND MITIGATION

The preliminary design of the project included approximately 81 acres of the exemplary Beech-Birch-Maple Forest on Hunt Ridge. To minimize impacts, the following avoidance and minimization measures were implemented:

- the original design of northern Hunt Ridge was scaled back by removing one planned turbine;
- a preliminary project design to connect the collector line that would have run from the northern array to Hunt Ridge was abandoned;
- if a temporary meteorological (met) tower is erected on the turbine pad for EO5, EO6 or EO7, it will be free-standing rather than guyed in order to avoid additional clearing; and
- if one of the permanent met towers is located in the mapped Beech-Birch-Maple area, the electrical supply will be buried to minimize clearing.

The final design proposes that 28 acres of the MNAP identified Beech-Birch-Maple Forest will be converted to an access road, collector corridor, and turbine location (Figure 1).

Efforts to avoid large toothwort colonies are incorporated into the design of roads, laydown areas, and adjustments of turbine pad placement and grading.

5.0 SUMMARY

In summary, Stantec completed field surveys in the amended project area in an effort to characterize and confirm records returned by MNAP for the area. Botanists and ecologists performed targeted habitat surveys during the spring and summer of 2009 and 2010 to areas predetermined to potentially hold RTE species. The surveys resulted in occurrences of large toothwort, the largest in the southern portion of the project area. Large toothwort is a species listed as S3 and Special Concern in Maine. Prior surveys produced additional records of large toothwort and a record of Goldie's fern. Since the 2008 survey, the Goldie's fern population has been disturbed by a timber harvest at its location and could not be found when visited in 2009 or 2010. The populations of large toothwort within the project area consist of thousands of individual plants growing in colonies across the landscape. Because these populations are so large, efforts to avoid and minimize impacts were used when designing the project components, but ultimately creating openings in the canopy will benefit the plant populations and allow them to expand their range. The impact to the exemplary Beech-Birch-Maple Forest on Hunt Ridge has been minimized to the extent possible, and represents approximately five percent of the mapped Beech-Birch-Maple complex.

Appendix 9-1

SPECIAL PLANT SURVEY FORM

Site: _____ Survey Site: Thompson Settlement Road
 Quad name: Oakfield / Meduxnekeag Lake Quad code: _____
 County: Aroostook Town: T4R3 WELS
 Date: 5/3/2010 Surveyor(s): E. Doucette, D. Dyer Sourcecode: F

Plant Name: Cardamine maxima (large toothwort) New Update Occurrence #: _____

| | |
|---|---|
| GPS Coordinates (<input checked="" type="checkbox"/> NAD 83, UTM Zone 19N; <input type="checkbox"/> Other-please specify) X: 566835, Y: 5101091 | GPS Unit and Accuracy: Trimble Pro-XT, 1-2 m accurate |
| Directions to Occurrence: Occurs within 1500 feet east of Thompson Settlement Road. | |
| <input checked="" type="checkbox"/> Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground. | |

MAP: Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation.

Locational Uncertainty (how closely can you map the feature to its actual location?)

mapped to w/in 12.5 m of actual location; greater uncertainty (estimate = _____ m / ft / km / miles); aerial delimited

Confidence in Observation of Population Extent

Confident full extent of feature **IS** known; Confident full extent is **NOT** known; **Uncertain** whether full extent is known

| | | | |
|---|---|---|--|
| EO DATA | Phenology | Population Area | Vigor? <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Other than normal Explain: more vigorous than other populations observed |
| # of Plants >1000_ | <input checked="" type="checkbox"/> In leaf | <input type="checkbox"/> 1 square yard | Evidence disease, predation, etc? Explain: |
| <input checked="" type="checkbox"/> Individuals | <input type="checkbox"/> In bud | <input type="checkbox"/> 1 – 5 square yards | <input type="checkbox"/> Yes |
| <input type="checkbox"/> Ramets | <input checked="" type="checkbox"/> In flower | <input checked="" type="checkbox"/> 5 – 20 square yards | <input checked="" type="checkbox"/> No |
| Population Structure | <input type="checkbox"/> Immature fruit | <input type="checkbox"/> 20 – 100 square yards | Type of reproduction? Explain: Flowering |
| __30_ % Vegetative | <input type="checkbox"/> Mature fruit | <input type="checkbox"/> 100 sq yds to 1 acre | <input checked="" type="checkbox"/> Sexual |
| __70_ % Reproductive | <input type="checkbox"/> Seed dispersing | <input type="checkbox"/> 1 acre + | <input type="checkbox"/> Asexual |
| | <input type="checkbox"/> Dormant | ____~area actual habitat | <input type="checkbox"/> Not Observed |
| | | ____~ area potential habitat | |
| Other Comments: population covers approximately 20 square feet, more than half flowering. | | | |

GENERAL DESCRIPTION

| | | | | | |
|--|---|--|--|---|---|
| Associated natural community: Beech-Birch-Maple Forest | | | | | |
| Associated plant species: <i>Matteuccia struthiopteris</i> , <i>Deparia acrostichoides</i> , <i>Scutellaria lateriflora</i> | | | | | |
| Substrate/soil type: Mucky mineral soil. | | | | | |
| Threats to Population: none observed | | | | | |
| Conservation/Management/ Research needs: none observed | | | | | |
| Elevation | Aspect | % Slope | Light | Topographic Position | Moisture |
| Min __800_ ft | <input type="checkbox"/> N <input type="checkbox"/> NE | <input type="checkbox"/> Flat | <input type="checkbox"/> Open | <input type="checkbox"/> Crest | <input type="checkbox"/> Inundated |
| | <input type="checkbox"/> E <input type="checkbox"/> NW | <input checked="" type="checkbox"/> 0-10 | <input type="checkbox"/> Partial | <input type="checkbox"/> Upper Slope | <input checked="" type="checkbox"/> Saturated (wet mesic) |
| | <input checked="" type="checkbox"/> S <input type="checkbox"/> SE | <input type="checkbox"/> 10-35 | <input checked="" type="checkbox"/> Filtered | <input type="checkbox"/> Mid-slope | <input checked="" type="checkbox"/> Moist (mesic) |
| Max __1000_ ft | <input type="checkbox"/> W <input type="checkbox"/> SW | <input type="checkbox"/> 35+ | <input type="checkbox"/> Shade | <input checked="" type="checkbox"/> Lower Slope | <input type="checkbox"/> Dry-mesic |
| | <input type="checkbox"/> Flat or NA | <input type="checkbox"/> Vertical | | <input type="checkbox"/> Bottom | <input type="checkbox"/> Dry (xeric) |
| | | | | <input type="checkbox"/> Level Plain | |

| | | |
|---|--|--|
| Photograph taken? <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes | Specimen collected? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes | Do other members of this genus occur at this site? <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes |
| | Collection # _____ Repository _____ | If yes, are there hybridization issues? <input type="checkbox"/> No; <input checked="" type="checkbox"/> Yes; Explain: C. diphylla is a parent to the hybrid target sp. C. maxima. |
| | | Are there identification issues? <input checked="" type="checkbox"/> No; <input type="checkbox"/> Yes; Explain: Significant and observable leaf morphology differences. |

| | | |
|--|----------------------------|---|
| Landowner name/address for entire population (attach additional owner information on a separate sheet): Evergreen Wind Power, II 179 Lincoln Street, Suite 500 Boston, MA 02111 | Phone _____ | Is landowner aware of plant? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| | Tax map # (if known) _____ | Is landowner protecting plant? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| | Lot # (if known) _____ | Comments _____ |

EO RANKING

CURRENT CONDITION of the plant's immediate habitat. Is the habitat pristine or degraded? Note any disturbances within the plant habitat (check off, describe below to what degree these have altered natural ecological processes, or if they have any negative or positive effects on the population). Note how the disturbance(s) may influence success of the plant at the site.

| | | |
|--|--|--|
| <input checked="" type="checkbox"/> Logging-most recently ~ <u>70-80</u> yrs ago | <input type="checkbox"/> Fire | <input type="checkbox"/> Dumping or mining |
| <input type="checkbox"/> Agriculture / Pasture | <input type="checkbox"/> Impoundment | <input type="checkbox"/> ORV / Vehicle disturbance |
| <input type="checkbox"/> Animal effects (insect outbreaks, browsing) | <input type="checkbox"/> Exotic plants | <input type="checkbox"/> Trails / Roads |
| <input type="checkbox"/> Wind or ice damage | <input type="checkbox"/> Erosion | <input type="checkbox"/> Other |
| <input checked="" type="checkbox"/> No Evidence of disturbance | | |

Describe:

Condition **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor)

Rank **B** – Some signs of human disturbance or degradation, but habitat generally intact

C – Signs of human disturbance or degradation, and habitat compromised in some significant way

D – Highly disturbed (multiple impacts causing habitat to be drastically altered)

Other / Habitat disturbed, consistent with needs of species / **Explain:**

SIZE / QUALITY: How large is this population relative to typical populations of this species? _____

Does it appear to be capable of maintaining itself if its habitat remains basically intact? Yes No

Size / Quality Rank **A** – Excellent **B** – Good **C** – Fair **D** – Poor

Comments:

LANDSCAPE CONTEXT of the area surrounding the plant habitat. What land uses and/or natural communities surround the observed area? Is the habitat fragmented? To what degree can the population be protected from effects of adjacent land uses?

Comments:

Landscape Rank **A** – Population surrounded by > = 1000 acres of undisturbed landscape

B – Population surrounded by fairly intact landscape, though there may be cuts nearby

C – Population surrounded by fragmented forest or rural landscape

D – Surrounding area developed

Other / Explain:

OVERALL RANK for EO based on your experience **A** – Excellent **B** – Good **C** – Fair **D** – Poor **E** – Extant

Comments:

MNAP reviewed / verified rank **A** – Excellent **B** – Good **C** – Fair **D** – Poor **E** – Extant

Date: _____ Reviewer: _____ Rationale: _____

SPECIAL PLANT SURVEY FORM

| | |
|---|---|
| Site name: <input style="width: 90%;" type="text"/> | Survey site: Oakfield Hills |
| Quad name: <input style="width: 90%;" type="text"/> | Quad code: <input style="width: 90%;" type="text"/> |
| County: Aroostook | Town: Oakfield |
| Date: 5/29/2008 | Surveyor(s): D.Dyer, E.Doucette |
| Sourcecode: F | |

| | | |
|--|---------------------------------|---------------|
| Plant Name: Large toothwort (<i>Cardamine maxima</i>) | New <input type="checkbox"/> | Occurrence #: |
| | Update <input type="checkbox"/> | |

GPS data: **NAD 83 UTM Zone 19; X: 467279 Y: 5098740**

Directions: **see Stantec maps. South-facing hardwood hillside in Oakfield, Maine; south of South Road between Bea Brook and the East Branch of the Mattawamkeag River. Collected points with Trimble Pro-XR, represented on Stantec's Delineated Natural Resource Maps**

| | | | |
|---|--|--|--|
| Number of individuals: >1,500 Population structure: 70 % Vegetative 30 % Reproductive | Phenology: <input checked="" type="checkbox"/> In leaf <input type="checkbox"/> In bud <input checked="" type="checkbox"/> In flower <input type="checkbox"/> Immature fruit <input type="checkbox"/> Mature fruit <input type="checkbox"/> Seed dispersing <input type="checkbox"/> Dormant | Population area: <input type="checkbox"/> 1 square yard <input type="checkbox"/> 1 - 5 square yards <input type="checkbox"/> 5-100 square yards <input type="checkbox"/> 100 square yards to 2 acres <input checked="" type="checkbox"/> 2 acres+ Hundreds of acres Est. area of potential habitat | Vigor: <input type="checkbox"/> Very feeble <input type="checkbox"/> Feeble <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Vigorous <input type="checkbox"/> Exceptionally vigorous |
|---|--|--|--|

Comments: **habitat potential exists all over this area in the semi-rich hardwood forest dominated by sugar maple, beech and yellow birch. It was growing in both areas which had been cut over in the last 10 years, and areas that were undisturbed in the last 70 years. Did not seem to be either helped nor harmed by the activity or lack thereof.**

| | |
|---|---------------------------------|
| Type of reproduction: <input checked="" type="checkbox"/> sexual <input type="checkbox"/> asexual | Explain: flowers present |
| Evidence of disease, predation, etc. <input type="checkbox"/> yes <input checked="" type="checkbox"/> no | Explain: |

| | | | | |
|--|--|--|---|--|
| Aspect <input type="checkbox"/> N <input type="checkbox"/> NE <input type="checkbox"/> E <input type="checkbox"/> NW <input checked="" type="checkbox"/> S <input type="checkbox"/> SE <input type="checkbox"/> W <input type="checkbox"/> SW <input type="checkbox"/> Flat or n/a | % Slope <input type="checkbox"/> Flat <input checked="" type="checkbox"/> 0-10 <input type="checkbox"/> 10-35 <input type="checkbox"/> 35+ <input type="checkbox"/> Vertical | Light <input type="checkbox"/> Open <input checked="" type="checkbox"/> Partial <input checked="" type="checkbox"/> Filtered <input type="checkbox"/> Shade | Topographic position <input type="checkbox"/> Crest <input type="checkbox"/> Upper slope <input checked="" type="checkbox"/> Mid-slope <input type="checkbox"/> Lower-slope <input type="checkbox"/> Bottom | Moisture <input type="checkbox"/> Inundated <input type="checkbox"/> Saturated (wet-mesic) <input checked="" type="checkbox"/> Moist (mesic) <input type="checkbox"/> Dry-mesic <input type="checkbox"/> Dry (xeric) |
|--|--|--|---|--|

Elevation: minimum ___ft maximum ___ft

Associated natural community/plant community: **Beech-birch-maple forest**

Associated plant species: **oak fern (*Gymnocarpium dryopteris*), northern beech fern (*Phegopteris connectilis*), drooping sedge (*Carex crinita*), fly honeysuckle (*Lonicera canadensis*), interrupted fern (*Osmunda claytoniana*), lady fern (*Athyrium filix-femina*), Jack in the pulpit (*Arisaema triphyllum*)**

Substrate/soil type:

| | |
|---|--|
| Threats to population: | Development, improper forest management |
| Conservation / management / research needs: | Full survey of population extents needed. |

Photograph taken? yes no

Specimen collected? yes no Collection #: **05292008-01** Repository: **Eric Doucette, Stantec Consulting**

Other species occurring at the site: Cardamine diphylla

Do other members of this genus occur at this site? yes no

If yes, please complete below:

Hybridization? yes no

Identification questions? yes no

Explain: **C. maxima is the fertile hybrid between C. diphylla**

and **C. concatenata**

RANKING

1. SIZE / QUALITY:

How large is this population relative to typical populations of the species? Does it appear to be viable, i.e. capable of maintaining itself if its habitat remains basically intact?

• **Size / Quality Rank:** **A** excellent **B** good **C** fair **D** poor

2. CURRENT CONDITION of the plant habitat:

Is the habitat supporting the EO pristine or degraded? Note any natural and anthropogenic disturbance within the plant habitat (check off, then describe extent and how recent below):

- | | |
|---|--|
| <input checked="" type="checkbox"/> Logging – most recently c. 15 yrs ago | <input type="checkbox"/> Animal effects (insect outbreaks, browsing) |
| <input type="checkbox"/> Agriculture / pasture | <input type="checkbox"/> Erosion |
| <input type="checkbox"/> Fire | <input type="checkbox"/> Dumping or Mining |
| <input type="checkbox"/> Wind or ice damage | <input type="checkbox"/> ORV / vehicle disturbance |
| <input type="checkbox"/> Impoundment | <input checked="" type="checkbox"/> Trails / roads |
| <input type="checkbox"/> Exotic plants | <input type="checkbox"/> other |

Describe the disturbance(s): to what degree have these altered natural ecological processes, or do they appear to have any negative or positive effects on the population?

Logging seems to have not affected this population negatively or positively. Found equally prolific in disturbed areas as in areas which have not been disturbed as those which have been harvested in the last 10-15 years.

Condition Rank: 2.5

• **Condition Rank:**

- 1 No apparent signs of human disturbance (human use may have occurred, but long enough ago that effects are no longer visible or are extremely minor).
- 2 Some signs of human disturbance or degradation, but habitat generally intact.
- 3 Highly disturbed.

3. LANDSCAPE CONTEXT of the area surrounding the plant habitat:

• What land uses and/or natural communities surround the observed area? To what degree can the population be protected from effects of adjacent land uses?

Landscape Rank: 2.5. Small pockets of basswood-maple-ash forest, in some areas. The landscape is a combination of logging and rural residential. There are some relatively large areas that have not been logged in at least 50 years, and other areas are currently being harvested. For more information see the Stantec Consulting Rare Plant report for Oakfield Wind Phase 1, 2008.

• **Landscape Rank:**

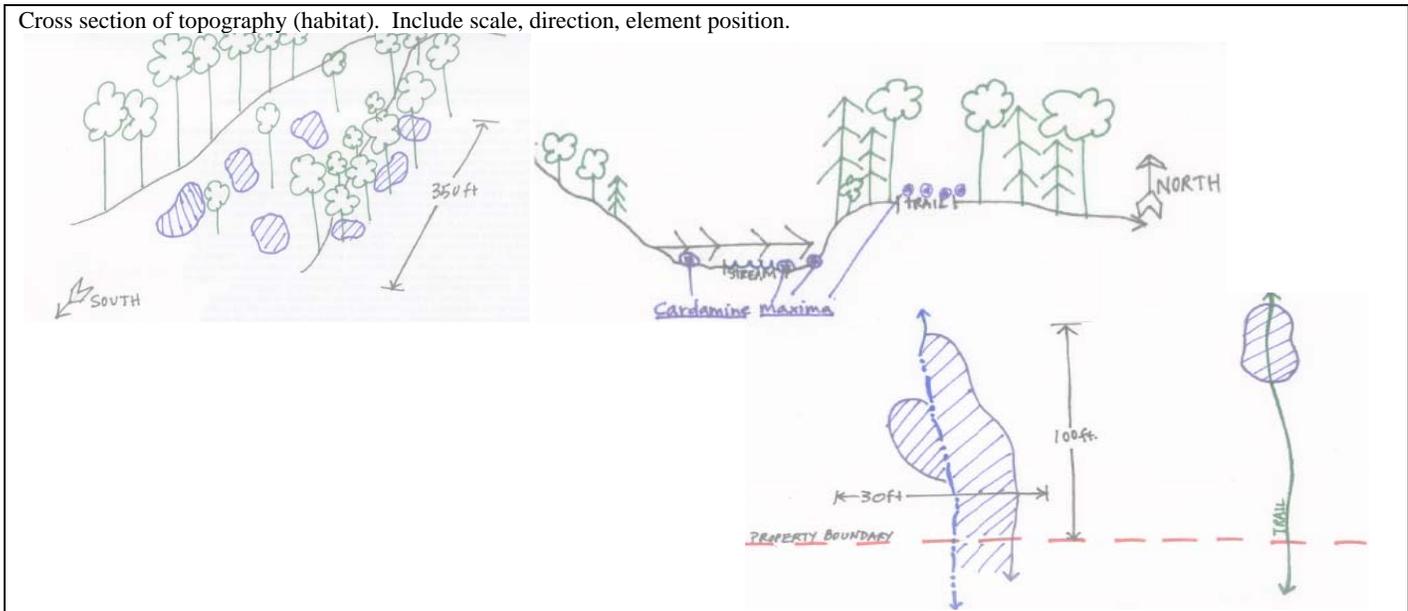
- 1 Population surrounded by \geq 1000 acres of undisturbed landscape.
- 2 Population surrounded by fairly intact landscape, though there may be cuts nearby.
- 3 Population surrounded by fragmented forest or rural landscape.
- 4 Surrounding area developed.

4. **OVERALL RANK** for plant EO based on your experience: **A** excellent **B** good **C** fair **D** poor

5. **MNAP reviewed/verified rank:** **A** excellent **B** good **C** fair **D** poor

Describe rationale (EO rank specs in MNAP element files; general EO rank spec considerations, etc.):

| | |
|---|--|
| Landowner name/address for the entire population: | Landowner phone: |
| | Lot number (if known): |
| | Tax map (if known): |
| | Landowner aware of plant? <input type="checkbox"/> yes <input type="checkbox"/> no |
| | Landowner protecting plant? <input type="checkbox"/> yes <input type="checkbox"/> no |
| | Landowner comments: |



Feature Map: It is very important to include a map indicating the precise location and extent of the feature. Please follow these instructions carefully when attaching your feature map.

1. Attach a photocopy of the appropriate part of a USGS topographic map (1:24,000 scale if available) and write the map scale on the map. Please do NOT enlarge or reduce the map.

2. Indicate on the map the exact location of the observed feature(s):

a. When the observed feature is **no larger than a pen point** on the map (i.e. extremely small patches), place small points on the map indicating the location(s) of the patches, and label each point with an arrow so they are easily seen.

b. When the observed feature is **larger than a pen point** on the map:

- (1) Draw a **thin solid boundary line showing the extent of the observed area** of the feature.
- (2) Indicate disjunct patches (polygons) by drawing the boundary for each patch separately.
- (3) If the boundary follows the edge of a lake, stream, road, marsh or other feature, draw the boundary precisely in the edge of the feature.
- (4) Where needed, add notes to the map with instructions on where the boundary line is located or if the boundary is shared with other observations.

Note: One Feature Map may be submitted for multiple features (communities and plants), providing the map is clear and easy to read. If necessary, please attach multiple feature maps to ensure clarity.

Locational Uncertainty is a measure of how the location of an observed area on a map varies from its actual location on the ground.

1. Is your depiction of the observed area on the map within 6.25 meters (approximately 20 ft) of its actual location on the ground? **Yes** **No**

a. If no, estimate the uncertainty distance based on landmarks, elevation, etc. The location of the observed area on the map is accurate to within _____ meters kilometers feet miles of the actual location on the ground.

b. Is the observed area known to be located within some feature(s) on the map (e.g. wetland boundary, lake, road, trail, highway, contour lines)? **Yes** **No**

(1) If yes, indicate the boundary within which the observed area is known to be located on the map with a **dashed line**, and if applicable, identify the feature.

Confidence Extent is a measure of how confident you are that the observed area represents the full extent of the feature.

Indicate whether there is confidence that the observed area represents the full extent of the feature at that location. **Yes** **No** **?**

Y = Confident that the full extent is known **N** = Confident that the full extent is NOT known **?** = Uncertain whether the full extent is known

Shaded areas are to be filled out by Maine Natural Areas Program staff.

Please mail the completed field form and appropriate map to **Data Manager, Maine Natural Areas Program, 93 State House Station, Augusta, ME 04333**. Thank you!

SPECIAL PLANT SURVEY FORM

Site: _____ Survey Site: _____
 Quad name: _____ Quad code: _____
 County: Aroostook Town: T4R3 WELS

Date: 6/15/2010 Surveyor(s): E. Doucette, D. Dyer Sourcecode: F

Plant Name: Cardamine maxima (large toothwort) New Update Occurrence #: _____

| | |
|--|---|
| GPS Coordinates (<input checked="" type="checkbox"/> NAD 83, UTM Zone 19N; <input type="checkbox"/> Other-please specify) | GPS Unit and Accuracy: Trimble Pro-XT, 1-2 m accurate |
| Directions to Occurrence: Occurs ~1500 feet west from a non-descript, private woods/logging road between 2 ridges. | |
| <input checked="" type="checkbox"/> Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground. | |

MAP: Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation.

Locational Uncertainty (how closely can you map the feature to its actual location?)

mapped to w/in 12.5 m of actual location; greater uncertainty (estimate = _____ m / ft / km / miles); aerial delimited

Confidence in Observation of Population Extent

Confident full extent of feature **IS** known; Confident full extent is **NOT** known; **Uncertain** whether full extent is known

| | | | |
|---|---|---|--|
| EO DATA | Phenology | Population Area | Vigor? <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Other than normal Explain: more vigorous than other populations observed |
| # of Plants >1000_ | <input checked="" type="checkbox"/> In leaf | <input type="checkbox"/> 1 square yard | Evidence disease, predation, etc? Explain: |
| <input checked="" type="checkbox"/> Individuals | <input type="checkbox"/> In bud | <input type="checkbox"/> 1 – 5 square yards | <input type="checkbox"/> Yes |
| <input type="checkbox"/> Ramets | <input checked="" type="checkbox"/> In flower | <input type="checkbox"/> 5 – 20 square yards | <input checked="" type="checkbox"/> No |
| Population Structure | <input type="checkbox"/> Immature fruit | <input checked="" type="checkbox"/> 20 – 100 square yards | Type of reproduction? Explain: Flowering |
| __30_ % Vegetative | <input type="checkbox"/> Mature fruit | <input type="checkbox"/> 100 sq yds to 1 acre | <input checked="" type="checkbox"/> Sexual |
| __70_ % Reproductive | <input type="checkbox"/> Seed dispersing | <input type="checkbox"/> 1 acre + | <input type="checkbox"/> Asexual |
| Other Comments: | <input type="checkbox"/> Dormant | ____~area actual habitat | <input type="checkbox"/> Not Observed |
| | | ____~ area potential habitat | |

GENERAL DESCRIPTION

| | | | | | |
|--|---|--|--|---|---|
| Associated natural community: Beech-Birch-Maple Forest | | | | | |
| Associated plant species: <i>Matteuccia struthiopteris</i> , <i>Deparia acrostichoides</i> , <i>Scutellaria lateriflora</i> | | | | | |
| Substrate/soil type: Mucky mineral soil. | | | | | |
| Threats to Population: none observed | | | | | |
| Conservation/Management/ Research needs: none observed | | | | | |
| Elevation | Aspect | % Slope | Light | Topographic Position | Moisture |
| Min _____ ft / m | <input type="checkbox"/> N <input type="checkbox"/> NE | <input type="checkbox"/> Flat | <input type="checkbox"/> Open | <input type="checkbox"/> Crest | <input type="checkbox"/> Inundated |
| Max _____ ft / m | <input type="checkbox"/> E <input type="checkbox"/> NW | <input checked="" type="checkbox"/> 0-10 | <input type="checkbox"/> Partial | <input type="checkbox"/> Upper Slope | <input checked="" type="checkbox"/> Saturated (wet mesic) |
| | <input checked="" type="checkbox"/> S <input type="checkbox"/> SE | <input type="checkbox"/> 10-35 | <input checked="" type="checkbox"/> Filtered | <input type="checkbox"/> Mid-slope | <input checked="" type="checkbox"/> Moist (mesic) |
| | <input type="checkbox"/> W <input type="checkbox"/> SW | <input type="checkbox"/> 35+ | <input type="checkbox"/> Shade | <input checked="" type="checkbox"/> Lower Slope | <input type="checkbox"/> Dry-mesic |
| | <input type="checkbox"/> Flat or NA | <input type="checkbox"/> Vertical | | <input type="checkbox"/> Bottom | <input type="checkbox"/> Dry (xeric) |
| | | | | <input type="checkbox"/> Level Plain | |

| | | |
|---|--|--|
| Photograph taken? <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes | Specimen collected? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes | Do other members of this genus occur at this site? <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes |
| | Collection # _____ Repository _____ | If yes, are there hybridization issues? <input type="checkbox"/> No; <input checked="" type="checkbox"/> Yes; Explain: C. diphylla is a parent to the hybrid target sp. C. maxima. |
| | | Are there identification issues? <input checked="" type="checkbox"/> No; <input type="checkbox"/> Yes; Explain: Significant and observable leaf morphology differences. |

| | | |
|--|----------------------------|---|
| Landowner name/address for entire population (attach additional owner information on a separate sheet): Evergreen Wind Power, II 179 Lincoln Street, Suite 500 Boston, MA 02111 | Phone _____ | Is landowner aware of plant? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| | Tax map # (if known) _____ | Is landowner protecting plant? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| | Lot # (if known) _____ | Comments _____ |

EO RANKING

CURRENT CONDITION of the plant's immediate habitat. Is the habitat pristine or degraded? Note any disturbances within the plant habitat (check off, describe below to what degree these have altered natural ecological processes, or if they have any negative or positive effects on the population). Note how the disturbance(s) may influence success of the plant at the site.

| | | |
|--|--|--|
| <input checked="" type="checkbox"/> Logging-most recently ~ <u>70-80</u> yrs ago | <input type="checkbox"/> Fire | <input type="checkbox"/> Dumping or mining |
| <input type="checkbox"/> Agriculture / Pasture | <input type="checkbox"/> Impoundment | <input type="checkbox"/> ORV / Vehicle disturbance |
| <input type="checkbox"/> Animal effects (insect outbreaks, browsing) | <input type="checkbox"/> Exotic plants | <input type="checkbox"/> Trails / Roads |
| <input type="checkbox"/> Wind or ice damage | <input type="checkbox"/> Erosion | <input type="checkbox"/> Other |
| <input checked="" type="checkbox"/> No Evidence of disturbance | | |

Describe:

Condition **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor)

Rank **B** – Some signs of human disturbance or degradation, but habitat generally intact

C – Signs of human disturbance or degradation, and habitat compromised in some significant way

D – Highly disturbed (multiple impacts causing habitat to be drastically altered)

Other / Habitat disturbed, consistent with needs of species / **Explain:**

SIZE / QUALITY: How large is this population relative to typical populations of this species? _____

Does it appear to be capable of maintaining itself if its habitat remains basically intact? Yes No

Size / Quality Rank **A** – Excellent **B** – Good **C** – Fair **D** – Poor

Comments:

LANDSCAPE CONTEXT of the area surrounding the plant habitat. What land uses and/or natural communities surround the observed area? Is the habitat fragmented? To what degree can the population be protected from effects of adjacent land uses?

Comments:

Landscape Rank **A** – Population surrounded by > = 1000 acres of undisturbed landscape

B – Population surrounded by fairly intact landscape, though there may be cuts nearby

C – Population surrounded by fragmented forest or rural landscape

D – Surrounding area developed

Other / Explain:

OVERALL RANK for EO based on your experience **A** – Excellent **B** – Good **C** – Fair **D** – Poor **E** – Extant

Comments:

MNAP reviewed / verified rank **A** – Excellent **B** – Good **C** – Fair **D** – Poor **E** – Extant

Date: _____ Reviewer: _____ Rationale: _____

SPECIAL PLANT SURVEY FORM

| | |
|---|---|
| Site name: <input style="width: 90%;" type="text"/> | Survey site: Oakfield Hills |
| Quad name: Meduxnekeag Lake | Quad code: <input style="width: 90%;" type="text"/> |
| County: Aroostook | Town: Oakfield |
| Date: 6/19/2008** | Surveyor(s): Stantec Consulting Sourcecode: F |

| | | |
|---|---|---------------|
| Plant Name: Goldie's fern (<i>Dryopteris goldiana</i>) | New <input checked="" type="checkbox"/> | Occurrence #: |
| | Update <input type="checkbox"/> | |

GPS data: (NAD 83 UTM Zone 19N) X **567248Y 5100957**

Directions: **Populations located adjacent and within Stantec delineated and GPS'd wetland A013, approximately 2,000 feet north of South Oakfield Road.**

| | | | |
|---|--|--|--|
| Number of individuals: 37 clumps total Population structure: _____ % Vegetative 100 % Reproductive | Phenology: <input checked="" type="checkbox"/> In leaf <input type="checkbox"/> In bud <input type="checkbox"/> In flower <input checked="" type="checkbox"/> Immature fruit <input type="checkbox"/> Mature fruit <input type="checkbox"/> Seed dispersing <input type="checkbox"/> Dormant | Population area: <input type="checkbox"/> 1 square yard <input type="checkbox"/> 1 - 5 square yards <input type="checkbox"/> 5-100 square yards <input checked="" type="checkbox"/> 100 square yards to 2 acres <input type="checkbox"/> 2 acres+ Hundreds of acres. Est. area of potential habitat | Vigor: <input type="checkbox"/> Very feeble <input type="checkbox"/> Feeble <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Vigorous <input type="checkbox"/> Exceptionally vigorous |
|---|--|--|--|

Comments: 15 clumps on a beech-birch-maple slope (about 70' by 200' area) and an additional 22 clumps growing in a PEM wetland at the base of the slope (about 30' by 120' area). Considered the same population.
 **2010 update: Plants not observed during the 2010 survey, forest harvest activity has made this population dormant until canopy returns to ~100% closed.

| | |
|---|-----------------------------------|
| Type of reproduction: <input checked="" type="checkbox"/> sexual <input type="checkbox"/> asexual | Explain: sporangia present |
| Evidence of disease, predation, etc. <input type="checkbox"/> yes <input checked="" type="checkbox"/> no | Explain: |

| | | | | |
|--|--|--|--|---|
| Aspect <input type="checkbox"/> N <input type="checkbox"/> NE <input type="checkbox"/> E <input type="checkbox"/> NW <input type="checkbox"/> S <input checked="" type="checkbox"/> SE <input type="checkbox"/> W <input type="checkbox"/> SW <input type="checkbox"/> Flat or n/a | % Slope <input type="checkbox"/> Flat <input type="checkbox"/> 0-10 <input checked="" type="checkbox"/> 10-35 <input type="checkbox"/> 35+ <input type="checkbox"/> Vertical | Light <input checked="" type="checkbox"/> Open <input type="checkbox"/> Partial <input type="checkbox"/> Filtered <input checked="" type="checkbox"/> Shade | Topographic position <input type="checkbox"/> Crest <input type="checkbox"/> Upper slope <input checked="" type="checkbox"/> Mid-slope <input checked="" type="checkbox"/> Lower-slope <input type="checkbox"/> Bottom | Moisture <input type="checkbox"/> Inundated <input checked="" type="checkbox"/> Saturated (wet-mesic) <input type="checkbox"/> Moist (mesic) <input checked="" type="checkbox"/> Dry-mesic <input type="checkbox"/> Dry (xeric) |
|--|--|--|--|---|

Elevation: minimum **1,000** ft maximum **1,100** ft

Associated natural community/plant community: **Beech/birch/maple forest**

Associated plant species: **yellow birch (*Betula alleghaniensis*), sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), red maple (*Acer rubrum*), mountain maple (*Acer spicatum*), alternate leaved dogwood (*Cornus alternifolia*), Jack-in-the-pulpit (*Arisaema triphyllum*), Bebb's willow (*Salix bebbiana*), *Carex vesicaria*, *Carex gynandra*, *Glyceria mellicaria*, turtlehead (*Chelone glabra*), sensitive fern (*Onoclea sensibilis*)**

Substrate/soil type:

| | |
|---|--|
| Threats to population: | Road/ATV trail within 50 feet of population |
| Conservation / management / research needs: | |

Photograph taken? yes no

Specimen collected? yes no Collection #: _____

Repository: **Stantec Consulting 30 Park Drive Topsham ME**

Other species occurring at the site:

Do other members of this genus occur at this site? yes no

If yes, please complete below:

Hybridization? yes no

Identification questions? yes no

Explain: **No question about identification.**

RANKING

1. SIZE / QUALITY:

How large is this population relative to typical populations of the species? Does it appear to be viable, i.e. capable of maintaining itself if its habitat remains basically intact?

- **Size / Quality Rank:** A excellent B good C fair D poor

2. CURRENT CONDITION of the plant habitat:

Is the habitat supporting the EO pristine or degraded? Note any natural and anthropogenic disturbance within the plant habitat (check off, then describe extent and how recent below):

- | | |
|---|--|
| <input checked="" type="checkbox"/> Logging – most recently c. 50 yrs ago | <input type="checkbox"/> Animal effects (insect outbreaks, browsing) |
| <input type="checkbox"/> Agriculture / pasture | <input type="checkbox"/> Erosion |
| <input type="checkbox"/> Fire | <input type="checkbox"/> Dumping or Mining |
| <input type="checkbox"/> Wind or ice damage | <input type="checkbox"/> ORV / vehicle disturbance |
| <input type="checkbox"/> Impoundment | <input checked="" type="checkbox"/> Trails / roads |
| <input type="checkbox"/> Exotic plants | <input type="checkbox"/> other |

Describe the disturbance(s): to what degree have these altered natural ecological processes, or do they appear to have any negative or positive effects on the population?

• Condition Rank:

- 1 No apparent signs of human disturbance (human use may have occurred, but long enough ago that effects are no longer visible or are extremely minor).
- 2 Some signs of human disturbance or degradation, but habitat generally intact.
- 3 Highly disturbed.

3. LANDSCAPE CONTEXT of the area surrounding the plant habitat: Active forest practices ongoing

• What land uses and/or natural communities surround the observed area? To what degree can the population be protected from effects of adjacent land uses?

Active clearing within 200 yards, prior harvest ca. 50 years ago. Old road/current ATV trail within 10 yards of population. 3 houses/camps within 500 yards of population

• Landscape Rank:

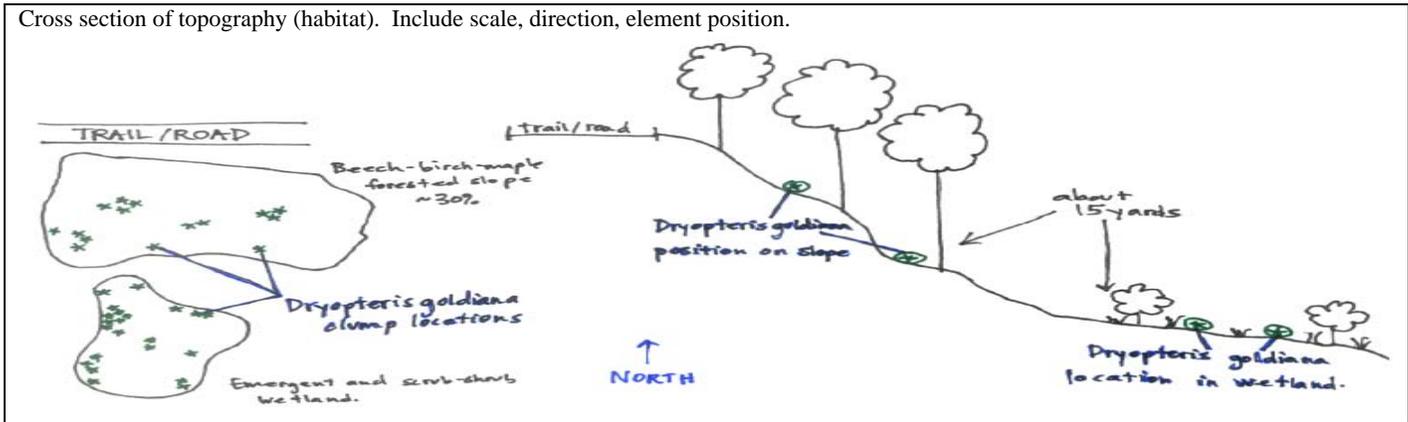
- 1 Population surrounded by >= 1000 acres of undisturbed landscape.
- 2 Population surrounded by fairly intact landscape, though there may be cuts nearby.
- 3 Population surrounded by fragmented forest or rural landscape.
- 4 Surrounding area developed.

4. **OVERALL RANK** for plant EO based on your experience: A excellent B good C fair D poor

5. **MNAP reviewed/verified rank:** A excellent B good C fair D poor

Describe rationale (EO rank specs in MNAP element files; general EO rank spec considerations, etc.):

| | |
|---|---|
| Landowner name/address for the entire population: | Landowner phone: |
| | Lot number (if known): |
| | Tax map (if known): |
| | Landowner aware of plant? <input type="checkbox"/> yes <input checked="" type="checkbox"/> no |
| | Landowner protecting plant? <input type="checkbox"/> yes <input type="checkbox"/> no |
| | Landowner comments: |



Feature Map: It is very important to include a map indicating the precise location and extent of the feature. Please follow these instructions carefully when attaching your feature map.

1. Attach a photocopy of the appropriate part of a USGS topographic map (1:24,000 scale if available) and write the map scale on the map. Please do NOT enlarge or reduce the map.
2. Indicate on the map the exact location of the observed feature(s):
 - a. When the observed feature is *no larger than a pen point* on the map (i.e. extremely small patches), place small points on the map indicating the location(s) of the patches, and label each point with an arrow so they are easily seen.
 - b. When the observed feature is *larger than a pen point* on the map:
 - (1) Draw a **thin solid boundary line showing the extent of the observed area** of the feature.
 - (2) Indicate disjunct patches (polygons) by drawing the boundary for each patch separately.
 - (3) If the boundary follows the edge of a lake, stream, road, marsh or other feature, draw the boundary precisely in the edge of the feature.
 - (4) Where needed, add notes to the map with instructions on where the boundary line is located or if the boundary is shared with other observations.

Note: One Feature Map may be submitted for multiple features (communities and plants), providing the map is clear and easy to read. If necessary, please attach multiple feature maps to ensure clarity.

Locational Uncertainty is a measure of how the location of an observed area on a map varies from its actual location on the ground.

1. Is your depiction of the observed area on the map within 6.25 meters (approximately 20 ft) of its actual location on the ground? **Yes No**
 - a. If no, estimate the uncertainty distance based on landmarks, elevation, etc. The location of the observed area on the map is accurate to within _____ meters kilometers feet miles of the actual location on the ground.
 - b. Is the observed area known to be located within some feature(s) on the map (e.g. wetland boundary, lake, road, trail, highway, contour lines)? **Yes No**
 - (1) If yes, indicate the boundary within which the observed area is known to be located on the map with a **dashed line**, and if applicable, identify the feature.

Confidence Extent is a measure of how confident you are that the observed area represents the full extent of the feature.

Indicate whether there is confidence that the observed area represents the full extent of the feature at that location. **Yes No ?**
Y = Confident that the full extent is known **N** = Confident that the full extent is NOT known **?** = Uncertain whether the full extent is known

Shaded areas are to be filled out by Maine Natural Areas Program staff.

Please mail the completed field form and appropriate map to **Data Manager, Maine Natural Areas Program, 93 State House Station, Augusta, ME 04333**. Thank you!

Appendix 9-2



STATE OF MAINE
DEPARTMENT OF CONSERVATION
93 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0093

JOHN ELIAS BALDACCI
GOVERNOR

ELIZA TOWNSEND
COMMISSIONER

March 31, 2010

Brooke Barnes
Stantec Consulting
30 Park Drive
Tosham, ME 04086

Re: Rare and exemplary botanical features, Proposed Potential Transmission Lines and Wind Development Areas, Project 195600518, Chester to Oakfield, Maine.

Dear Mr. Barnes:

I have searched the Natural Areas Program's Biological and Conservation Data System files in response to your request of March 1, 2010 for information on the presence of rare or unique botanical features documented within 250 feet of the two proposed transmission line alignments and at the potential wind development sites in the area between the Towns of Chester and Oakfield, Maine. Rare and unique botanical features include the habitat of rare, threatened, or endangered plant species and unique or exemplary natural communities. For certain types of projects, we also incorporate review of landscape analysis sites, which are areas determined to have a high potential to support significant natural features. Our review involves examining maps, manual and computerized records, aerial photography, other sources of information such as scientific articles or published references, and the personal knowledge of staff or cooperating experts.

This finding is for project scoping purposes only and should not be considered as a final review of the proposed project. When specific location options for facilities and/or transmission lines have been determined and updated environmental assessments have been completed, a subsequent review request should be submitted to us for recommendations regarding impacts to significant natural features prior to application submittal.

Our official response covers only botanical features. For authoritative information and official response for zoological features you must make a similar request to the Maine Department of Inland Fisheries and Wildlife, 284 State Street, Augusta, Maine 04333.

According to the information currently in our Biological and Conservation Data System files, there are several botanical features documented along the potential transmission line corridors and within the potential wind development area.

Please refer to the table below and enclosed maps and fact sheets for more information about these features.

Specific commentary follows:

Hunt Ridge, Oakfield (Map 1). This site supports an exemplary Beech – Birch – Maple Forest. If wind infrastructure is planned within the natural community mapped here, please submit site plans for further commentary.

Dyer Brook and Robinson Mountain, Dyer Brook (Map 2). This site supports an exemplary Red Oak – Northern Hardwoods – White Pine Forest and a population of the rare plant Large Toothwort, *Cardamine maxima*. If wind infrastructure is planned within the natural community mapped here, please submit site plans for further commentary.

Table 1. Rare and Exemplary Botanical Features

| Feature | Global Rank | State Rank | State Status | Occurrence Rank | Last Observed |
|---|-------------|------------|-----------------|-----------------|---------------|
| Beech – Birch – Maple Forest (Map 1) | G3G5 | S4 | NA | Good | 2004 |
| Red Oak – Northern Hardwood Forest (Map 2) | GNR | S4 | NA | Fair | 2003 |
| Large Toothwort, <i>Cardamine maxima</i> (Map 2) | G5 | S1 | Special Concern | Fair | 2003 |
| Streamshore Ecosystem (Map 3) | | S4 | NA | Good | 2009 |
| Small Yellow Water Crowfoot, <i>Ranunculus gmelinii</i> var. <i>purshii</i> (Map 3) | G5T5 | S2 | Threatened | Good | 2008 |
| Showy Lady's-slipper, <i>Cypripedium reginae</i> (Map 3) | G4 | S3 | Threatened | Good | 2008 |
| Marsh Valerian, <i>Valeriana uliginosa</i> (Map 3) | G4 | S2 | Special Concern | Good | 2008 |
| Swamp Fly-honeysuckle, <i>Lonicera oblongifolia</i> (Map 3) | G4 | S3 | Special Concern | Fair | 2008 |
| Northern Bog Sedge, <i>Carex gynocrates</i> (Map 3) | G5 | S2 | Special Concern | Good | 2008 |
| Eccentric Bog Ecosystem (Map 4) | GNR | S3 | NA | Good | 2007 |
| Swarthy Sedge, <i>Carex adusta</i> (Map 5) | G5 | S2 | Endangered | Fair | 1997 |

Alder Brook, Glenwood PLT (Map 3). This site supports an exemplary Streamshore Ecosystem and has indicators of enrichment. We recommend that you survey this area for rare calciphilic plant species.

Alder Brook Headwaters (Map 3). The rare plants at this site (Small Yellow Water Crowfoot, Showy Lady's-slipper, Marsh Valerian, Swamp Fly-honeysuckle, and Northern Bog Sedge) occur at the MEPCO Transmission Line, at the Headwaters of Alder Brook site, along the potential easterly alignment. Some accommodation should be made to provide continued survival of these populations at this site.

Flinn Pond, T1 R5 WELS and Benedicta TWP (Map 4). The potential westerly alignment (Greenfield Glenwood Options 090209) intersects the edge of an Eccentric Bog Ecosystem at this site. The transmission line as proposed poses no concerns and should not impact the ecosystem.

Horseback, Chester (Map 5). A single stem of the rare Swarthy Sedge, an early successional species, was found on the existing R.O.W. of the potential westerly alignment in 1997. The alignment as proposed is not a concern for this population.

Skitacook Stream Flats, T4 R3 WELS and Linneus (Map 6). The potential alignment in this area crosses the easterly edge of this landscape analysis site. We recommend that you survey the area for rare species in this area of the transmission line alignment.

Ebhorse Stream Bog, Woodville and Chester (Map 7). The potential alignment crosses through a landscape analysis site, however, we believe it is unlikely that any natural communities or ecosystems would be mapped at this site. We do, however, suggest botanical survey work where the northern white cedar grows on the northeast side.

Keene Bog, Chester (Map 8). This landscape analysis site has not been surveyed by MNAP and but we believe it has the potential for natural community mapping. The current alignment to the east of the existing easterly line (Oakfield T Line) is preferred. If the westerly alignment (Greenfield Glenwood Options 090209) is the preferred alignment, we suggest exploring options to move the line farther away from the bog on the southwest side of this site. Straightening the line by removing the last two angles before the terminus would sufficiently move the line from this bog.

If a field survey of the project area is conducted, please refer to the enclosed supplemental information regarding rare and exemplary botanical features documented to occur in the vicinity of the project site. The list may include information on features that have been known to occur historically in the area as well as recently field-verified information. While historic records have not been documented in several years, they may persist in the area if suitable habitat exists. The enclosed list identifies features with potential to occur in the area, and it should be considered if you choose to conduct field surveys.

Comprehensive field surveys do not exist for all natural areas in Maine, and in the absence of a specific field investigation, the Maine Natural Areas Program cannot provide a definitive statement on the presence or absence of unusual natural features at this site.

The Natural Areas Program is continuously working to achieve a more comprehensive database of exemplary natural features in Maine. We would appreciate the contribution of any information obtained should you decide to do field work. The Natural Areas Program welcomes coordination with individuals or organizations proposing environmental alteration, or conducting environmental assessments. If, however, data provided by the Natural Areas Program are to be published in any form, the Program should be informed at the outset and credited as the source.

The Natural Areas Program has instituted a fee structure of \$75.00 an hour to recover the actual cost of processing your request for information. You will receive an invoice for \$300.00 for our services.

Thank you for using the Natural Areas Program in the environmental review process. Please do not hesitate to contact me if you have further questions about the Natural Areas Program or about rare or unique botanical features on this site.

Sincerely,



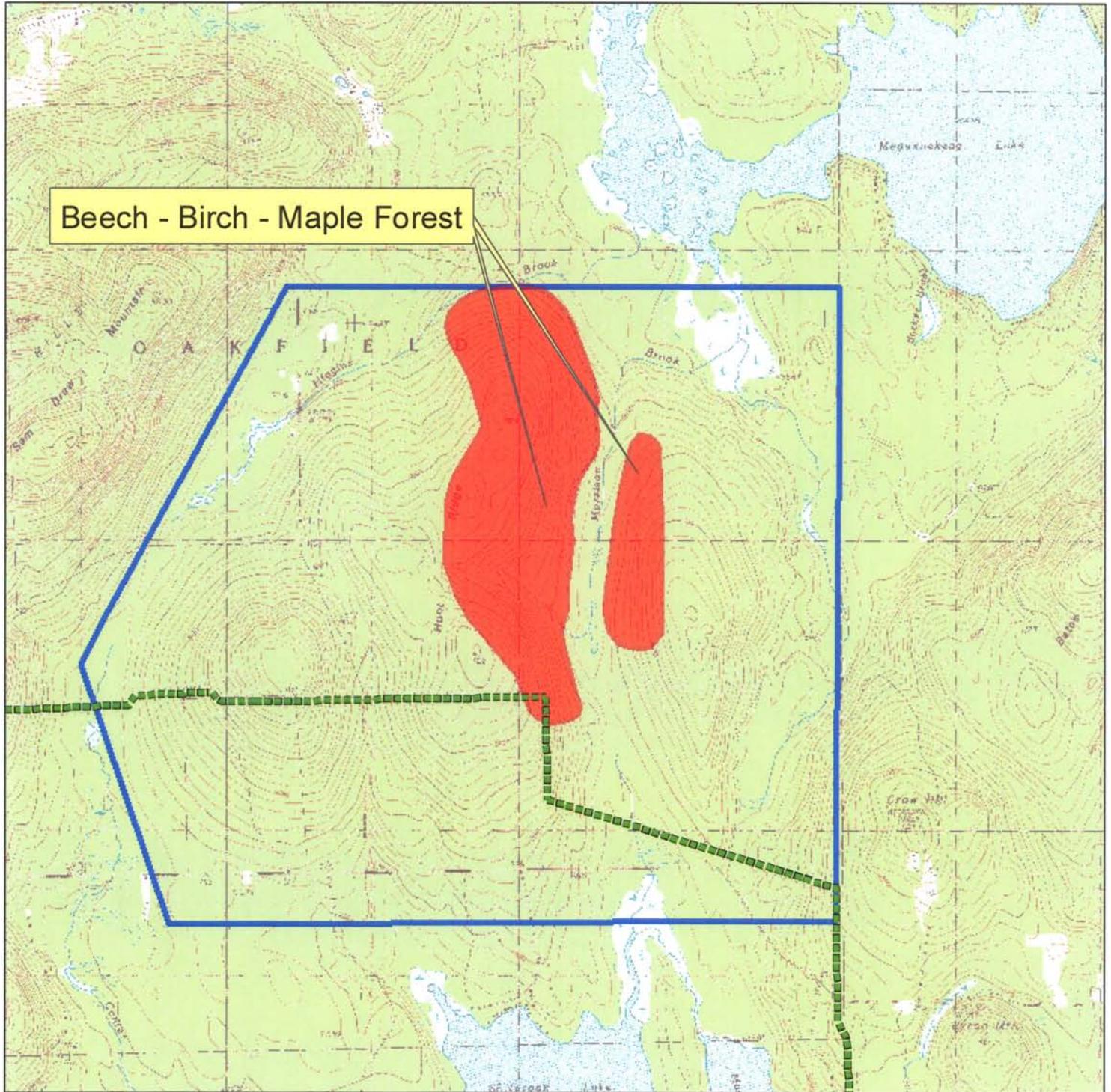
Lisa St. Hilaire
Information Manager
Maine Natural Areas Program
207-287-8046

Lisa.St.Hilaire@maine.gov

Enclosures

Map 1. Hunt Ridge, Oakfield, Maine

Potential Transmission Line Corridors and Potential Wind Development Areas Stantec PN 195600518



-  Natural Community
-  Potential Transmission Line Oakfield T Line
-  Approximate Project Boundary

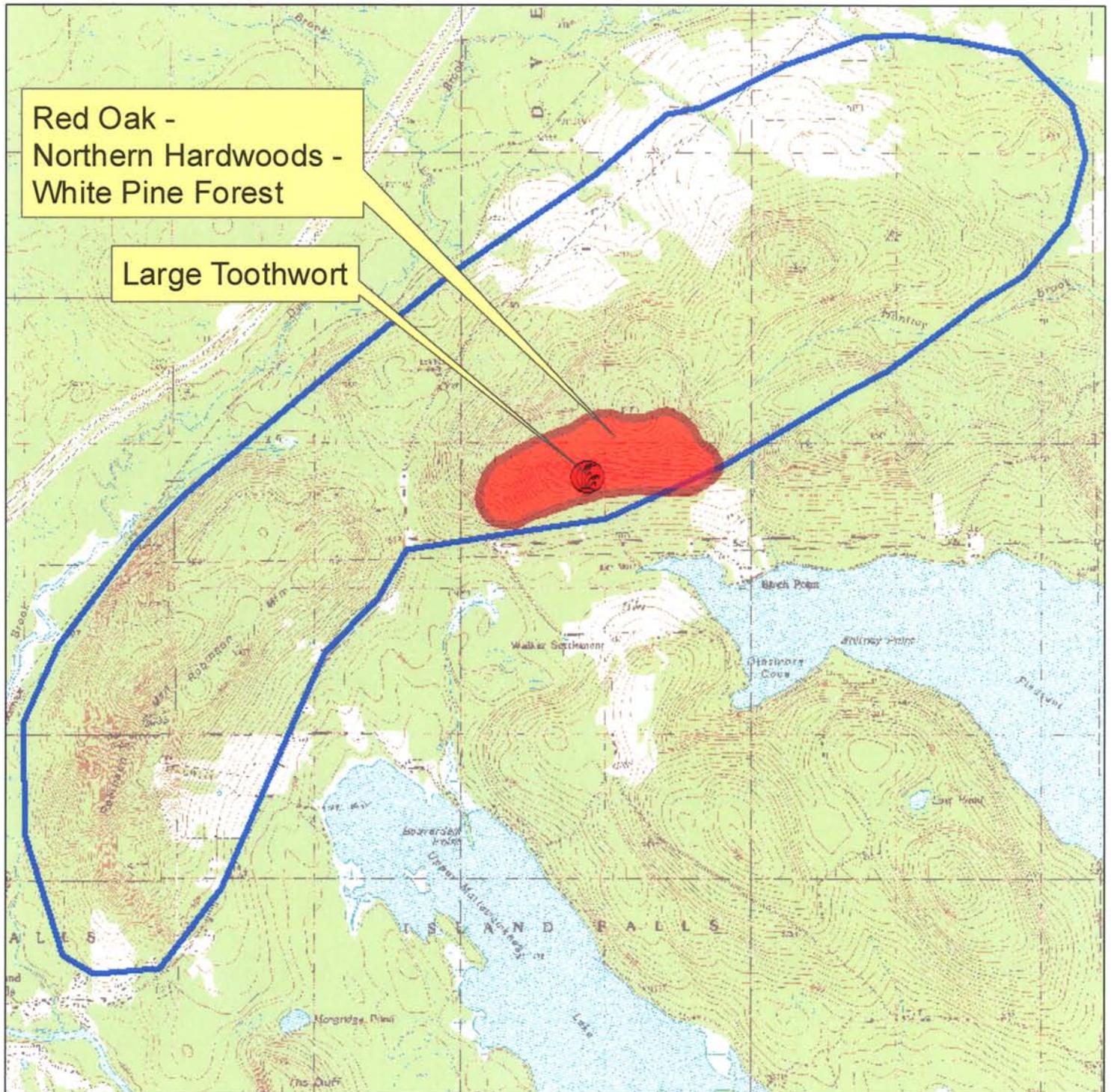
0 0.2 0.4 0.8 1.2 1.6 Miles

Maine Natural Areas Program
March 2010



Map 2. Dyer Brook and Robinson Mountain, Dyer Brook, Maine

Potential Transmission Line Corridors and
Potential Wind Development Areas Stantec PN 195600518



-  Rare Plant
-  Natural Community
-  Approximate Project Boundary

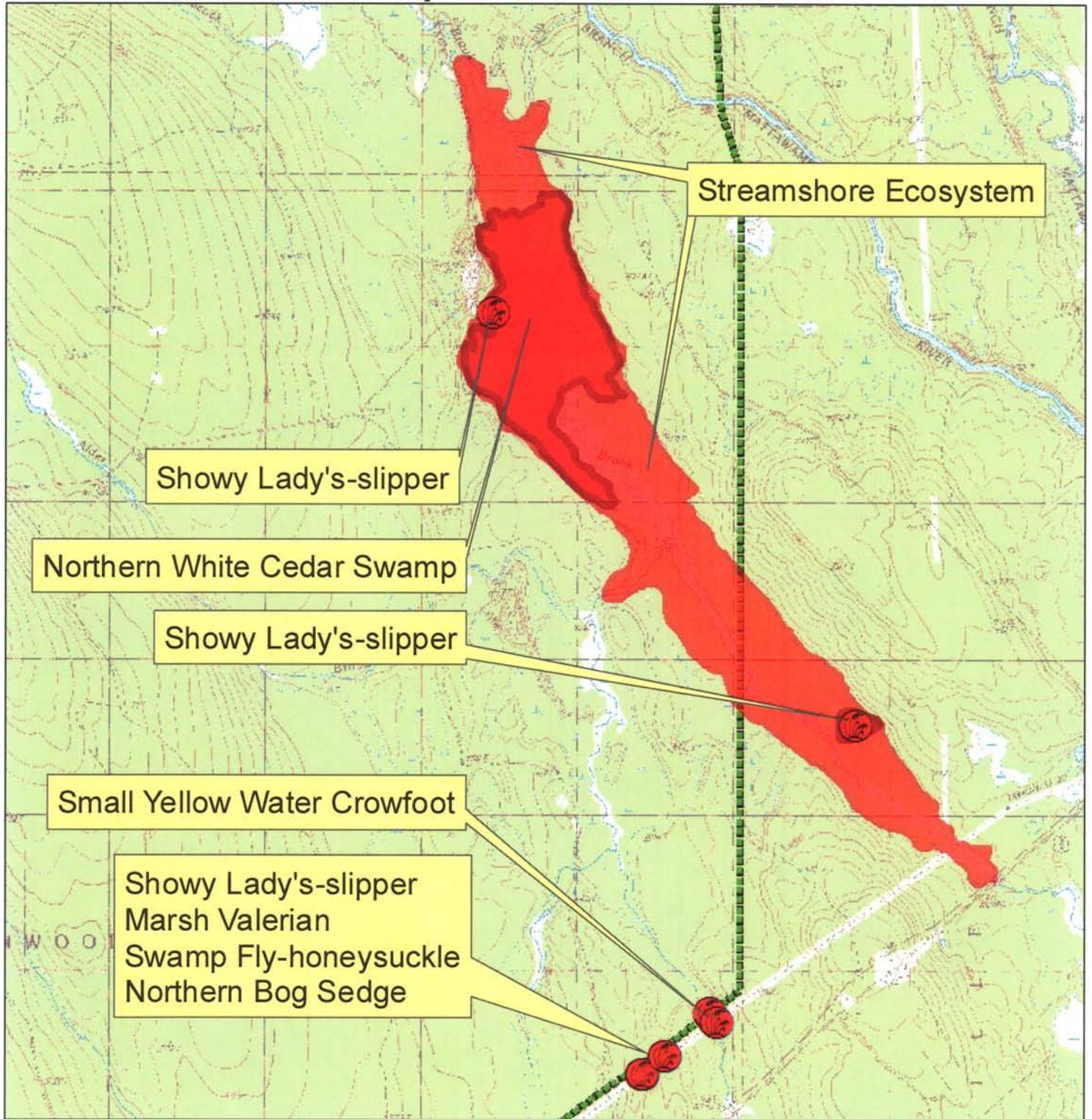
0 0.150.3 0.6 0.9 1.2
Miles

Maine Natural Areas Program
March 2010

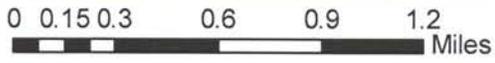


Map 3. Alder Brook and Alder Brook Headwaters, Haynesville, Glenwood PLT, T3 R3 WELS

Potential Transmission Line Corridors and Potential Wind Development Areas Stantec PN 195600518

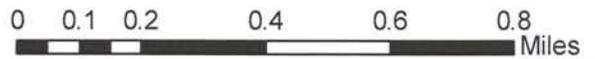
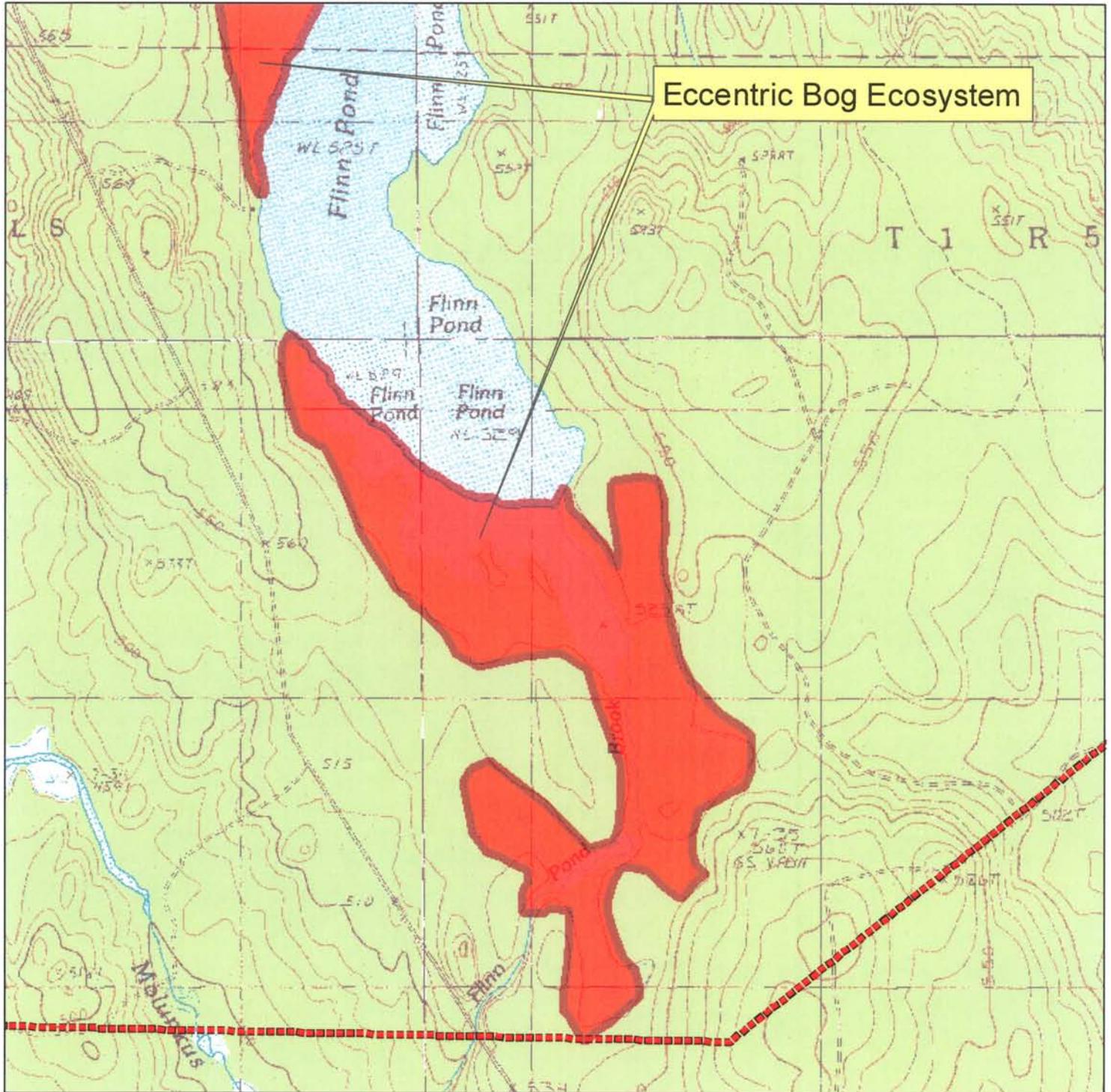


- Rare Plant
- Natural Community
- Potential Transmission Line Oakfield T Line



Map 4. Flinn Pond, T1 R5 WELS, Maine

Potential Transmission Line Corridors and Potential Wind Development Areas Stantec PN 195600518



 Natural Community

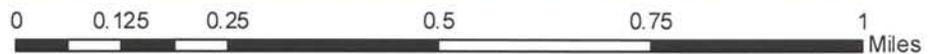
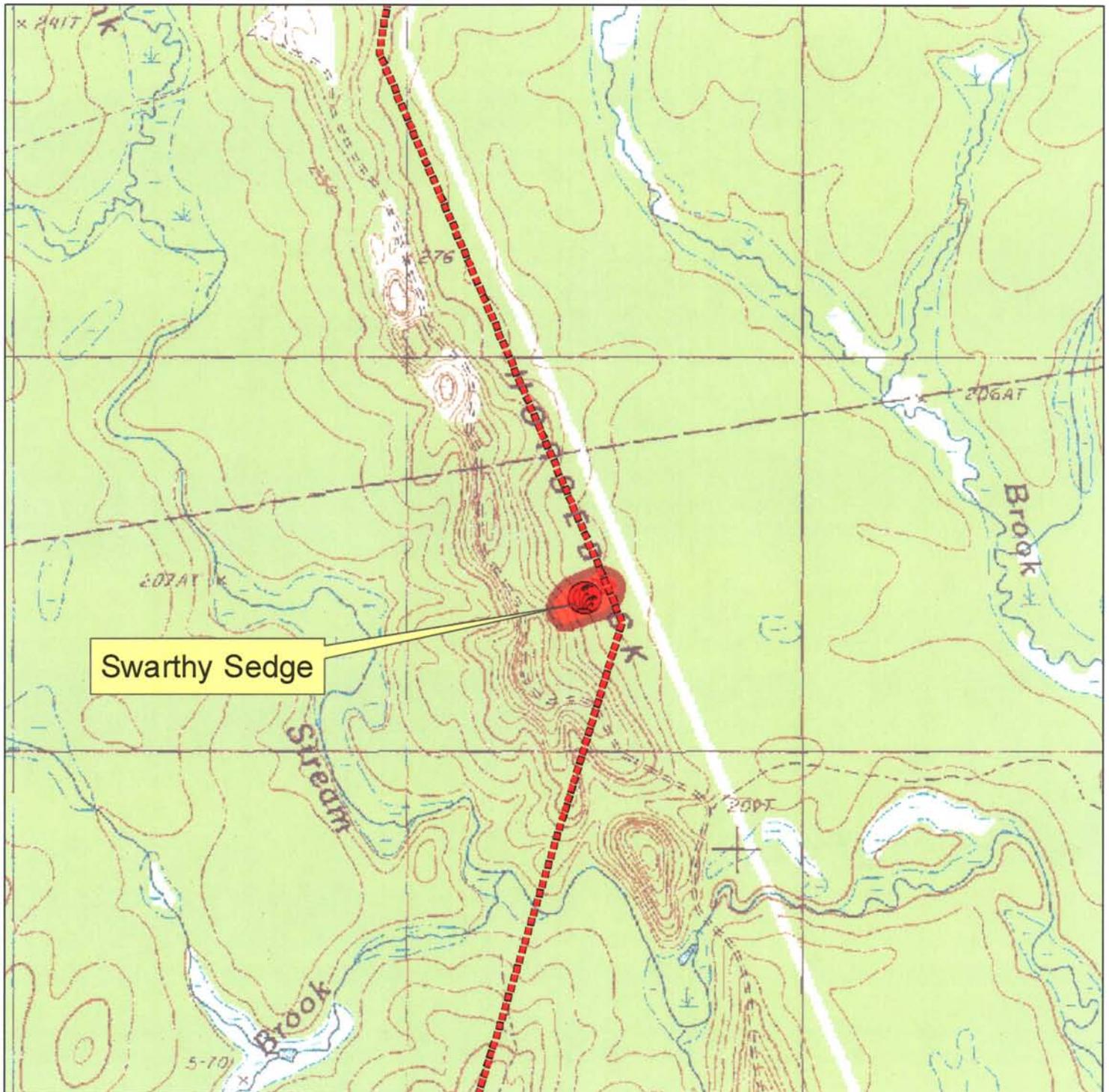
 Potential Transmission Line Greenfield Glenwood

Maine Natural Areas Program
March 2010



Map 5. Horseback, Chester, Maine

Potential Transmission Line Corridors and Potential Wind Development Areas Stantec PN 195600518



Rare Plant

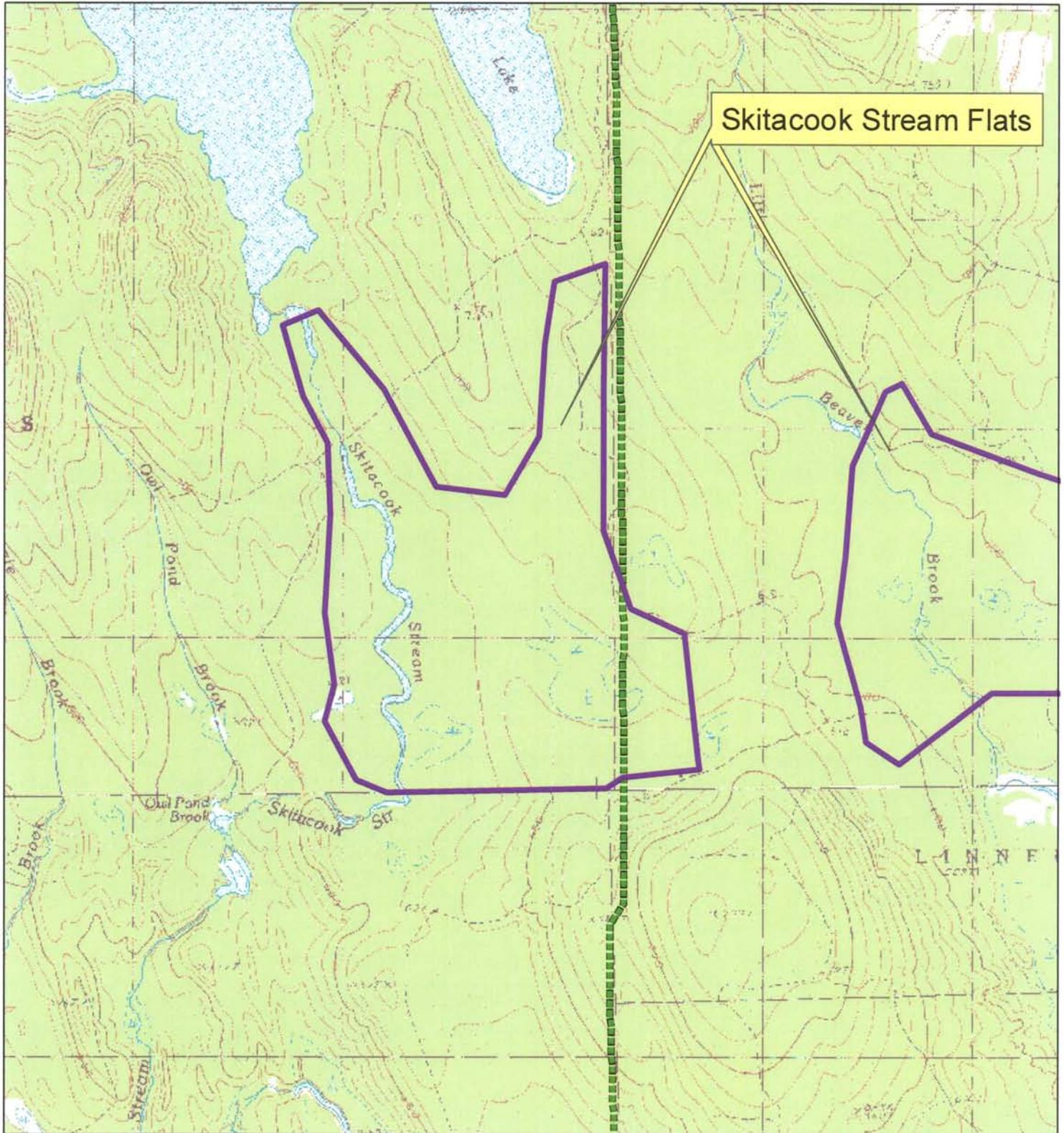


Potential Transmission Line Greenfield Glenwood

Maine Natural Areas Program
March 2010



Map 6. Skitacook Stream Flats, T4 R3 WELS, Linneus Potential Transmission Line Corridors and Potential Wind Development Areas Stantec PN 195600518



Landscape Analysis Site



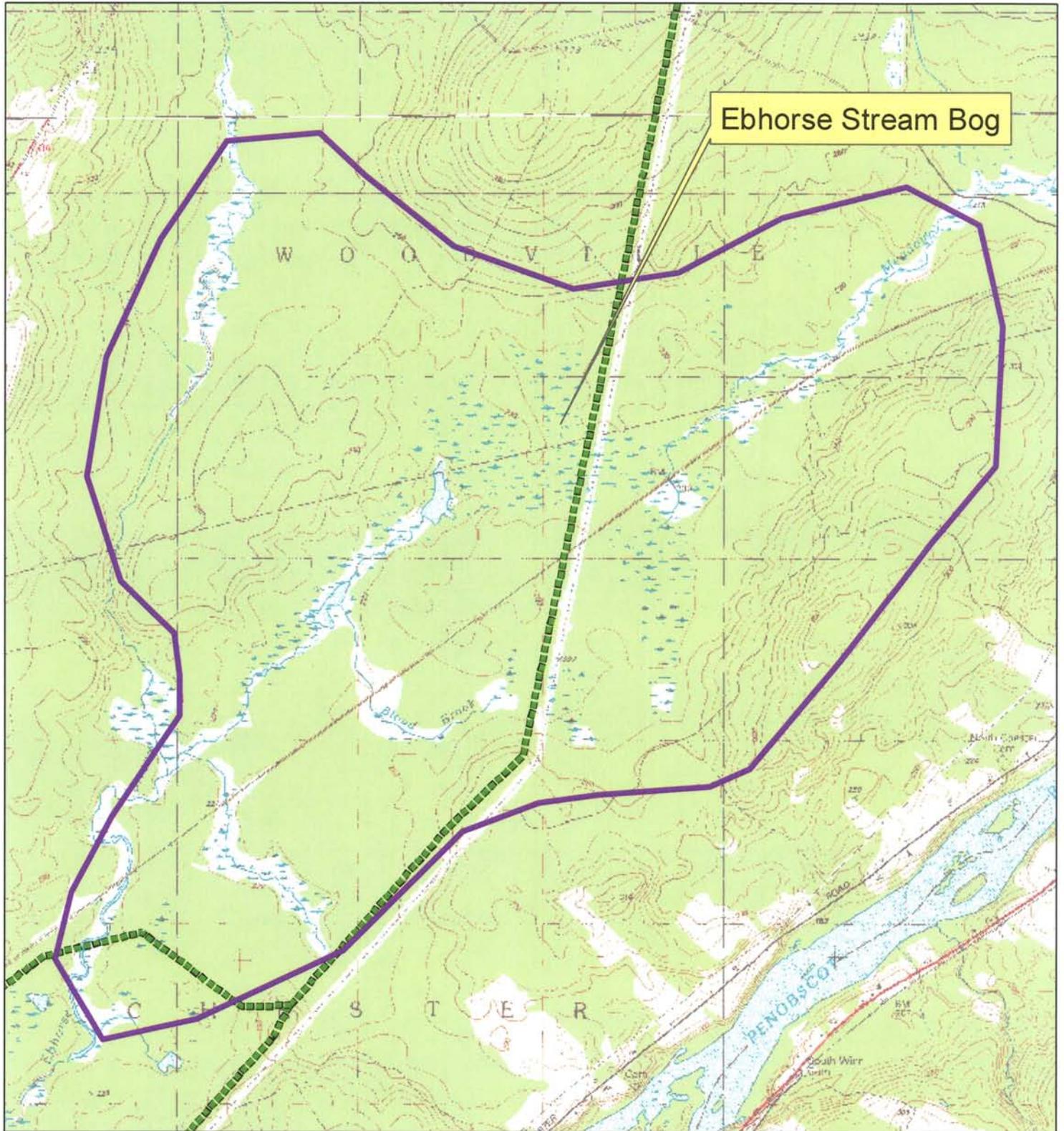
Potential Transmission Line Oakfield T Line

0 0.1250.25 0.5 0.75 1 Miles

Maine Natural Areas Program
March 2010



Map 7. Ebhorse Stream Bog, Woodville and Chester Potential Transmission Line Corridors and Potential Wind Development Areas Stantec PN 195600518



Landscape Analysis Site



Potential Transmission Line Oakfield T Line

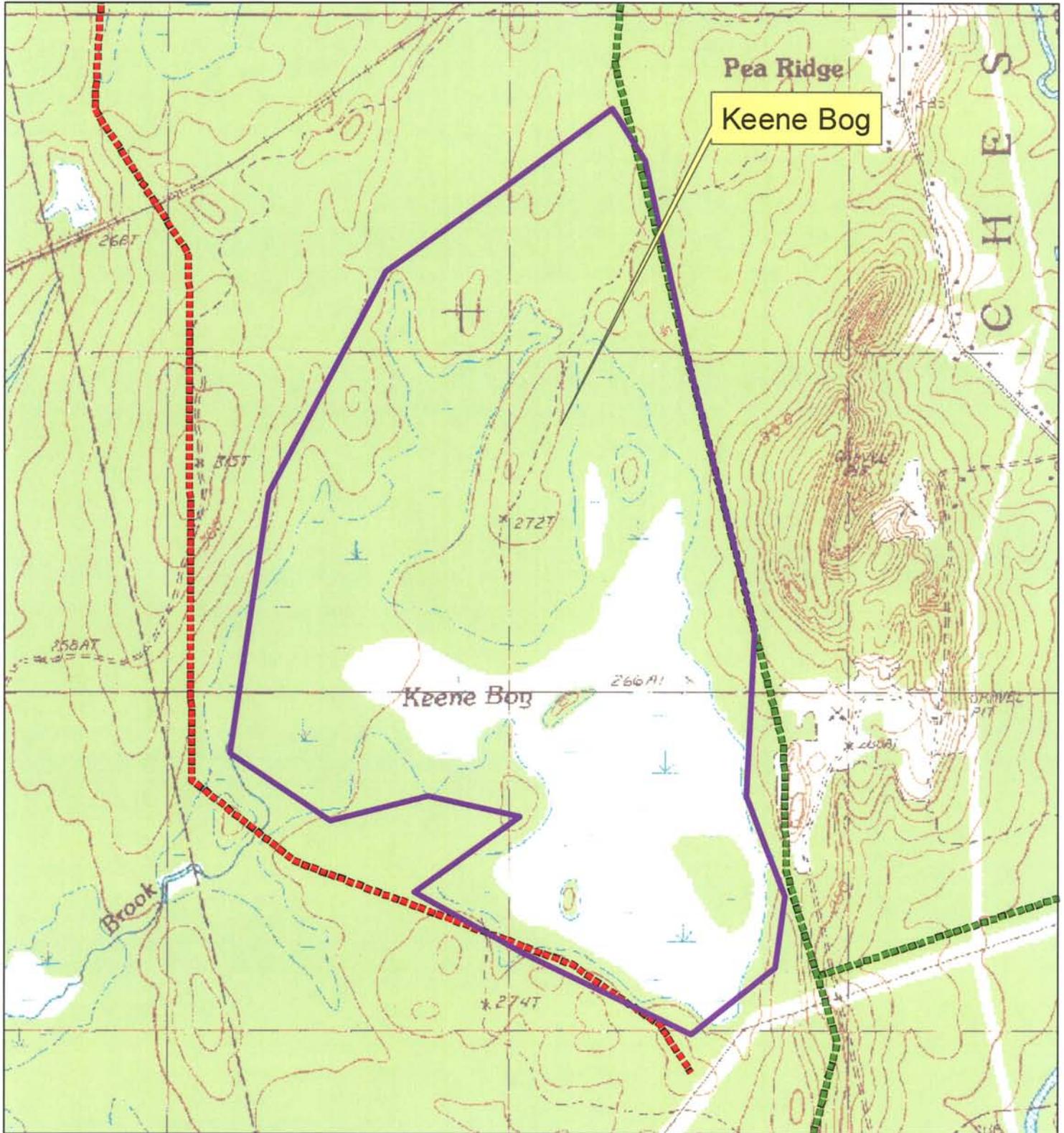
0 0.125 0.25 0.5 0.75 1 Miles

Maine Natural Areas Program
March 2010



Map 8. KeeneBog, Chester

Potential Transmission Line Corridors and Potential Wind Development Areas Stantec PN 195600518



-  Landscape Analysis Site
-  Potential Transmission Line Greenfield Glenwood
-  Potential Transmission Line Oakfield T Line

0 0.05 0.1 0.2 0.3 0.4
Miles

Maine Natural Areas Program
March 2010



Northern Hardwoods Forest

State Rank S5

Similar Types

Maple - Basswood - Ash Forests and Sugar Maple Forests are similar to, and often contiguous with, this type. In them, beech is far less abundant, white ash is usually well represented in the canopy, and the herb layer contains species indicative of rich-soil areas. Red Oak - Northern Hardwoods - White Pine Forests have a higher proportion of red oak and can have a higher proportion of conifers (>25%). Spruce - Northern Hardwoods Forests also have >25% conifers in the canopy.

Community Description

These closed canopy forests are dominated by a combination of beech, yellow birch, and sugar maple. Paper birch, red maple, conifers, and red oak may be present at lower cover. Conifers and red oak can each have <25% cover. Striped maple is a common subcanopy tree. The variable shrub layer is dominated by tree regeneration. Cover, richness and composition vary with site conditions.

Soil and Site Characteristics

Sites are typically found on the lower to middle portion of hillslopes (slopes generally 10-50%). Soils are generally mesic and well drained, though not deep (typically 15-50 cm) silt loams to sandy loams to loamy sands formed over glacial till, with pH 5.0-5.6; some occur on stabilized talus. Elevations range up to 2000'.

Diagnostics

A combination of beech, sugar maple, and yellow birch distinguishes this type. Though red oak is often entirely absent, conifers and red oak can be present and have up to 25% cover each. The herb layer lacks rich site indicators such as Dutchman's breeches, maidenhair fern, and blue cohosh.

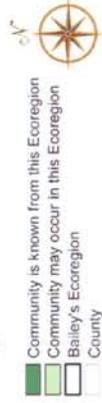
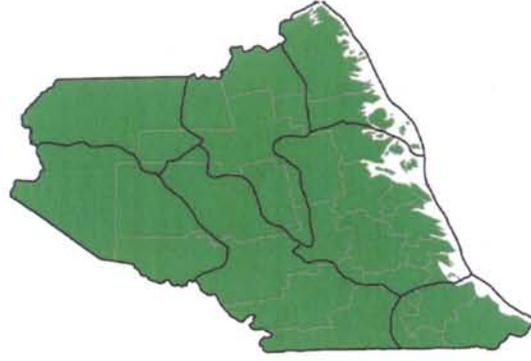


Diseased Beech Bark

Conservation, Wildlife, and Management Considerations

This is the dominant hardwood type in Maine, and therefore it is extensively harvested and managed. Most management techniques diverge from the natural gap

Location Map



Characteristic Plants

These plants are frequently found in this community type. Those with an asterisk are often diagnostic of this community.

Canopy

- American beech*
- Eastern hemlock*
- Paper birch*
- Sugar maple*
- Yellow birch*

Sapling/shrub

- American beech*
- Hobblebush*
- Striped maple*
- Sugar maple*
- Yellow birch*

Herb

- Bluebead lily*
- Canada mayflower
- Shining clubmoss*
- Starflower
- Striped maple*
- Sugar maple*

Associated Rare Plants

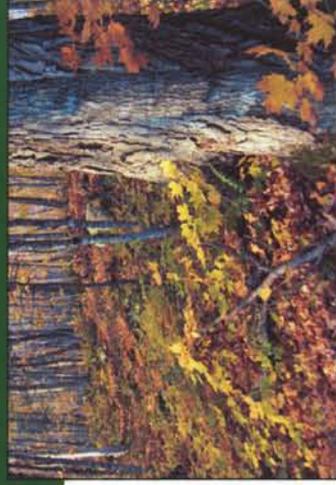
- Autumn coral-root
- Boreal bedstraw
- Broad beech fern
- Cut-leaved toothwort
- Nodding pogonia
- Tall white violet

Associated Rare Animals

- Early hairstreak

Examples on Conservation Lands You Can Visit

- Baxter State Park - Piscataquis Co.
- Big & Little Squaw Mountain Public Lands - Piscataquis Co.
- Bigelow Preserve Public Lands - Franklin/Somerset Co.
- Deboulle Ponds Public Lands - Aroostook Co.
- Grafton Notch State Park & Mahoosuc Public Lands - Oxford Co.
- White Mountain National Forest - Oxford Co.



Northern Hardwoods Forest

pattern, which is at the scale of single trees or small groups of trees. Large (>1000 acres) examples reflecting only natural disturbance are scarce statewide, and intact examples in central and southern Maine tend to be smaller and more isolated.

Beech scale disease (Nectria) has devastated beech in many stands in eastern Maine. Although beech regenerates vigorously from sprouts after the trees have died, most sprouts succumb to the disease by the time they reach maturity. There are indications that some trees may express a genetic resistance to this disease.

Distribution

One of the predominant forest types in the New England - Adirondack Province and Laurentian Mixed Forest Province. Extends east, west, and north from Maine; occurs only as scattered areas southward.



Landscapes
Pattern: Matrix, typically hundreds of quality patches usually now smaller.

American Beech with Beech Nuts



Maine Department of Conservation
Natural Areas Program

Carex adusta Boott

Swarthy Sedge

Habitat: Dry, open places. [Rocky coastal (non-forested, upland)]

Range: Newfoundland south to New Brunswick, Maine and northern New York, west to Michigan, Minnesota, and British Columbia.

Phenology: Fruits July - September.

Family: Cyperaceae

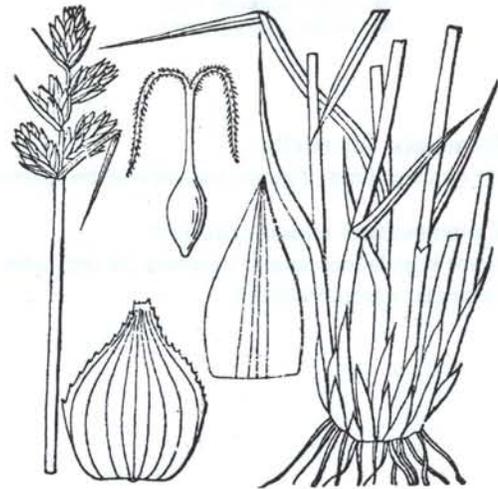


Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: Identification of species of the genus *Carex* is usually difficult and dependent upon rather technical characters. *C. adusta* is in the section *Ovales* and it is distinguished by the following characteristics: densely tufted growth; lower leaves are merely scales; 4-15 spikes are crowded into a cluster 2-3 cm long; perigynia are 4.2-5.2 mm long and half as wide, with fine dorsal nerves; floral scales as long as the perigynia; upper portion of the leaf sheath is smooth, lacking minute papillae.

Ecological characteristics: Known to occur in Maine on sandy roadsides and disturbed, dry clearings. This is a pioneer species of open areas that have been recently disturbed by fire or mechanical means, so that mineral soil is exposed. In Maine, it seems to be most common in the coastal region.

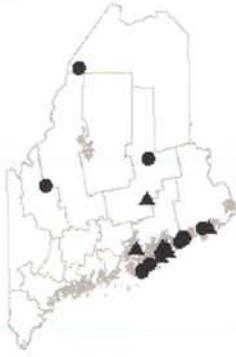
Synonyms:

Rarity of *Carex adusta*

| | | |
|--------------------------|------------|--|
| State Rank: | S2 | Imperiled in Maine because of rarity or vulnerability to further decline. |
| New England Rank: | Division 2 | Regionally rare plant: Fewer than 20 current (seen since 1970) occurrences within New England. |
| Global Rank: | G5 | Demonstrably widespread, abundant, and secure globally. |

Status of *Carex adusta*

| | | |
|------------------------|------------|--|
| Federal Status: | None | No Federal Status. |
| State Status: | Endangered | Rare and in danger of being lost from the state in the foreseeable future; or federally listed as Endangered. Listing criteria met: Few individuals, At edge of range, Declining populations, Vulnerable to human activity |



- ▲ Historical (before 1982)
- Recent (1982 - present)

Known Distribution in Maine:

This rare plant has been documented from a total of 14 town(s) in the following county(ies): Aroostook, Franklin, Hancock, Knox, Penobscot, Washington.

Dates of documented observations are: 1883, 1890, 1891 (2), 1897, 1898, 1899 (2), 1914, 1916, 1949, 1988, 1991 (3), 1995 (2), 1997 (3), 1999, 2000 (2), 2002

Reason(s) for rarity:

At southern limit of range; habitat may be ephemeral.

Conservation considerations:

Some populations appear to persist for only a few years. All occur in locations where natural or artificial disturbance maintains open conditions.

Plant rarity and status is based on 2008 data and the rest of the information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 06 MAY 2004. We are grateful to our Botanical Advisory Group for additional information on particular species, and in particular, to Arthur Haines for his assistance with identifying characteristics and taxonomic questions. Nomenclature follows Haines and Vining's *Flora of Maine* (V.F. Thomas Press, 1998); where older works refer to a plant by another name, it is given under "Synonyms". The Natural Areas Program, within the Department of Conservation, maintains the most comprehensive source of information on Maine's rare or endangered plants and rare or exemplary natural communities, and is a member of the Association for Biodiversity Information.

If you know of locations for this plant or would like more information on this species,
please contact the Natural Areas Program
State House Station 93, Augusta, Maine 04333; telephone (207) 287-8044.





Maine Department of Conservation
Natural Areas Program

Carex gynocrates Wormsk. ex Drej.

Northern Bog Sedge

Habitat: Peaty soils, often with circumneutral pH.
[Conifer forest (forest, upland); Forested wetland]

Range: Circumboreal, south to Pennsylvania, Michigan, Minnesota, and Utah.

Phenology: Fruits June - August.

Family: Cyperaceae

Aids to Identification: Identification of species of the genus *Carex* is usually difficult and dependent upon rather technical characters. *C. gynocrates* is the only member of the section *Dioicae* in this region. It is identified by its loosely rhizomatous growth, lenticular achenes, slender leaves (1mm wide), solitary spike, and ovoid perigynia, 3-3.5mm long.

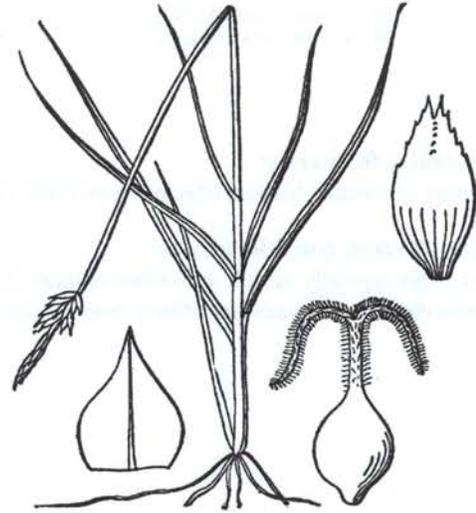


Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Ecological characteristics: This sedge is often found in association with Northern White Cedar fens in Maine.

Synonyms: Sometimes placed as subspecies *gynocrates* in the circumboreal taxon *C. dioica* (Gleason and Cronquist second ed., 1991), but separated by most authors as a distinct species.

Rarity of *Carex gynocrates*

| | | |
|--------------------------|------|--|
| State Rank: | S2 | Imperiled in Maine because of rarity and vulnerability to further decline. |
| New England Rank: | INDT | Indeterminate. Under review for inclusion in appropriate division. Taxonomy, nomenclature, or status not clearly understood. |
| Global Rank: | G5 | Demonstrably widespread, abundant, and secure globally. |

Status of *Carex gynocrates*

| | | |
|-------------------------------|-----------------|---|
| Federal Status: | None | No Federal Status. |
| State Status: | Special Concern | |
| Proposed State Status: | Special Concern | Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered. |



Known Distribution in Maine:

This rare plant has been documented from a total of 11 town(s) in the following county(ies): Aroostook, Penobscot, Piscataquis.

Dates of documented observations are: 1898, 1984, 1987, 1989 (2), 1990, 1991, 1993, 2001 (2), 2002, 2003

- ▲ Historical (before 1983)
- Recent (1983 - present)

Reason(s) for rarity:

Scarcity of suitable habitat. May be more common than records indicate.

Conservation considerations:

This sedge typically occurs in forested habitats. Effects of logging are unknown, but partial removal of the canopy would be less likely to have adverse effects than would complete removal of the canopy.

The information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 06 MAY 2004. We are grateful to our Botanical Advisory Group for additional information on particular species, and in particular, to Arthur Haines for his assistance with identifying characteristics and taxonomic questions. Nomenclature follows Haines and Vining's *Flora of Maine* (V.F. Thomas Press, 1998); where older works refer to a plant by another name, it is given under "Synonyms". The Natural Areas Program, within the Department of Conservation, maintains the most comprehensive source of information on Maine's rare or endangered plants and rare or exemplary natural communities, and is a member of the Association for Biodiversity Information.

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State House Station 93, Augusta, Maine 04333; telephone (207) 287-8044.





Maine Department of Conservation
Natural Areas Program

Cypripedium reginae Walt.

Showy Lady's-slipper

Habitat: Circumneutral peatlands (often at edges) or sunlit openings of mossy woods. [Forested wetland; Open wetland, not coastal nor rivershore (non-forested, wetland)]

Range: Newfoundland to North Dakota and Manitoba, south in Appalachians to Georgia.

Phenology: In Maine flowers late June to July.

Family: Orchidaceae

Aids to Identification: The largest and showiest of our lady's-slippers. Foliage of non-flowering plants emerging in early spring may be mistaken for false hellebore. Flowering plants are unique with their tall leafy stems bearing one or two large flowers with white petals and sepals contrasting with magenta pink pouch. Densely pubescent throughout, the hairs may cause a rash similar to poison ivy.

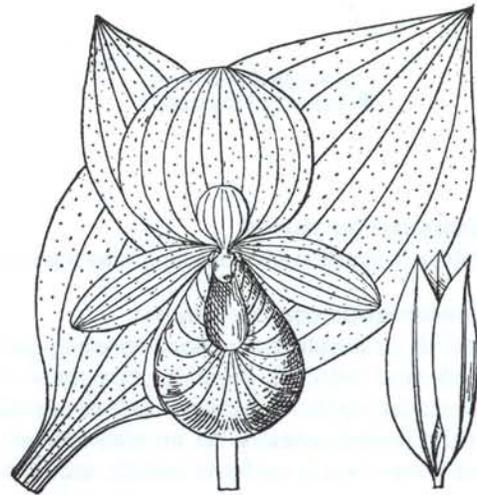


Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Ecological characteristics: Showy lady's-slippers apparently require constant moisture, some sunlight and circumneutral soil conditions. In acid bogs their roots go under the acid *Sphagnum* to more neutral groundwater below. In clearings or woods edges colonies may be very large and flowering abundant, but plants in deep shade often lack flowers. *C. reginae* seeds seem to germinate best at depths of at least 5 cm. It has been suggested that this may account for the presence of dense colonies in deer yards where the deer hooves may help to push seeds to the appropriate depth. *C. reginae* takes about 15 years to reach flowering age, which explains why they are slow to reappear after colonies have been dug up.

Synonyms: Formerly known as *Cypripedium spectabile* Salisb.

Rarity of *Cypripedium reginae*

| | | |
|--------------------------|------|---|
| State Rank: | S3 | Rare in Maine. |
| New England Rank: | None | |
| Global Rank: | G4 | Widespread, abundant, and apparently secure globally, but with cause for long-term concern. |

Status of *Cypripedium reginae*

| | | |
|------------------------|------------|---|
| Federal Status: | None | No Federal Status. |
| State Status: | Threatened | Rare and, with further decline, could become endangered; or federally listed as Threatened. Listing criteria met: Declining populations, Vulnerable to human activity |



○ Historical (before 1983)
● Recent (1983- present)

Known Distribution in Maine:

This rare plant has been documented from a total of 52 town(s) in the following county(ies): Androscoggin, Aroostook, Cumberland, Hancock, Kennebec, Knox, Oxford, Penobscot, Piscataquis, Somerset, Washington.

Dates of documented observations are: 1874, 1880, 1889 (2), 1891, 1896, 1903, 1904, 1906, 1907 (2), 1908, 1910 (3), 1914, 1924, 1925, 1935, 1940 (2), 1943, 1950, 1978, 1981 (6), 1982, 1983 (3), 1984, 1985, 1989 (3), 1990 (4), 1991, 1992, 1993, 1995, 1997, 1998 (3), 19XX (2), 2000 (2), 2001 (2), 2002 (6)

Reason(s) for rarity:

Habitat destruction and collecting, also scarcity of suitable habitat.

Conservation considerations:

Orchids are popular among some speciality gardeners, and populations of this species are vulnerable to unscrupulous or uneducated collectors. Plants dug from the wild usually do not survive; more importantly, removing these plants harms the natural population and may cause its eventual disappearance. Tissue-culture propagation of this species has been tried in limited instances, but any plants offered for sale have almost certainly been dug from the wild. This orchid grows and flowers best in moderate sunlight, and partial removal of the canopy can benefit the populations, if done correctly.

Plant rarity and status is based on 2008 data and the rest of the information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 29 APR 2004. We are grateful to our Botanical Advisory Group for additional information on particular species, and in particular, to Arthur Haines for his assistance with identifying characteristics and taxonomic questions. Nomenclature follows Haines and Vining's *Flora of Maine* (V.F. Thomas Press, 1998); where older works refer to a plant by another name, it is given under "Synonyms". The Natural Areas Program, within the Department of Conservation, maintains the most comprehensive source of information on Maine's rare or endangered plants and rare or exemplary natural communities, and is a member of the Association for Biodiversity Information.

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State House Station 93, Augusta, Maine 04333; telephone (207) 287-8044.





Maine Department of Conservation
Natural Areas Program

Lonicera oblongifolia (Goldie) Hook.

Swamp Fly-honeysuckle

- Habitat:** Bogs, swampy thickets and wet woods.
[Forested wetland; Open wetland, not coastal nor rivershore (non-forested, wetland)]
- Range:** New Brunswick and Quebec to Manitoba, New York, Pennsylvania, Michigan and Minnesota.
- Phenology:** Flowers May - June.
- Family:** Caprifoliaceae



Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: Swamp fly-honeysuckle is a shrub that grows up to 1.5 m high with upward pointing branches covered with small hairs, and opposite oval leaves 2-5 cm in length. The flowers, borne in pairs, are yellow, two-lipped, and narrow. The fleshy red berries also occur in pairs. The only other honeysuckle that is found in similar communities is *Lonicera villosa*, the mountain fly honeysuckle. It is distinguished by its blue berries and winter buds covered by 2 valvate scales (vs. several imbricate scales).

Ecological characteristics: Because of the specific habitat requirements of swamp fly-honeysuckle -- open areas of cool cedar swamps underlain by limestone -- it is not widespread, but populations may be plentiful where it does occur.

Synonyms:

Rarity of *Lonicera oblongifolia*

| | | |
|--------------------------|------|---|
| State Rank: | S3 | Rare in Maine. |
| New England Rank: | None | |
| Global Rank: | G4 | Widespread, abundant, and apparently secure globally, but with cause for long-term concern. |

Status of *Lonicera oblongifolia*

| | | |
|------------------------|-----------------|---|
| Federal Status: | None | No Federal Status. |
| State Status: | Special Concern | Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered. |



▲ Historical (before 1983)
● Recent (1983 - present)

Known Distribution in Maine:

This rare plant has been documented from a total of 25 town(s) in the following county(ies): Aroostook, Penobscot, Piscataquis, Somerset, Washington.

Dates of documented observations are: 1883 (2), 1937, 1938 (2), 1941, 1945, 1983, 1984, 1985, 1986, 1987, 1988, 1989 (2), 1993 (4), 1994, 1997, 2001 (2), 2002 (5), 2003 (2)

Reason(s) for rarity:

Specific habitat requirements.

Conservation considerations:

Appears reasonably secure; known populations are persistent.

The information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 13 MAY 2004. We are grateful to our Botanical Advisory Group for additional information on particular species, and in particular, to Arthur Haines for his assistance with identifying characteristics and taxonomic questions. Nomenclature follows Haines and Vining's *Flora of Maine* (V.F. Thomas Press, 1998); where older works refer to a plant by another name, it is given under "Synonyms". The Natural Areas Program, within the Department of Conservation, maintains the most comprehensive source of information on Maine's rare or endangered plants and rare or exemplary natural communities, and is a member of the Association for Biodiversity Information.

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Maine Department of Conservation
Natural Areas Program

Ranunculus gmelinii DC.
Small Yellow Water Crowfoot

Habitat: Springy rills, clear cold ponds, shores and meadows. [Open water (non-forested, wetland)]

Range: Eastern Quebec and Nova Scotia to Alaska, south to Maine, Michigan and Minnesota. Also in Asia.

Phenology: Flowers in July and August.

Family: Ranunculaceae



Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: This species differs from the common buttercup in being semi-aquatic, the elongate stems creeping or floating in shallow water or sprawling on muddy shores or in meadows. The underwater leaves have long stalks, are flaccid in texture and are semi-transparent. The above-water leaves are thicker with 3 to 5 lobes. The golden-yellow, 5-petaled flowers occur in clusters of one to four, and mature into a cluster of achenes (dry fruits containing seeds) in a rounded head. These achenes have a persistent style that protrudes like a beak. It somewhat resembles *R. flabellaris*, the yellow water crowfoot, a species that is more common in Maine. *R. gmelinii* is recognized by its smaller size (petals 3-7 mm long, achenes 1-1.6 mm long with a beak 0.4-0.8 mm long) and achenes that are not thickened and spongy in the basal half.

Ecological characteristics: Ecological relationships in Maine are not well known.

Synonyms: Formerly known as *Ranunculus gmelinii* DC. var. *hookeri* (D. Don) L. Benson and also var. *purshii* (Richards.) Hara.

Rarity of *Ranunculus gmelinii*

| | | |
|--------------------------|------------|--|
| State Rank: | S2 | Imperiled in Maine because of rarity or vulnerability to further decline. |
| New England Rank: | Division 2 | Regionally rare plant. Fewer than 20 current (seen since 1970) occurrences in New England. |
| Global Rank: | G5T5 | Species demonstrably widespread, abundant, and secure globally. |

Status of *Ranunculus gmelinii*

| | | |
|------------------------|------------|---|
| Federal Status: | None | No Federal Status. |
| State Status: | Threatened | Rare and, with further decline, could become endangered; or federally listed as Threatened. |



Maine Department of Conservation
Natural Areas Program

Valeriana uliginosa (Torr. & Gray) Rydb.

Marsh Valerian

- Habitat:** Circumneutral fens, in open areas.
[Forested wetland; Open wetland, not coastal nor rivershore (non-forested, wetland)]
- Range:** Quebec to Ontario, Maine, Vermont, New York, Ohio, Indiana, Michigan, and Wisconsin.
- Phenology:** Perennial, flowers May - June.
- Family:** Caprifoliaceae



Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: Valerians are perennial herbs with opposite, pinnately compound leaves. The flowers are small and white. During flowering, the sepals appear as 5-20 narrow bristles; in fruit these elongate and form a plume that aids in wind dispersal of the fruits, similar to dandelion. *V. uliginosa* is a native species of circumneutral fens with simple basal leaves and glabrous leaflets. The introduced *V. officinalis* occurs in fields and disturbed areas. This similar looking species has pinnately-divided leaves and pubescent leaflets (on the undersurface).

Ecological characteristics: Found in cool, limy swamps associated with larch (*Larix laricina*) and white cedar (*Thuja occidentalis*). May decline as trees encroach on the openings in which it grows.

Synonyms: Former names include *Valeriana sitchensis* Bong. ssp. *uliginosa* (Torr. & Gray) Boivin.

Rarity of *Valeriana uliginosa*

| | | |
|--------------------------|------------|---|
| State Rank: | S2 | Imperiled in Maine because of rarity or vulnerability to further decline. |
| New England Rank: | Division 2 | Regionally rare plant: Fewer than 20 current (seen since 1970) occurrences within New England. |
| Global Rank: | G4Q | Widespread, abundant, and apparently secure globally, but with cause for long-term concern (questionable taxonomy). |

Status of *Valeriana uliginosa*

| | | |
|------------------------|-----------------|---|
| Federal Status: | None | No Federal Status. |
| State Status: | Special Concern | Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered. |



▲ Historical (before 1982)
● Recent (1982- present)

Known Distribution in Maine:

This rare plant has been documented from a total of 22 town(s) in the following county(ies): Aroostook.

Dates of documented observations are: 1896 (2), 1898, 1900, 1909, 1916, 1956, 1983, 1985 (2), 1986, 1987 (2), 1989, 1992, 1998 (2), 1999, 2001 (2), 2002 (4)

Reason(s) for rarity:

Habitat naturally scarce.

Conservation considerations:

Most often found in openings within its cedar bog habitat, suggesting that decreased light with canopy closure may be limiting. Partial removal of the canopy could be beneficial to the species; complete canopy removal could cause more drastic habitat changes and would be more likely to be detrimental.

The information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 17 MAY 2004. We are grateful to our Botanical Advisory Group for additional information on particular species, and in particular, to Arthur Haines for his assistance with identifying characteristics and taxonomic questions. Nomenclature follows Haines and Vining's *Flora of Maine* (V.F. Thomas Press, 1998); where older works refer to a plant by another name, it is given under "Synonyms". The Natural Areas Program, within the Department of Conservation, maintains the most comprehensive source of information on Maine's rare or endangered plants and rare or exemplary natural communities, and is a member of the Association for Biodiversity Information.

If you know of locations for this plant or would like more information on this species, please contact the Natural Areas Program
State House Station 93, Augusta, Maine 04333; telephone (207) 287-8044.



Rare and Exemplary Botanical Features in the Project Vicinity

Documented within a four-mile radius of the Proposed Potential Transmission Line Corridors, , Project #195600518, Chester to Oakfield, Maine.

| Feature Name | Global Rank | State Rank | State Status | EO Number | Last Seen | Habitat |
|-----------------------------------|-------------|------------|--------------|-----------|------------|--|
| Maple - basswood - ash forest | GNR | S3 | | 38 | 2004-06-24 | Hardwood to mixed forest (forest, upland) |
| Beech - birch - maple forest | G3G5 | S4 | | 49 | 2004-06-09 | Hardwood to mixed forest (forest, upland) |
| Carex oronensis | G3 | S3 | T | 59 | 1996-07-10 | Old field/roadside (non-forested, wetland or upland) |
| Valeriana uliginosa | G4Q | S2 | SC | 28 | 1988-06-28 | Open wetland, not coastal nor rivershore (non-forested, wetland) |
| Cypripedium reginae | G4 | S3 | T | 70 | 1988-06-28 | Forested wetland |
| Carex gynocrates | G5 | S2 | SC | 16 | 1988-06-28 | Forested wetland |
| Northern white cedar woodland fen | GNR | S4 | | 12 | 2006-09-12 | Forested wetland |
| Sheep laurel dwarf shrub bog | G5 | S4 | | 43 | 2006-07-13 | Open wetland, not coastal nor rivershore (non-forested, wetland) |
| Silver maple floodplain forest | GNR | S3 | | 30 | 2006-07-18 | Forested wetland |
| Hemlock forest | G4G5 | S4 | | 26 | 2006-06-21 | Conifer forest (forest, upland) |
| Cypripedium reginae | G4 | S3 | T | 71 | 2006-08-23 | Open wetland, not coastal nor rivershore (non-forested, wetland) |
| Cypripedium reginae | G4 | S3 | T | 72 | 2006-08-24 | Forested wetland |
| Leatherleaf boggy fen | G5 | S4 | | 18 | 2006-09-07 | Open wetland, not coastal nor rivershore (non-forested, wetland) |
| Unpatterned fen ecosystem | GNR | S4 | | 59 | 2007-08-15 | Forested wetland |
| Northern white cedar swamp | GNR | S4 | | 20 | 2007-09-19 | Forested wetland |
| Hypericum ascyron | G4 | S1 | E | 2 | 2007-07-26 | Forested wetland |
| Northern white cedar woodland fen | GNR | S4 | | 15 | 2007-06-14 | Forested wetland |

Rare and Exemplary Botanical Features in the Project Vicinity

Documented within a four-mile radius of the Proposed Potential Transmission Line Corridors, , Project #195600518, Chester to Oakfield, Maine.

| Feature Name | Global Rank | State Rank | State Status | EO Number | Last Seen | Habitat |
|--------------------------------|-------------|------------|--------------|-----------|------------|--|
| Unpatterned fen ecosystem | GNR | S4 | | 64 | 2007-07-25 | Open wetland, not coastal nor rivershore (non-forested, wetland) |
| Unpatterned fen ecosystem | GNR | S4 | | 65 | 2007-09-26 | Forested wetland |
| Northern white cedar swamp | GNR | S4 | | 22 | 2007-09-26 | Forested wetland |
| Leatherleaf boggy fen | G5 | S4 | | 20 | 2007-09-26 | Open wetland, not coastal nor rivershore (non-forested, wetland) |
| Silver maple floodplain forest | GNR | S3 | | 32 | 2007-09-18 | Forested wetland |
| Cypripedium reginae | G4 | S3 | T | 75 | 2008-07-02 | Open wetland, not coastal nor rivershore (non-forested, wetland) |
| Valeriana uliginosa | G4Q | S2 | SC | 29 | 2008-07-02 | Open wetland, not coastal nor rivershore (non-forested, wetland) |
| Lonicera oblongifolia | G4 | S3 | SC | 44 | 2008-07-02 | Forested wetland |
| Carex gynocrates | G5 | S2 | SC | 19 | 2008-07-02 | Forested wetland |
| Dryopteris goldiana | G4 | S2 | SC | 27 | 2008-09-02 | Hardwood to mixed forest (forest, upland) |
| Carex oronensis | G3 | S3 | T | 53 | 2007-06-22 | Old field/roadside (non-forested, wetland or upland) |

Rare and Exemplary Botanical Features in the Project Vicinity

Documented within a four-mile radius of the Proposed Potential Transmission Line Corridors, , Project #195600518, Chester to Oakfield, Maine.

| Feature Name | Global Rank | State Rank | State Status | EO Number | Last Seen | Habitat |
|--|-------------|------------|--------------|-----------|------------|--|
| Red oak - northern hardwoods - white pine forest | GNR | S4 | | 12 | 1986-11-08 | Hardwood to mixed forest (forest, upland) |
| Red oak - northern hardwoods - white pine forest | GNR | S4 | | 13 | 2003-06-04 | Hardwood to mixed forest (forest, upland) |
| Mixed graminoid - shrub marsh | GNR | S5 | | 8 | 1985-07-17 | Open wetland, not coastal nor rivershore (non-forested, wetland) |
| Ranunculus gmelinii var. purshii | G5T5 | S2 | T | 2 | 2003-09-02 | Open water (non-forested, wetland) |
| Carex oronensis | G3 | S3 | T | 18 | 2006-06-22 | Old field/roadside (non-forested, wetland or upland) |
| Carex oronensis | G3 | S3 | T | 21 | 1987-07-13 | Old field/roadside (non-forested, wetland or upland) |
| Carex oronensis | G3 | S3 | T | 22 | 1987-07-13 | Old field/roadside (non-forested, wetland or upland) |
| Carex oronensis | G3 | S3 | T | 23 | 2006-06-22 | Old field/roadside (non-forested, wetland or upland) |
| Carex oronensis | G3 | S3 | T | 24 | 1998-07-10 | Old field/roadside (non-forested, wetland or upland) |
| Carex oronensis | G3 | S3 | T | 32 | 2006-06-20 | Old field/roadside (non-forested, wetland or upland) |
| Carex oronensis | G3 | S3 | T | 55 | 1993-07-24 | Old field/roadside (non-forested, wetland or upland) |
| Panax quinquefolius | G3G4 | S3 | E | 31 | 1999-07-15 | Hardwood to mixed forest (forest, upland) |
| Ranunculus gmelinii var. purshii | G5T5 | S2 | T | 9 | 1991 | Open water (non-forested, wetland) |
| Juncus subtilis | G4 | S1 | T | 2 | 1901-09-25 | Open wetland, not coastal nor rivershore (non-forested, wetland) |
| Platanthera flava var. herbiola | G4T4Q | S2 | SC | 7 | 1916-07-11 | Non-tidal rivershore (non-forested, seasonally wet) |
| Trichophorum clintonii | G4 | S3 | SC | 6 | 1916-07-10 | Non-tidal rivershore (non-forested, seasonally wet) |

Rare and Exemplary Botanical Features in the Project Vicinity

Documented within a four-mile radius of the Proposed Potential Transmission Line Corridors, , Project #195600518, Chester to Oakfield, Maine.

| Feature Name | Global Rank | State Rank | State Status | EO Number | Last Seen | Habitat |
|------------------------------|-------------|------------|--------------|-----------|------------|--|
| Carex oronensis | G3 | S3 | T | 66 | 1916-07-10 | Old field/roadside (non-forested, wetland or upland) |
| Carex praticola | G5 | SX | PE | 1 | 1898-06-09 | Hardwood to mixed forest (forest, upland) |
| Valeriana uliginosa | G4Q | S2 | SC | 15 | 1896-07 | Open wetland, not coastal nor rivershore (non-forested, wetland) |
| Hypericum ascyron | G4 | S1 | E | 1 | 1951-08-05 | Forested wetland |
| Carex oronensis | G3 | S3 | T | 3 | 1916-07-10 | Old field/roadside (non-forested, wetland or upland) |
| Viola novae-angliae | G4Q | S2 | SC | 13 | 1916-07-10 | Non-tidal rivershore (non-forested, seasonally wet) |
| Sedge - leatherleaf fen lawn | G4G5 | S4 | | 3 | 2006-06-13 | Open wetland, not coastal nor rivershore (non-forested, wetland) |
| Eccentric bog ecosystem | GNR | S3 | | 7 | 1987-08-14 | Forested wetland |
| Eccentric bog ecosystem | GNR | S3 | | 8 | 1987-08-13 | Open wetland, not coastal nor rivershore (non-forested, wetland) |
| Eccentric bog ecosystem | GNR | S3 | | 9 | 2007-06-14 | Forested wetland |
| Eccentric bog ecosystem | GNR | S3 | | 10 | 1987-08-07 | Open wetland, not coastal nor rivershore (non-forested, wetland) |
| Eccentric bog ecosystem | GNR | S3 | | 12 | 2007-08-16 | Open wetland, not coastal nor rivershore (non-forested, wetland) |
| Eccentric bog ecosystem | GNR | S3 | | 16 | 2006-07-11 | Forested wetland |
| Carex adusta | G5 | S2 | E | 19 | 1997-08-25 | Rocky coastal (non-forested, upland) |
| Valeriana uliginosa | G4Q | S2 | SC | 13 | 1909-06-09 | Open wetland, not coastal nor rivershore (non-forested, wetland) |
| Cardamine maxima | G5 | S1 | SC | 2 | 2003-06-04 | |
| Hemlock forest | G4G5 | S4 | | 21 | 2003-06-05 | Conifer forest (forest, upland) |

STATE RARITY RANKS

- S1** Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.
- S2** Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
- S3** Rare in Maine (20-100 occurrences).
- S4** Apparently secure in Maine.
- S5** Demonstrably secure in Maine.
- SU** Under consideration for assigning rarity status; more information needed on threats or distribution.
- S#?** Current occurrence data suggests assigned rank, but lack of survey effort along with amount of potential habitat create uncertainty (e.g. S3?).

Note: **State Rarity Ranks** are determined by the Maine Natural Areas Program.

GLOBAL RARITY RANKS

- G1** Critically imperiled globally because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extinction.
- G2** Globally imperiled because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
- G3** Globally rare (20-100 occurrences).
- G4** Apparently secure globally.
- G5** Demonstrably secure globally.
- GNR** Not yet ranked.

Note: **Global Ranks** are determined by NatureServe.

STATE LEGAL STATUS

Note: State legal status is according to 5 M.R.S.A. § 13076-13079, which mandates the Department of Conservation to produce and biennially update the official list of Maine's **Endangered** and **Threatened** plants. The list is derived by a technical advisory committee of botanists who use data in the Natural Areas Program's database to recommend status changes to the Department of Conservation.

- E** ENDANGERED; Rare and in danger of being lost from the state in the foreseeable future; or federally listed as Endangered.
- T** THREATENED; Rare and, with further decline, could become endangered; or federally listed as Threatened.

NON-LEGAL STATUS

- SC** SPECIAL CONCERN; Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.
- PE** Potentially Extirpated; Species has not been documented in Maine in past 20 years or loss of last known occurrence has been documented.

ELEMENT OCCURRENCE RANKS - EO RANKS

Element Occurrence ranks are used to describe the quality of a rare plant population or natural community based on three factors:

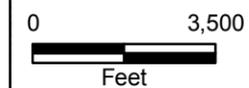
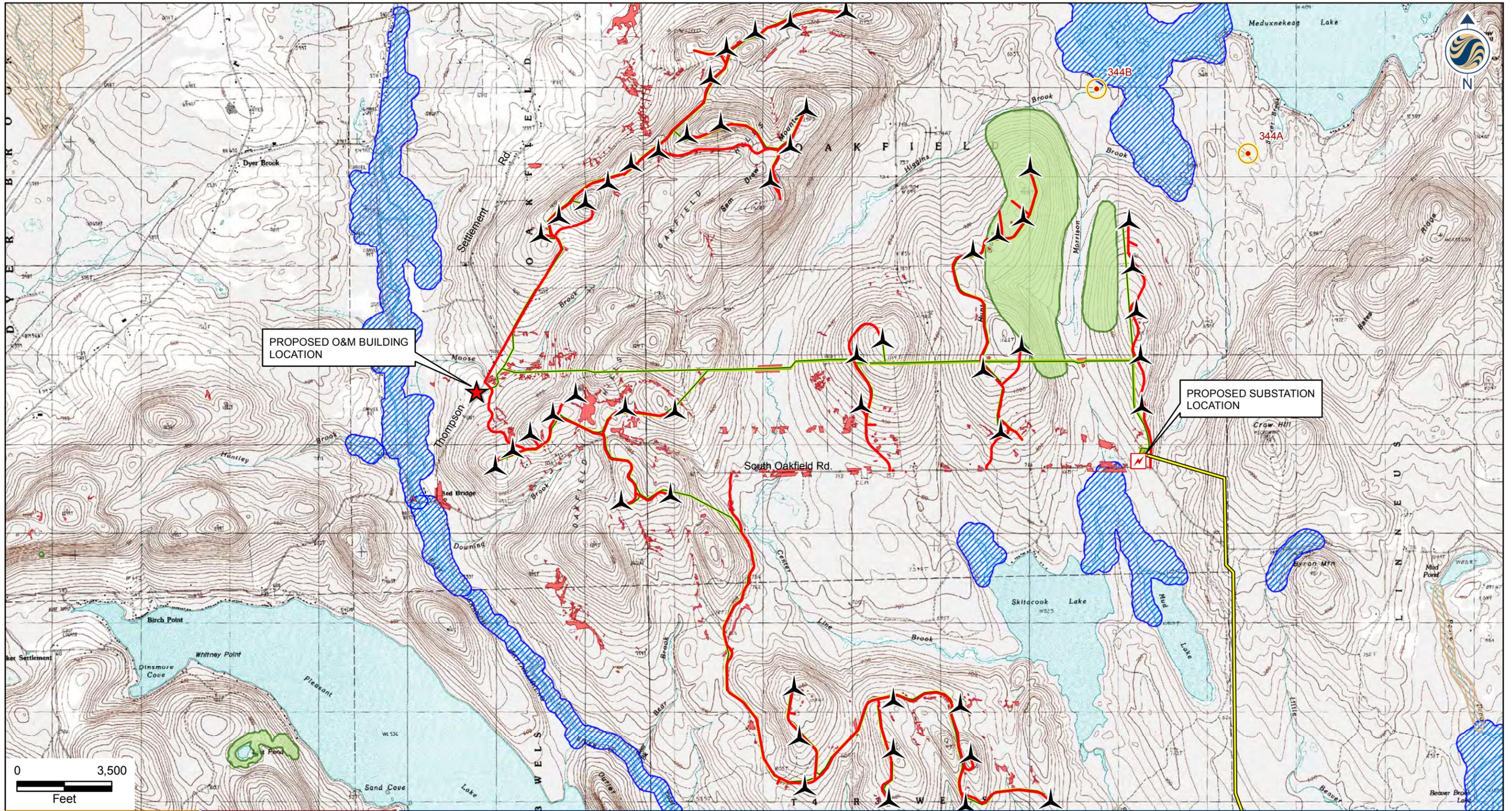
- **Size:** Size of community or population relative to other known examples in Maine. Community or population's viability, capability to maintain itself.
- **Condition:** For communities, condition includes presence of representative species, maturity of species, and evidence of human-caused disturbance. For plants, factors include species vigor and evidence of human-caused disturbance.
- **Landscape context:** Land uses and/or condition of natural communities surrounding the observed area. Ability of the observed community or population to be protected from effects of adjacent land uses.

These three factors are combined into an overall ranking of the feature of **A, B, C, or D**, where **A** indicates an excellent example of the community or population and **D** indicates a poor example of the community or population. The Maine Natural Areas Program tracks all occurrences of rare (S1-S3) plants and natural communities as well as A and B ranked common (S4-S5) natural communities.

Note: **Element Occurrence Ranks** are determined by the Maine Natural Areas Program.

Visit our website for more information on rare, threatened, and endangered species!
<http://www.maine.gov/doc/nrimc/mnap>

Appendix 9-3



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Legend

- Proposed Turbine (Vestas 50)
- Proposed 115kv Transmission Corridor
- Proposed Collector Corridor
- Proposed Access Roads
- Bald Eagle Nest
- Maine Natural Area Program Rare Exemplary Natural Community
- Deer Wintering Area (DWA)
- Inland Wading Bird and Waterfowl Habitat (IWWH)
- Delineated Wetlands

Notes

Data Sources:
 Maine Office of GIS
 Maine Natural Areas Program
 Maine Inland Fisheries and Wildlife
 LURC

Client/Project
 Evergreen Wind Power II, LLC
 Oakfield Wind Project Amendment
 Oakfield, Maine

Figure No.
 1

Title
**Summit Development Area
 Essential Habitat Map**
 May 2011