



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

JOHN ELIAS BALDACCI
GOVERNOR

PATRICK K. MCGOWAN
COMMISSIONER

September 27, 2006

Dana Valleau
E-Pro Consulting
249 Western Ave
Augusta, ME 04330

Dear Mr. Valleau,

On Thursday September 11, 2006 as per your request I visited the site for the proposed wind power generation facility on Kibby Range and Kibby Mountain in Skinner Twp, Maine. Also along for the survey were both you (Dana Valleau) and Arthur Gilman. The purpose of the site visit was to determine if the proposed location of the wind power generation facility will jeopardize an occurrence of a Fir- Heart-leaved Birch Subalpine Forest Community as well as occurrences of two rare plant species, Auricled twayblade (*Listera auriculata*) on the Dead River and Boreal Bedstraw (*Galium kamtschaticum*) on Kibby Range.

We hiked the southern ridge of Kibby Mountain into an area that falls within the mapped polygon of the Fir- Heart-leaved Birch Subalpine Forest Community. Observations that were made included 1) that the area had historically received a heavy harvest and that current tree density and size reflected to some degree the growth response following the historic harvest, 2) the trees within the southern most portion of the mapped polygon were considerably larger (40-50 feet tall) than what is characteristic of a Fir- Heart-leaved Birch Subalpine Forest Community, and 3) further upslope (northward) on the ridge, the vegetation was characteristic of the mapped subalpine community. Conclusions from the survey of this area at Kibby Mountain are that the Maine Natural Areas Program will modify the polygon of this community to better reflect where the community occurs on the mountain and that the proposed entry into the southern most end of the community to construct and maintain proposed wind power facilities will result in only a minor impact to the subalpine community. If no other facilities are constructed on Kibby Mountain than what is currently proposed, the Subalpine Forest Community should continue function as a viable community for the foreseeable future.

We also hiked sections of Kibby Range, a mountain area where the rare plant Boreal Bedstraw has been documented. We looked at two areas where the proposed access road would likely impact occurrences of the Boreal bedstraw. Options for moving the road away from the plants were discussed. Of interest during the hike was that we encountered the Boreal Bedstraw in four additional locations, all of which were outside of the project area. After observing the species in these other locations, it became apparent that the construction of the access road on Kibby Range would only impact a small amount of the species habitat on the mountain. The



Maine Natural Areas Program suggests that to insure the accuracy of this conclusion, some additional survey work be done to document that the Boreal bedstraw is in fact more wide spread at the site than current data demonstrates.

A third site that was visited was the shore of the Dead River at the location where the proposed transmission line is to cross. A population of the Auricled twayblade has been documented here and some of the plants were still identifiable at the time of the visit. At this site the Auricled twayblade occurs in sandy soil on the riverbank generally within 10-15 feet of the river. Balsam fir and red maple trees also occur along the river bank and the adjacent narrow floodplain terrace. Arthur Gilman indicated that during his botanical survey of the area he had also observed Auricled twayblade plants spread over a long distance downstream of the crossing site. That information, along with the fact that Auricle twayblade has been previously documented by other surveyors at several areas up and down the Dead River suggests that the potential impact from the transmission line will not cause a significant impact to this species existence along the Dead River. We also note that the transmission line may not be incompatible with the species at this site as it will be well above the river, and that the alder and other shrubs will remain along the river bank. Removal of larger balsam firs and red maples from the site should be done when the ground is frozen and no machinery should operate along the river bank within 10 - 15 feet of the river.

Please let me know if there are any questions regarding the summary of this site visit. An invoice for \$675.00 (13.0 hrs.) for the work completed will be forwarded to your office in a separate mailing.

Sincerely,



Donald S. Cameron, Botanist/Ecologist
Maine Natural Areas Program
Department of Conservation
#93 State House Station
Augusta, ME 04333-0093
(#207-287-8041/don.s.cameron@state.me.us)



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JOHN ELIAS BALDACCI
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PATRICK K. MCGOWAN
COMMISSIONER

May 12, 2006

Dana Valteau
TRC
249 Western Ave.
Augusta, ME 04330

Re: Rare and exemplary botanical features, Kibby Wind Power Project.

Dear Mr. Valteau:

I have searched the Natural Areas Program's digital, manual and map files in response to your request of May 5, 2006 for information on the presence of rare or unique botanical features documented from the vicinity of the project site in the minor civil divisions of Kibby Township, Skinner Township, Jim Pond Township, Eustis, Coplin Township, Wyman Township, Carrabassett Valley, Highland Plantation, Pleasant Ridge Plantation, Concord, and Moscow, Maine. Rare and unique botanical features include the habitat of rare, threatened or endangered plant species and unique or exemplary natural communities. Our review involves examining maps, manual and computerized records, other sources of information such as scientific articles or published references, and the personal knowledge of staff or cooperating experts.

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

According to our information, many rare plants and natural communities of statewide ecological importance are located within the proposed boundary of the project (see enclosed map, shapefile and rare plant and natural community fact sheets).

The table below provides information on the exemplary features of statewide ecological importance in terms of state rank and element occurrence rank (see attached explanation of ranks). The element occurrence rank is a system used to rank the overall quality (i.e. condition, landscape context and size) of a natural community or rare plant occurrence.



Town or Minor Civil Division	Scientific Name	Common Name	State Rarity Rank	Global Rarity Rank	Element Occurrence Rank
Dead River Twp	Acidic cliff – gorge	Acidic Cliff	S4	-	E- Extant
Wyman Twp	Carex adusta	Swarthy Sedge	S2	G5	C- Fair
Dead River Twp	Dryopteris fragrans	Fragrant Cliff Wood-fern	S3	G5	-
Skinner & Kibby Twp	Fir-heart-leaved birch subalpine forest	Subalpine Fir Forest	S3	-	B- Good
Kibby Twp	Galium kamtschaticum	Boreal Bedstraw	S2	G5	E – Extant
Kibby Twp	Galium kamtschaticum	Boreal Bedstraw	S2	G5	E – Extant
Kibby Twp	Galium kamtschaticum	Boreal Bedstraw	S2	G5	E – Extant
Kibby Twp	Galium kamtschaticum	Boreal Bedstraw	S2	G5	AB- Excellent or good
Skinner Twp	Galium kamtschaticum	Boreal Bedstraw	S2	G5	A- Excellent
Skinner Twp	Galium kamtschaticum	Boreal Bedstraw	S2	G5	A- Excellent
Kibby Twp	Galium kamtschaticum	Boreal Bedstraw	S2	G5	E- Extant
Kibby Twp	Goodyera oblongifolia	Giant Rattlesnake-plantain	S2	G5?	C- Fair
Concord Twp	Houstonia longifolia var. longifolia	Long-leaved Bluet	S2S3	G4G5 TNR	AB- Excellent or good
Kibby Twp	Listera auriculata	Auricled Twayblade	S2	G3G4	C- Fair
Jim Pond Twp	Listera auriculata	Auricled Twayblade	S2	G3G4	A- Excellent
Wyman Twp	Mixed graminoid-shrub marsh	Grassy Shrub Marsh	S5	-	E- Extant
Wyman Twp	Mixed tall sedge fen	Tall Sedge Fen	S4	G4G5	AB- Excellent
Kibby Twp	Pyrola minor	Lesser Wintergreen	S2	G5	E- Extant
Kibby Twp	Pyrola minor	Lesser Wintergreen	S2	G5	E- Extant
Skinner Twp	Pyrola minor	Lesser Wintergreen	S2	G5	C- Fair
Kibby Twp	Pyrola minor	Lesser Wintergreen	S2	G5	A- Excellent
Carrabassett Valley	Spruce- northern hardwoods forest	Spruce- Northern Hardwoods Forest	S4	-	B- Good

If you would like more information on these rare plants and natural communities, or would like to schedule a field visit to this area, please contact MNAP ecologist Don Cameron at 287-8041.

Due to the rarity of these plants and natural communities and because high elevation habitats are extremely slow to recover from soil and vegetation disturbances, the Maine Natural Areas Program recommends that every effort be made to minimize impacts to these documented occurrences:

1. Disturbance Minimization: Inadvertent impacts to soil and vegetation should be avoided. This will be best accomplished by setting out strict no disturbance zones adjacent to the construction zones. These no disturbance zones should be clearly marked.
2. Off-site Disposal: Construction debris and cleared vegetation should be disposed of off site.
3. Restoration Plan: A restoration plan should be developed that addresses how the site will be rehabilitated at the time the facility is decommissioned or if the project is terminated before completion.
4. Access Plan: A plan to prevent access to the site by unauthorized motorized vehicles such as ATV's and four-wheel drive trucks should be required. The irresponsible use of off-road vehicles in sensitive habitats such as high elevation terrain can lead to long lasting environmental damage. As part of this plan, gates should be erected on access roads from the outset of the project and any temporary roads needed for construction should be reclaimed as soon as they are no longer needed.
5. Erosion Control: Erosion is a chronic problem on steeply sloped mountain roads. Controls need to be in place to prevent erosion from runoff from roads and other unvegetated areas.
6. Access Roads: As the site is part of a large unfragmented area of plant and animal habitat, wherever possible access roads and power lines should follow existing routes to prevent additional fragmentation.

If someone is hired to conduct a field survey of the project area, 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 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.

This finding is available and appropriate for preparation and review of environmental assessments, but it is not a substitute for on-site surveys. Comprehensive field surveys do not exist for all 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 \$150.00 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,



Raquel D. Ross, Information Manager
93 State House Station
Augusta, ME 04333-0093
207-287-8046
raquel.ross@maine.gov

Enclosures

Sparse vegetation on steep outcrops or cliffs of granitic or other acidic rock. Marginal wood fern and rock polypody are characteristic ferns; fragrant wood fern can be found on cooler sites. Rock tripe lichens may form extensive patches. This type is common, in small areas, but not well documented.



Characteristic Species

Canopy

Sapling/shrub

Dwarf Shrub

Herb

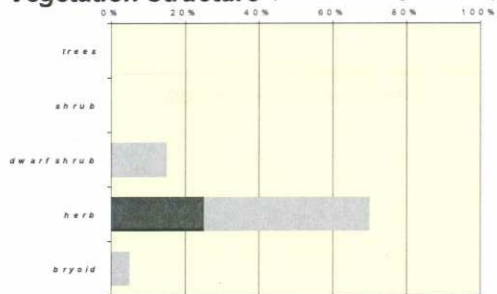
- Brownish sedge (F)
- Common hairgrass (F)
- Marginal woodfern (F)
- Rand's goldenrod (F)
- Rock polypody (F)

Bryoid

- Rocktripe lichen (F)

(4 samples)
Nearly vertical to vertical outcrops of non-calcareous, resistant rocks. Mostly dry, with large unvegetated areas; a moist microclimate is maintained over local areas by runoff from higher elevations, or, in gorges, by the flowing streamwater. Low to moderate elevations, below treeline.

Vegetation Structure (total cover by stratum)



Associated Rare Plants

Fragrant woodfern

Diagnostics

Sparsely vegetated cliffs below treeline, without circumneutral indicator species.

Similar Types

Boreal Circumneutral Outcrops have circumneutral indicator species such as shrubby cinquefoil or certain uncommon herbs. Three-toothed Cinquefoil - Blueberry Low Summit Balds are on summits, not cliffs, and usually have heath shrubs mixed with the herbs.

VCU2

Acidic Cliff - Gorge
Acidic Cliff

Distribution

Essentially statewide except for extreme southern Maine, more common northward. Links to types outside of Maine are needed for a more complete distribution picture.

Landscape Pattern: Small Patch

State Rank S4

Where to see it (examples on conservation lands)

Deboullie Ponds Public Lands

Dunn Falls, Appalachian Trail

Grindstone Falls

Mount Kineo Public Lands

Tunk Mountain, Donnell Pond Public Lands

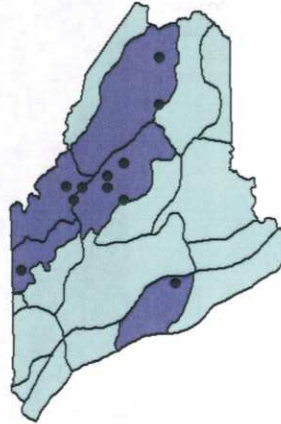
Aroostook Co.

Oxford Co.

Penobscot Co.

Piscataquis Co.

Hancock Co.



Conservation, Wildlife, and Management Considerations

Many sites are relatively inaccessible and minimally affected by either forestry or recreational activities. Several are within public lands or conservation ownership.

Common ravens, peregrine falcons, and golden eagles may nest on cliffs in western, northern and coastal Maine.

Cross-references to Other Classifications

SAF Type(s)

New Hampshire

Cliff seep

S3S4

National Vegetation Classification

(Type, Global Rank)

CEGL006528 Polyodium virginianum Cliff Sparse Vegetation
[Provisional]

G?

Literature References

FCU5

Fir - Heart-leaved Birch Subalpine Forest

Subalpine Fir Forest

Balsam fir, or mixtures of fir and heart-leaved birch, form a dense canopy of somewhat stunted trees. Patches of heart-leaved birch and mountain ash are common where wind, fire, or landslides have created openings, along with a dense shrub layer of mountain ash, hobblebush, and regenerating fir. Herbs may be sparse, or may form locally dense patches in openings: wood ferns and big-leaved aster in particular tend to be patchy. In some expressions of this type that have developed after fire, the canopy consists almost entirely of paper birch or heart-leaved birch. Fir waves, an unusual landscape pattern of linear bands of fir dieback and regeneration, are another variant of this community.



(18 samples)

Montane, commonly found above 2700' on level ridgetops and steep, stony, upper slopes. The mineral soil layer is thin, typically 10-30 cm, and rocky. Natural disturbances such as landslides, wind and fire can exert lasting influences on community dynamics. Recurrent landslides can keep some areas in birch - mountain ash dominance.

Characteristic Species

Canopy	
Balsam fir	(F,C)
Heart-leaved paper birch	(F)
Red spruce	(F)
Paper birch	(C)

Sapling/shrub	
Balsam fir	(F,C)
Mountain ash	(F,C)
Wild-raisin	(F)
Black spruce	(C)
Heart-leaved paper birch	(C)

Dwarf Shrub

Herb	
Spinulose wood fern	(F,C)
Bluebead lily	(F)
Northern wood-sorrel	(F)
Starflower	(F)
Balsam fir	(C)
Big-leaved aster	(C)
Mountain woodfern	(C)

Bryoid	
Common broom-moss	(F)
Three-lobed bazzania	(F)

Vegetation Structure (total cover by stratum)



Associated Rare Plants

Northern comandra

Diagnostics

Dominance of fir or heart-leaved birch (occasionally paper birch) in a subalpine setting.

Similar Types

One form of the Maritime Spruce - Fir Forest type is compositionally very similar but occurs at sea level in the extreme environment of the far Downeast coast. Decreasing in elevation, this type can grade into Spruce - Fir - Wood-sorrel - Feather-moss Forest or Spruce - Fir - Broom-moss Forest, which are distinguished by their higher proportion of spruce in the canopy and by less stunted trees.

FCU5

Fir - Heart-leaved Birch Subalpine Forest

Subalpine Fir Forest

Distribution

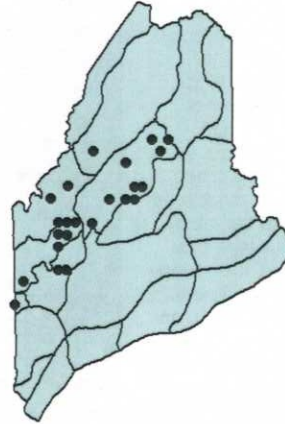
Western and central Maine westward (New England - Adirondack Province).

State Rank S3

Landscape Pattern: Large Patch

Where to see it (examples on conservation lands)

Mahoosuc Mountain, Mahoosuc Public Lands	Oxford Co.
Baldpate Mountain, Grafton Notch State Park	Oxford Co.
East Royce Mountain, White Mountain National Fo	Oxford Co.
Baxter State Park	Piscataquis Co.
Columbus Mountain, Appalachian Trail	Piscataquis Co.
Big Squaw Mountain Public Lands	Piscataquis Co.
Sugarloaf Mountain, Appalachian Trail	Franklin Co.
Crocker Mountain, Appalachian Trail	Franklin Co.
Bigelow Preserve Public Lands	Somerset Co.



Conservation, Wildlife, and Management Considerations

Although subalpine forests are naturally dynamic as they cycle through periods of wind damage and regeneration, they appear to be relatively stable in overall extent, and are extensive on Maine's higher mountains. Market pressures are low due to the generally low timber quality. Many major occurrences are well protected within public lands or private conservation lands. Recreation and windpower generation could locally impact other minor sites, but these uses are unlikely to present a significant threat to the integrity of these forests.

This high-elevation forest community type may be used as nesting habitat by a number of high elevation and/or coniferous forest specialist bird species, such as the spruce grouse, dark-eyed junco, bay-breasted warbler, black-backed woodpecker, white-throated sparrow, and blackpoll warbler. The uncommon Bicknell's thrush inhabits structurally complex forests above 2500 ft. The rock vole and long-tailed shrew both inhabit cool moist crevices in

Cross-references to Other Classifications

SAF Type(s)

5 Balsam fir	ME > SAF
18 Paper birch	?

New Hampshire

High-elevation balsam fir forest	S3S4
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National Vegetation Classification

(Type, Global Rank)

CEGL006112	Abies balsamea - (Betula papyrifera var. cordifolia) Forest	G?
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Literature References

- Foster and Reiners 1983
- Fahey and Reiners 1981
- Moloney 1986
- Sprugel 1976
- Reiners and Lang 1979
- Flaccus 1959

HGF2

Mixed Graminoid - Shrub Marsh
Grassy Shrub Marsh

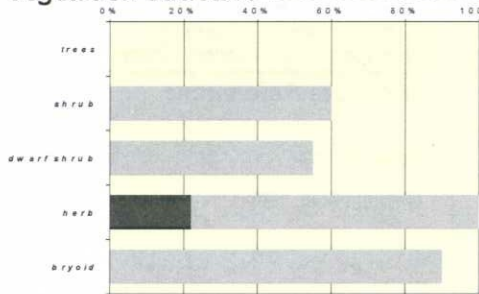
A heterogeneous type in which herbs and shrubs occur in various assemblages and proportions. Many examples are transitional to other open wetland types. A variant in southern Maine has buttonbush as a prominent shrub. The more typical expression is dominated by herbs, with a mixture of graminoids making up at least 50% of the cover, often with a sparse shrub layer containing meadowsweet or hardhack. Bluejoint is frequent, but not in large swards. Any of a variety of graminoids may be prominent at different sites. Three-way sedge and yellow loosestrife are indicators. Bryophytes are generally minor. Type is very broadly defined and could be subdivided into shrub vs. herbaceous types using additional site data and analyses.



(39 samples)

Typically on mineral soils that are flooded early in the growing season and remain saturated (or occasionally flooded) throughout the season. Soil pH is typically in the 5.0 - 6.0 range. Some smaller occurrences function as vernal pools, drying out during the season. Beaver activity often affects these wetlands, and can cause dramatic (although sometimes temporary) changes in dominance.

Vegetation Structure (total cover by stratum)



Associated Rare Plants

- Comb-leaved mermaidweed
- Eastern joe-pye weed
- Eastern mannagrass
- Featherfoil
- Hollow joe-pye weed
- Red-root flatsedge
- Tall beak-rush

Characteristic Species

Canopy

Sapling/shrub

- Meadowsweet (F,C)
- Bog willow (C)
- Buttonbush (C)
- Redosier dogwood (C)
- Speckled alder (C)
- Sweetgale (C)

Dwarf Shrub

- Leatherleaf (C)
- Sweetgale (C)

Herb

- Bluejoint (F,C)
- Yellow loosestrife (F,C)
- Three-way sedge (C,F)
- Beaked sedge (C)
- Black bulrush (C)
- Expanded bulrush (C)
- Few-seeded sedge (C)
- Marsh St. Johnswort (C)

Bryoid

- Sphagnum mosses (C)

Diagnostics

Mixture of herb and shrub wetland species (herbs 25-95%, shrubs 0-70% cover), without dominance of tussock sedge, bluejoint grass, or alder; mineral soil (may have a thin organic layer). Sweetgale and leatherleaf frequent, but usually total <50% cover.

Similar Types

Sweetgale Mixed Shrub Fens are similar, but occur on organic soils and have plants more characteristic of peatlands: rhodora, sheep laurel, Labrador tea, bog rosemary, pitcher plants, and/or bog aster. Those plants may be present in this type, but form <1% cover. Tussock Sedge Meadows and Bluejoint Meadows are strongly dominated by tussock sedge and bluejoint, respectively. Alder Shrub Thickets have >20% cover of alder or alder mixed with gray birch. Three-way Sedge - Goldenrod Outwash Plain Pondshores share diagnostic species but differ in their setting, zonation, and associated species.

HGF2

Mixed Graminoid - Shrub Marsh

Grassy Shrub Marsh

Distribution

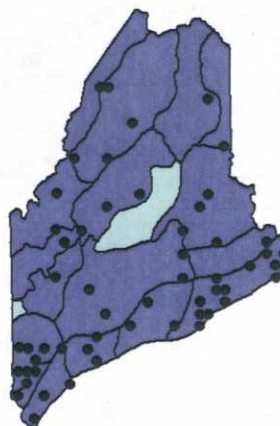
Statewide, extending southward, westward, and into Canada.

State Rank S5

Landscape Pattern: Small Patch

Where to see it (examples on conservation lands)

Mt Agamenticus	York Co.
Narraguagus Wildlife Management Area	Washington Co.
Tunk Lake Area, Donnell Pond Public Lands	Hancock Co.
Downing Bog, Donnell Pond Public Lands	Hancock Co.
Fran Brook, Mount Blue State Park	Franklin Co.
East Branch Pleasant River, Appalachian Trail	Piscataquis Co.
Stratton Brook Pond, Bigelow Preserve	Franklin Co.
Kennebec Crossing, Appalachian Trail	Somerset Co.



Conservation, Wildlife, and Management Considerations

These marshes are well distributed throughout Maine and well represented on public lands and private conservation lands (only a few of which are listed above). Maintaining appropriate wetland buffers can help ensure that adjacent land uses do not degrade the marshes.

Several rare reptiles may be found in this community type. The ribbon snake seeks out prey in these wetlands. In Southern Maine, spotted turtles and Blanding's turtles may overwinter in marshes where water levels remain reliably deep throughout most years. Some occurrences may function as vernal pools, which provide important breeding habitat for a variety of amphibians including wood frogs, spotted salamanders, and blue-spotted salamanders. These

Cross-references to Other Classifications

SAF Type(s)

New Hampshire

Mixed tall graminoid/medium to tall shrub marsh	S4S5
Oxbow marsh	S3
Buttonbush basin swamp	S3
Robust graminoid/medium shrub/Sphagnum marsh	S3S4
Northern basin marsh	S1

National Vegetation Classification

(Type, Global Rank)

CEGL006349	Scirpus cyperinus Seasonally Flooded Herbaceous Vegetation	G?
CEGL003908	Cephalanthus occidentalis Semipermanently Flooded Shrubland [Placeholder]	G?

Literature References

- Sperduto 1994
- Calhoun et al. 1994

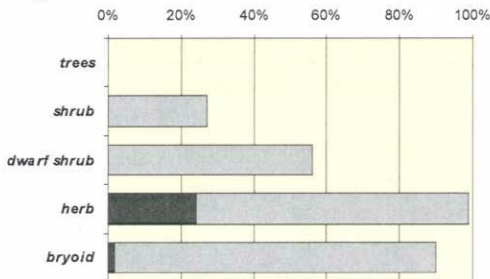
Expanses of tall sedges and grasses on peat, with the silvery hue of slender sedge, typically the dominant species, often visible from a distance. Beaked sedge and lake bank sedge are also characteristic; the ubiquitous bluejoint is often present in small amounts. Tussock sedge may be present in small amounts, not forming dense tussocks. The herb layer is often continuous (75-100%), and whatever shrubs occur are usually below or mixed in with the graminoid canopy, except for an occasional alder or meadowsweet protruding above. Dwarf shrubs are usually <50% cover, and always less abundant than the herbs. The bryoid layer consists entirely of bryophytes and varies from sparse to almost continuous, inverse to the amount of standing water.



(21 samples)

In wetland basins, occurring as part of a peatland or on peaty deposits adjacent to open water, in a minerotrophic setting. Substrate is always saturated, and may be flooded at high water; acidic to circumneutral, pH 4.8-6.8.

Vegetation Structure (total cover by stratum)



Associated Rare Plants

Long's bulrush

Characteristic Species

Canopy

Sapling/shrub

- Meadowsweet (C)
- Speckled alder (C)

Dwarf Shrub

- Large cranberry (C)
- Leatherleaf (C)
- Sweetgale (C)

Herb

- Beaked sedge (F,C)
- Silvery sedge (F,C)
- Slender sedge (F,C)
- Bluejoint (F)
- Tussock sedge (F)
- Inflated sedge (C)
- Three-way sedge (C)
- Yellow loosestrife (C)

Bryoid

- Sphagnum mosses (F,C)

Diagnostics

Peatland vegetation with tall sedges including slender sedge and beaked sedge dominant, grasses such as bluejoint present; often adjacent to open water; sweetgale, leatherleaf, and meadowsweet, if present, are subdominant to the sedges.

Similar Types

Sweetgale Mixed Shrub Fens share many species and can occur in similar settings, but are strongly shrub-dominated rather than herb-dominated. Other graminoid-dominated fen vegetation types feature different, less robust sedges, and usually have a more well developed bryoid layer. Tussock Sedge Meadows can occur in similar settings, but are strongly dominated by tussock sedge. Mixed Graminoid - Shrub Marshes can share some species, but occur on mineral substrates or on a thin organic layer over mineral soil, rather than on peat.

HGS2

Mixed Tall Sedge Fen
Tall Sedge Fen

Distribution

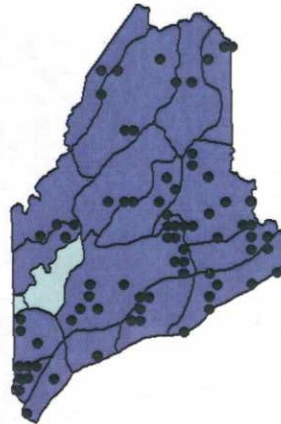
Statewide. Probably extends throughout northern New England and New York, but not well documented; Canadian distribution unknown.

State Rank S4

Landscape Pattern: Small Patch

Where to see it (examples on conservation lands)

Saco Heath Preserve	York Co.
Fourth Machias Lake, Duck Lake Public Lands	Hancock Co.
Jones Pond, Bigelow Preserve	Franklin Co.
Killick Pond Wildlife Management Area	York Co.
Salmon Brook Lake Bog Public Lands	Aroostook Co.



Conservation, Wildlife, and Management Considerations

This community type is well-represented in Maine, and fairly stable in extent, with several examples on public lands and private conservation lands. Impoundment or draining would have negative impacts on hydrology and on vegetation. Slow vegetation growth rates, due to the nutrient-poor environment, result in slow recovery from physical disturbances. Degradation from recreational use is unlikely, because of the unstable substrate; but if disturbance, such as foot traffic, is a necessity, traversing during frozen conditions or using boardwalks can minimize impacts.

In southern Maine, these wetlands may provide habitat for several rare reptiles including ribbon snakes, Blanding's turtles and spotted turtles. Two rare dragonflies, the ringed boghaunter and the ebony boghaunter, are found in this community, especially in very wet locations with abundant inundated sphagnum (often suspended in the water column). The ebony boghaunter is found statewide, but the ringed boghaunter is restricted to the southern part of the

Cross-references to Other Classifications

SAF Type(s)

New Hampshire

Hairy-fruited sedge/sweet gale-large cranberry sedge fen S3

National Vegetation Classification

(Type, Global Rank)

CEGL006302	Chamaedaphne calyculata / (Carex lasiocarpa, Carex utriculata) - Utricularia spp. Shrub Herbaceous Vegetation	G4G5
CEGL002257	Carex rostrata - Carex lacustris - (Carex vesicaria) Herbaceous Vegetation	G4G5

Literature References

- Damman and French 1987
- Anderson and Davis 1997
- Gawler 1998
- Davis and Anderson 2001

Mixed forests in which a mixture of red spruce and yellow birch, or less often another hardwood (sugar maple, red maple, beech), dominates the canopy. Scattered large supercanopy white pine are occasional. Balsam fir and paper birch are common, typically as smaller trees. The sapling/shrub layer may be fairly well developed (20-40%), with striped maple and saplings of canopy species; shrub species vary among sites. The herb layer ranges from sparse to heavy, but is usually >15%, divided between forbs, ferns, and regenerating trees, with dwarf shrubs virtually absent. The bryoid layer is patchy and locally well developed, with bryophytes far more abundant than lichens. As is typical in mesic forests in Maine, three-lobed bazzania is a frequent bryophyte.



(11 samples)

Cool microsites, from near sea level to 2200'. Usually on hillslopes, ranging from lower to upper slopes and from gentle to steep (up to 50%). The soils are typically well-drained, sometimes somewhat excessively drained, sandy to loamy in texture, with pH of 5.0 - 5.4.

Characteristic Species

Canopy

- Red spruce (F,C)
- Yellow birch (F,C)
- Balsam fir (F)
- White pine (C)

Sapling/shrub

- Balsam fir (F,C)
- Red spruce (F,C)
- Striped maple (F,C)
- American beech (C)
- Hobblebush (C)
- Mountain maple (C)
- Red maple (C)

Dwarf Shrub

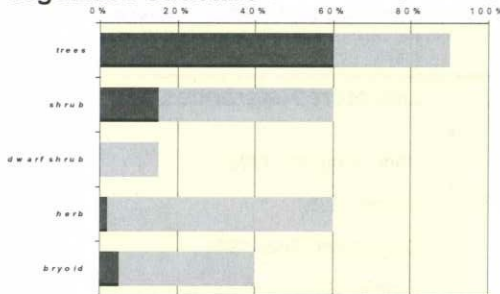
Herb

- Spinulose wood fern (F,C)
- Northern wood-sorrel (F)
- Starflower (F)

Bryoid

- Dicranum moss (F)
- Flat-tufted feather-moss (F)
- Pincushion moss (F)

Vegetation Structure (total cover by stratum)



Associated Rare Plants

- Giant rattlesnake-plantain

Diagnostics

Mixture of red spruce and northern hardwoods (most often yellow birch, but may be sugar maple or beech) in the canopy; conifer and deciduous components > 25% RD each.

Similar Types

Beech - Birch - Maple Forests are more strongly deciduous. Spruce - fir forest types can be similar but have < 25% RD northern hardwood species. All of those types can be contiguous with this type and may intergrade with it.

Distribution

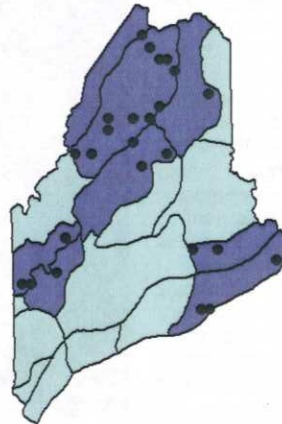
Most characteristic of the New England - Adirondack Province, and extending westward from Maine; found to a lesser extent in the Laurentian Mixed Forest Province.

Landscape Pattern: Matrix

State Rank S4

Where to see it (examples on conservation lands)

- Cranberry Brook, Moosehorn National Wildlife Ref Washington Co.
- Western Mountain, Acadia National Park Hancock Co.
- Black Mountain, Mahoosuc Public Lands Oxford Co.
- Mahoosuc Notch, Mahoosuc Public Lands Oxford Co.
- Nesuntabunt Mountain, Nahmakanta Public Lands Piscataquis Co.
- Big Reed Pond Preserve Piscataquis Co.
- Chamberlain Lake Public Lands Piscataquis Co.



Conservation, Wildlife, and Management Considerations

This type is believed to have been more widespread in presettlement times, with some stands becoming Beech - Birch - Maple Forests as the spruce was selectively harvested.

This type provides nesting habitat for a large number of passerine bird species, including sharp-shinned hawk, cape may warbler, black-throated blue warbler, black-throated green warbler, blackburnian warbler, scarlet tanager, spruce grouse, Swainson's thrush, northern parula, and ovenbird. The globally uncommon hairstreak butterfly uses beech as its larval host plant.

Cross-references to Other Classifications

SAF Type(s)

- 30 Red spruce - yellow birch ME > SAF
- 31 Red spruce - sugar maple - beech ME > SAF

New Hampshire

- Hemlock - spruce - northern hardwoods forest S3S4
- Northern hardwood - spruce - fir forest S4

National Vegetation Classification

(Type, Global Rank)

- CEGL006267 Picea rubens - Betula alleghaniensis / Dryopteris campyloptera Forest G?

Literature References

- Chokkalingham 1998
- Cogbill 1985
- Oosting and Reed 1944
- Lorimer 1977



Maine Department of Conservation
Natural Areas Division

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

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.



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

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:	S1	Critically imperiled in Maine because of extreme rarity or vulnerability to extirpation.
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.

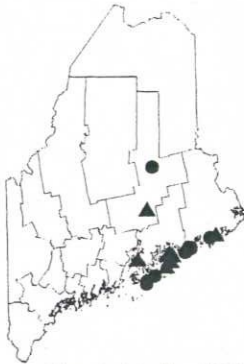
Status of *Carex adusta*

Federal Status:	None	No Federal Status.
State Status*:	Endangered	
Proposed 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

* The current official state status is based on 1988 data.

**Proposed state status based on current (1998) data.

Known Distribution in Maine:



▲ Historical (before 1978)
● Recent (1978 - present)
One symbol may represent multiple occurrences or several towns

This rare plant has been documented from a total of 12 town(s) in the following county(ies): 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)

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.

The information in this fact sheet was downloaded from the Natural Areas Division's Biological and Conservation Database on 04 FEB 1999. 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 Division, 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 Division
State House Station 93, Augusta, Maine 04333; telephone (207) 287-8044.





Maine Department of Conservation
Natural Areas Division

Dryopteris fragrans (L.) Schott

Fragrant Cliff Wood-fern

Habitat: Dry cliffs and rocky banks (often calcareous). [Rocky summits and outcrops (non-forested, upland); Alpine or subalpine (non-forested, upland)]

Range: Circumboreal, south to northern New England and west to Minnesota.

Phenology: Perennial, semi-evergreen; the old fronds remaining attached to the plant long after they are withered and brown.

Family: Polypodiaceae

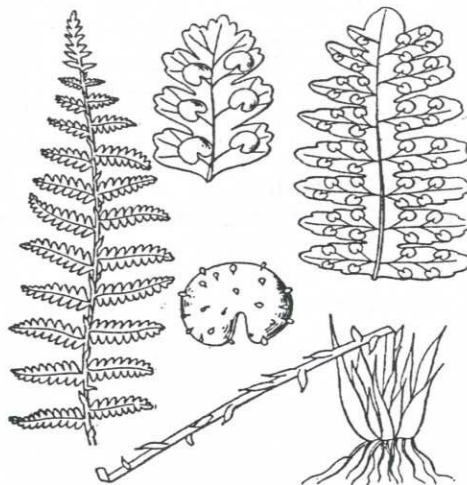


Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: A small, aromatic, evergreen fern usually surrounded by dead fronds at its base. The fronds are 6-25 cm long and 4-5 cm across; the sori on the undersides of the pinnae are brown. The separation between the leaflets on the leaves gives the plant a delicate appearance.

Ecological characteristics: This fern is limited to cool, dry, sometimes shaded cliffs or banks, the rocks sometimes are calcareous or basic, but other times acidic.

Synonyms:

Rarity of *Dryopteris fragrans*

State Rank:	S3	Rare in Maine.
New England Rank:	None	
Global Rank:	G5	Demonstrably widespread, abundant, and secure globally.

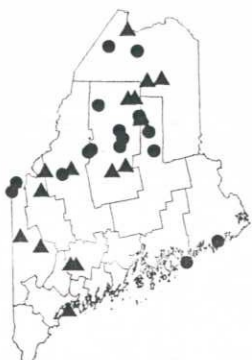
Status of *Dryopteris fragrans*

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

* The current official state status is based on 1988 data.

**Proposed state status based on current (1998) data.

Known Distribution in Maine:



▲ Historical (before 1978)
● Recent (1978 - present)
One symbol may represent multiple occurrences or several towns

This rare plant has been documented from a total of 34 town(s) in the following county(ies): Aroostook, Cumberland, Franklin, Hancock, Kennebec, Oxford, Penobscot, Piscataquis, Somerset, Washington.

Dates of documented observations are: 1885, 1895, 1906, 1916, 1932 (2), 1937, 1943 (3), 1944, 1945, 1946, 1947, 1958, 1959, 1965, 1976, 1981 (2), 1982, 1983, 1984, 1985, 1987, 1988, 1989 (2), 1991, 1992 (2), 1993 (2), 1995

Reason(s) for rarity:

At southern limit of range, habitat naturally scarce.

Conservation considerations:

Known populations are in remote locations, not particularly vulnerable to human activities.

The information in this fact sheet was downloaded from the Natural Areas Division's Biological and Conservation Database on 05 FEB 1999. 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 Division, 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

Galium kamtschaticum Steller ex J.A. & J.H. Schultes

Boreal Bedstraw

- Habitat:** Cool woods, thickets, streamsides.
[Hardwood to mixed forest (forest, upland)]
- Range:** Cape Breton Island, Quebec, northern New England, and northern New York.
- Phenology:** Flowers June - August.
- Family:** Rubiaceae



Aids to Identification: Boreal bedstraw has oval leaves arranged in whorls of four along 4-angled stems. The yellowish-green flowers are all on pedicels 4-12mm long. It is distinguished from other perennials in the bedstraw genus by its 3-nerved, oval leaves and the fact that all of the flowers are borne on a slender pedicel. Closely related bedstraws with wide leaves, such as *Galium circaezans*, have some flowers pedicellate and others sessile.

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

Ecological characteristics: Known to occur in rich woods in Maine.

Synonyms:

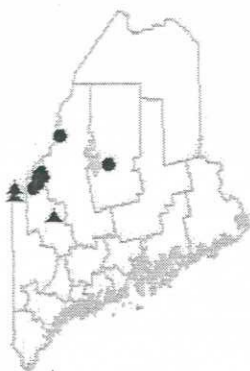
Rarity of *Galium kamtschaticum*

State Rank:	S2	Imperiled in Maine because of rarity of 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 *Galium kamtschaticum*

Federal Status:	None	No Federal Status.
State Status:	Special Concern	
Proposed State Status:	Threatened	Rare and with further decline could become endangered.

Known Distribution in Maine:



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

This rare plant has been documented from a total of 8 town(s) in the following county(ies): Franklin, Oxford, Piscataquis, Somerset

Dates of documented observations are: 1962, 1974 (2), 1999 (4), 2000 (4), 2001, 2002

Reason(s) for rarity:

At southern limit of range.

Conservation considerations:

Logging operations should leave an uncut buffer around the streams where these plants occur near. It is unclear how canopy removal would affect the populations

The information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 04 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

Goodyera oblongifolia Raf.

Giant Rattlesnake-plantain

Habitat: Dry coniferous or mixed woods. [Conifer forest (forest, upland)]

Range: Alaska, British Columbia to southwest Alberta, Saskatchewan, Ontario, Québec to Maine, New Brunswick & Nova Scotia; California, Montana, Arizona, South Dakota; Great Lakes.

Phenology: A perennial, leaves evergreen. Flowers late July - August, fruits mature fall. Fruit stalk and capsule often visible the next summer.

Family: Orchidaceae



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

Aids to Identification: This orchid is closely related to our more common rattlesnake plantains (such as the checkered rattlesnake plantain, *G. tessellata*), and like them, grows from a basal rosette of leaves, sending up a flower stalk on which are borne small, creamy white flowers. It differs from other members of its genus in having the leaves larger (up to 10 cm long) and marked with only a broad whitish stripe up the middle, rather than the reticulated (net-like) leaf patterns of other *Goodyeras*.

Ecological characteristics: *Goodyera oblongifolia* differs from many of Maine's rare plants in that its habitat is not at all unusual, at least in appearance. The plant grows in spruce-fir woods of northern Maine, which in themselves are extensive. However, within this vast belt of ostensibly suitable habitat, the species has seldom been found, perhaps because it is at its southern range limit. Where it does occur, it may form large colonies, spreading by underground rhizomes.

Synonyms: Formerly known as *Goodyera decipiens* (Hook) Piper, *Peramium deciepens* (Hook) Piper.

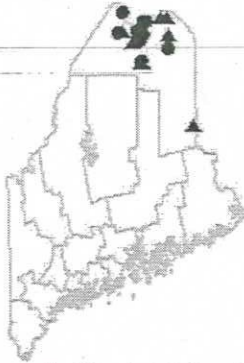
Rarity of *Goodyera oblongifolia*

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 (uncertain).

Status of *Goodyera oblongifolia*

Federal Status:	None	No Federal Status.
State Status:	Endangered	
Proposed 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

Known Distribution in Maine:



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

This rare plant has been documented from a total of 12 town(s) in the following county(ies): Aroostook.

Dates of documented observations are: 1880, 1881, 1893, 1905, 1956, 1976, 1981 (4), 1983 (2), 1991, 1994, 1996, 1999, 2001 (3), 2002 (2)

Reason(s) for rarity:

At southeastern edge of range, more abundant in western US and Canada. Populations are scattered and local in eastern US and Canada.

Conservation considerations:

This plant has been known to disappear from an area following logging. 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. Not known to have been successfully propagated, so any plants offered for sale have almost certainly been collected from the wild.

The information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 07 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

Houstonia longifolia Gaertn.

Long-leaved Bluet

- Habitat:** Slaty ledges or rivershore gravels, not strongly acidic. [Non-tidal rivershore (non-forested, seasonally wet)]
- Range:** Maine to Saskatchewan, south to Georgia, Oklahoma.
- Phenology:** Herbaceous perennial, flowers July - September.
- Family:** Rubiaceae

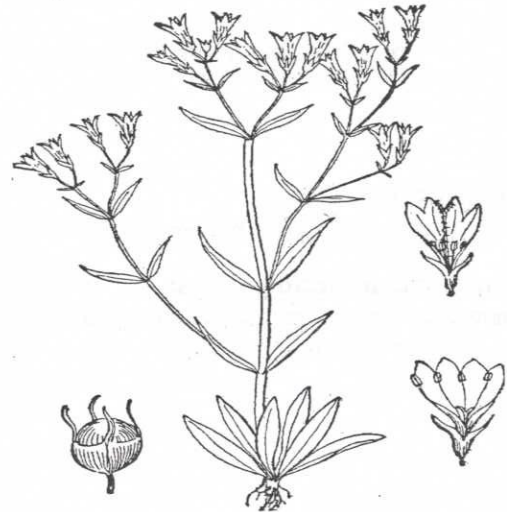


Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: Bluets are small, slender plants with opposite stem leaves, small 4-petaled flowers, and inferior ovaries. The common bluet, *Houstonia caerulea*, found growing on lawns, has flowers that have a yellow center and horizontally spreading corolla lobes. *Houstonia longifolia* has uniform colored white to pale blue flowers and ascending corolla lobes, and occurs in different habitats..

Ecological characteristics: Usually found growing in slight cracks or depressions on rivershore ledges. Maine populations although apparently persistent are not large and the plants tend to be small.

Synonyms: Formerly known as *Hedyotis longifolia*, *Houstonia purpurea* var. *tenuifolia* (Nutt.) Gray.

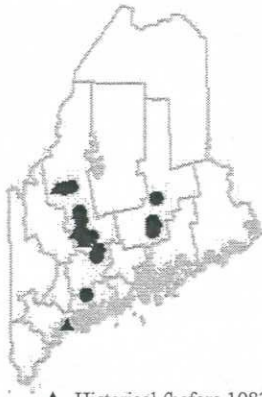
Rarity of *Houstonia longifolia*

- State Rank:** S2 Imperiled in Maine because of rarity or vulnerability to further decline.
- New England Rank:** None
- Global Rank:** G4G5 Species widespread, abundant, and apparently secure globally but possibly with cause for long-term concern.

Status of *Houstonia longifolia*

- 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:



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

This rare plant has been documented from a total of 18 town(s) in the following county(ies): Cumberland, Kennebec, Penobscot, Sagadahoc, Somerset.

Dates of documented observations are: 1885, 18XX, 1906 (2), 1909, 1916, 1979, 1984 (2), 1986 (3), 1987 (3), 1988, 1989, 1990 (2), 1994, 1996 (3), 1997, 2000 (4), 2001, 2002

Reason(s) for rarity:

Habitat naturally scarce, at northern limit of range.

Conservation considerations:

Known populations are small, but the plant seems to persist on the few river ledges where it grows. Heavy recreational use of ledges could pose problems.

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.

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





Listera auriculata Wieg.

Auricled Twayblade

Habitat: Alluvial banks, calcareous silts or crevices, alder-thickets, and swamps. [Non-tidal rivershore (non-forested, seasonally wet); Forested wetland]

Range: Newfoundland and Quebec to New Hampshire and New York; Isle Royale, Michigan.

Phenology: Flowers July - August.

Family: Orchidaceae



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

Aids to Identification: Auricled twayblade grows 10-25 cm tall, with one spike of up to about 20 small, pale green flowers. On the stem, there is a single pair of oppositely arranged leaves, 2-5 cm long, and rounded at the base. This species can be distinguished from the other species of *Listera* (*L. cordata* and *L. convallarioides*) by the glandular hairs present on the axis of the inflorescence, flowers stalks, and ovaries (visible with a 10x hand lens).

Ecological characteristics: In Maine this species is often found growing underneath alders in alluvium of streams and rivers. Populations are typically small and may last only a few years.

Synonyms:

Rarity of *Listera auriculata*

State Rank:	S1	Critically imperiled in Maine because of extreme rarity or vulnerability to extirpation.
New England Rank:	Division 1	Globally rare plant occurring in New England: Only a few occurrences exist within New England.
Global Rank:	G3	Rare or uncommon globally.

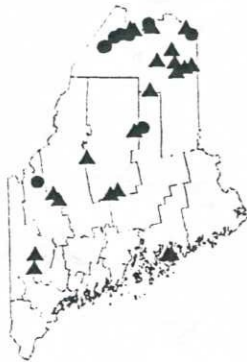
Status of *Listera auriculata*

Federal Status:	None	No Federal Status.
State Status*:	None	No State Status.
Proposed State Status**:	Threatened	Rare and, with further decline, could become endangered; or federally listed as Threatened. Listing criteria met: Few individuals, Special habitat, At edge of range, Vulnerable to human activity

* The current official state status is based on 1988 data.

** Proposed state status based on current (1998) data.

Known Distribution in Maine:



▲ Historical (before 1978)
● Recent (1978 - present)
One symbol may represent multiple occurrences or several towns

This rare plant has been documented from a total of 27 town(s) in the following county(ies): Aroostook, Franklin, Hancock, Oxford, Penobscot, Piscataquis, Somerset.

Dates of documented observations are: 1862, 1887, 1888, 1891, 1893, 1894, 1896, 1897, 1901, 1902 (2), 1908 (2), 1914, 1920 (2), 1927, 1942, 1944, 1946, 1978, 1985 (4), 1986 (2), 1989, 1994, 1997, 19XX

Reason(s) for rarity:

At southern limit of range; habitat naturally scarce.

Conservation considerations:

Known populations are small, and subject to the vagaries of small populations like random fluctuations or localized disturbance events. Populations have been known to be short-lived. Like all orchids, this plant should not be collected or dug. It is not known to have been successfully propagated, and any plants offered for sale have almost certainly been collected from the wild.

The information in this fact sheet was downloaded from the Natural Areas Division's Biological and Conservation Database on 08 FEB 1999. 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 Division, 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

Pyrola minor L.

Lesser Wintergreen

- Habitat:** Moist woods. [Conifer forest (forest, upland)]
- Range:** Circumboreal. South to the higher mountains of New England and northern Michigan.
- Phenology:** Flowers June - August.
- Family:** Ericaceae



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

Aids to Identification: This small wintergreen grows to a height of only 5-15 cm. Like other members of the genus *Pyrola*, this herb has no true stem, but rather a flower stalk upon which grows a raceme of white flowers. Lesser wintergreen can be distinguished from closely related species by two characteristics: the flowers grow on all sides of the stalk, rather than just being one-sided; and the style of each flower is straight and does not protrude beyond the end of the petals. The nearly basal leaves of *P. minor* are round-oblong and 2-4 cm long.

Ecological characteristics: In Maine, this plant is found in cool, moist woods, usually near streams or riverbanks.

Synonyms: Formerly known as *Braxilia minor* and *Pyrola minor* var. *parviflora*.

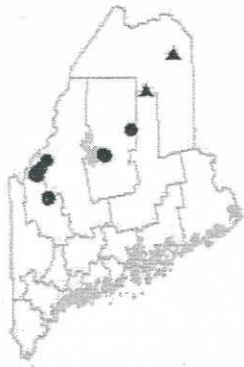
Rarity of *Pyrola minor*

- | | | |
|--------------------------|------|--|
| State Rank: | S2 | Imperiled in Maine because of rarity and vulnerability to further decline. |
| New England Rank: | None | |
| Global Rank: | G5 | Demonstrably widespread, abundant, and secure globally. |

Status of *Pyrola minor*

- | | | |
|-------------------------------|-----------------|---|
| 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:



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

This rare plant has been documented from a total of 7 town(s) in the following county(ies): Aroostook., Franklin, Piscataquis, Somerset

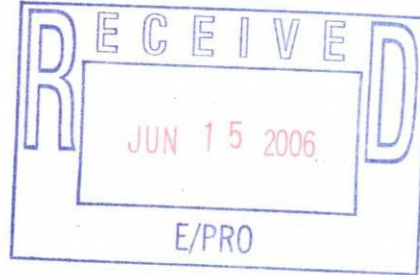
Dates of documented observations are: 1946, 1999 (4), 2000 (2), 2001 (4)

Reason(s) for rarity:

At southern limit of range.

Conservation considerations:

Unknown. Complete canopy removal would more likely harm the populations than would partial canopy removal.



The information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 04 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.



SNAME	SCOMNAME	EO_NUM	GRANK	SRANK	EORANK	MAPS
Pyrola minor	Lesser Wintergreen	4.000000	G5	S2	E - Verified extant (viability not assessed)	Kibby
Pyrola minor	Lesser Wintergreen	5.000000	G5	S2	E - Verified extant (viability not assessed)	Jim Po
Galium kamtschaticum	Boreal Bedstraw	5.000000	G5	S2	E - Verified extant (viability not assessed)	Kibby
Galium kamtschaticum	Boreal Bedstraw	6.000000	G5	S2	E - Verified extant (viability not assessed)	Jim Po
Houstonia longifolia var. longifolia	Long-leaved Bluet	17.000000	G4G5TNR	S2S3	AB - Excellent or good estimated viability	Bingha
Carex adusta	Swarthy Sedge	22.000000	G5	S2	C - Fair estimated viability	Black
Pyrola minor	Lesser Wintergreen	3.000000	G5	S2	C - Fair estimated viability	Kibby
Galium kamtschaticum	Boreal Bedstraw	4.000000	G5	S2	E - Verified extant (viability not assessed)	Kibby
Galium kamtschaticum	Boreal Bedstraw	7.000000	G5	S2	AB - Excellent or good estimated viability	Jim Po
Mixed graminoid - shrub marsh	Grassy Shrub Marsh	14.000000	GNR	S5	E - Verified extant (viability not assessed)	Sugarl
Mixed tall sedge fen	Tall Sedge Fen	12.000000	G4G5	S4	AB - Excellent or good estimated viability	Sugarl
Fir - heart-leaved birch subalpine forest	Subalpine Fir Forest	23.000000	GNR	S3	B - Good estimated viability	Kibby
Galium kamtschaticum	Boreal Bedstraw	10.000000	G5	S2	A - Excellent estimated viability	Kibby
Galium kamtschaticum	Boreal Bedstraw	11.000000	G5	S2	A - Excellent estimated viability	Kibby
Galium kamtschaticum	Boreal Bedstraw	12.000000	G5	S2	E - Verified extant (viability not assessed)	Jim Po
Listera auriculata	Auricled Twayblade	34.000000	G3G4	S2	C - Fair estimated viability	Jim Po
Pyrola minor	Lesser Wintergreen	12.000000	G5	S2	A - Excellent estimated viability	Jim Po
Listera auriculata	Auricled Twayblade	35.000000	G3G4	S2	A - Excellent estimated viability	Jim Po
Spruce - northern hardwoods forest	Spruce - Northern Hardwoods Forest	10.000000	GNR	S4	B - Good estimated viability	Poplar
Goodyera oblongifolia	Giant Rattlesnake-plantain	24.000000	G5?	S2	C - Fair estimated viability	Chain
Dryopteris fragrans	Fragrant Cliff Wood-fern	44.000000	G5	S3		Little B
Acidic cliff - gorge	Acidic Cliff	6.000000	GNR	S4	E - Verified extant (viability not assessed)	Little B

SNAME	SCOMNAME	EO_NUM	GRANK	SRANK	EORANK	MAPS
Pyrola minor	Lesser Wintergreen	4.000000	G5	S2	E - Verified extant (viability not assessed)	Kibby M
Pyrola minor	Lesser Wintergreen	5.000000	G5	S2	E - Verified extant (viability not assessed)	Jim Po
Galium kamtschaticum	Boreal Bedstraw	5.000000	G5	S2	E - Verified extant (viability not assessed)	Kibby M
Galium kamtschaticum	Boreal Bedstraw	6.000000	G5	S2	E - Verified extant (viability not assessed)	Jim Po
Houstonia longifolia var. longifolia	Long-leaved Bluet	17.000000	G4G5TNR	S2S3	AB - Excellent or good estimated viability	Bingha
Carex adusta	Swarthy Sedge	22.000000	G5	S2	C - Fair estimated viability	Black M
Pyrola minor	Lesser Wintergreen	3.000000	G5	S2	C - Fair estimated viability	Kibby M
Galium kamtschaticum	Boreal Bedstraw	4.000000	G5	S2	E - Verified extant (viability not assessed)	Kibby M
Galium kamtschaticum	Boreal Bedstraw	7.000000	G5	S2	AB - Excellent or good estimated viability	Jim Po
Mixed graminoid - shrub marsh	Grassy Shrub Marsh	14.000000	GNR	S5	E - Verified extant (viability not assessed)	Sugarl
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Dryopteris fragrans	Fragrant Cliff Wood-fern	44.000000	G5	S3		Little B
Acidic cliff - gorge	Acidic Cliff	6.000000	GNR	S4	E - Verified extant (viability not assessed)	Little B

Rare or Exemplary Botanical Features in the Project Vicinity

Documented within or adjacent to the Proposed Kibby Wind Power Project, Kibby Twp, Skinner Twp, Jim Pond Twp, Eustis, Coplin Twp, Wymen Twp, Carrabasset Valley, Highland Pt, Pleasant Ridge Pt, Concord and Moscow.

Scientific Name	Common Name	State Rarity Rank	Global Rarity Rank	State Legal Status	Habitat Description
Acidic cliff - gorge Acidic Cliff		S4	GNR		Nearly vertical to vertical outcrops of non-calcareous, resistant rocks often moistened by runoff from higher elevations. Soil development is minimal and vegetation sparse.
Arnica lanceolata Harry Arnica		S2	G3	T	Ledgey or gravelly shores or wet cliffs, often subalpine.
Beech - birch - maple forest Northern Hardwoods Forest		S4	G3G5		Northern hardwood forests found on cool, mid-elevation ridges and slopes, often blanketing large areas. Forests on richer soils may have a more diverse herbaceous flora.
Dryopteris fragrans Fragrant Cliff Wood-fern		S3	G5	SC	Dry cliffs and rocky banks (often calcareous).
Erigeron hyssopifolius Hyssop-leaved Fleabane		S2	G5	SC	Calcareous rocks, talus and gravels.
Fir - heart-leaved birch subalpine forest Subalpine Fir Forest		S3	GNR		Coniferous forest of high elevations, generally above 900m. Occurs both on level ridgetops and on steep, stony, upper slopes. Balsam fir usually dominant, often with patches of Mountain ash and Heart-leaved paper birch. A variant is the deciduous forest
Galcaris spectabilis Showy Orchis		S1	G5	E	Rich, mostly calcareous woods.
Gentiana rubricaulis Red-stemmed Gentian		SH	G4?	PE	Wet meadows on circumneutral to calcareous soils

Rare or Exemplary Botanical Features in the Project Vicinity

Documented within or adjacent to the Proposed Kibby Wind Power Project, Kibby Twp, Skinner Twp, Jim Pond Twp, Eustis, Coplin Twp, Wyman Twp, Carrabassett Valley, Highland Pt, Pleasant Ridge Pt, Concord and Moscow.

Scientific Name	Common Name	State Rarity Rank	Global Rarity Rank	State Legal Status	Habitat Description
<i>Houstonia longifolia</i> var. <i>longifolia</i> Long-leaved Bluet		S2S3	G4G5TNI	SC	Slaty ledges or rivershore gravels, not strongly acidic.
<i>Listera auriculata</i> Auricled Twayblade		S2	G3G4	T	Alluvial banks, calcareous silts or crevices, alder-thickets, and swamps.
<i>Minuartia groenlandica</i> Mountain Sandwort		S3	G5	SC	Granitic ledges and gravel.
<i>Prenanthes nana</i> Dwarf Rattlesnake Root		S1	G5	E	Rocky or mossy exposed places in alpine areas.

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 (on the order of 20-100 occurrences).
- S4** Apparently secure in Maine.
- S5** Demonstrably secure in Maine.
- SH** Occurred historically in Maine, and could be rediscovered; not known to have been extirpated.
- SU** Possibly in peril in Maine, but status uncertain; need more information.
- SX** Apparently extirpated in Maine (historically occurring species for which habitat no longer exists in Maine).

Note: **State Ranks** 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 extirpation from the State of Maine.
- 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 (on the order of 20-100 occurrences).
- G4** Apparently secure globally.
- G5** Demonstrably secure globally.

Note: **Global Ranks** are determined by The Nature Conservancy.

T indicates subspecies rank, Q indicates questionable rank, HYB indicates hybrid species.

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.
- SC** SPECIAL CONCERN; Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.
- PE** POSSIBLY EXTIRPATED; Not known to currently exist in Maine; not field-verified (or documented) in Maine over the past 20 years.

FEDERAL STATUS

- LE** Listed as Endangered at the national level.
- LT** Listed as Threatened at the national level.

Please note that species names follow Flora of Maine: A Manual for Identification of Native and Naturalized Vascular Plants of Maine, Arthur Haines and Thomas F. Vining, 1998, V.F. Thomas Co., P.O. Box 281, Bar Harbor, Maine 04069-0281.

Where entries appear as binomials, all representatives (subspecies and varieties) of the species are rare in Maine; where names appear as trinomials, only that particular variety or subspecies is rare in Maine, not the species as a whole.

Visit our web site for more information on rare, threatened and endangered species! <http://www.mainenaturalareas.org/>