

Bigelow and Flagstaff Lake Units

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Bigelow and Flagstaff Lake Units

Property Description

The Bigelow range rises dramatically from the southern edge of Flagstaff Lake. The West Peak of the Bigelow range, 4,125 feet in elevation, is the third tallest mountain in Maine, and the range harbors a large number of exemplary natural communities and rare plant species, especially in its alpine areas. A number of additional BPL lands ring the impounded Flagstaff Lake. These lands are managed for multiple uses including recreation, wildlife, and timber harvesting and provide a scenic buffer for boaters on the lake. The lands included in this section are: Bigelow Preserve, Dead River Peninsula, Flagstaff, Flagstaff Island, Flagstaff Lake, Spring Lake, and Wyman. Together, these lands total 44,674 acres. Bigelow Preserve was created by a statewide, citizen-initiated referendum and has specific management mandates. An Ecological Reserve covers 10,561 acres of the Bigelow Preserve, including all of the alpine area.

Geology and Soils

Around 400 million years ago, sediments accumulated in an ocean basin between two continental plates. These chaotically sorted, magnesium rich sediments probably eroded off a nearby volcanic island or continental margin. The layers of sediments were incorporated into a syncline (large-scale fold) of pelitic rock (mudstone) that was highly metamorphosed by heat from igneous plutons when they intruded the area. The Bigelow ridgeline follows this syncline, and metamorphosed mudstones can be seen on top of the mountain. The regional folding and igneous intrusions occurred as part of the Acadian orogeny, one of New England's three mountain building events.

A northwest striking fault has offset many of the bedrock units on Bigelow. The fault intersects Cranberry Pond on the ridgeline and runs west of East Nubble. This fault, probably related to a network of faults known as the Dead River fault system, caused the northeast side of the fault to be uplifted relative to the southwest side (Caljouw 1981).

There were several stages of glacial lakes to the north and east of Bigelow Preserve. The largest and most stable of these lakes was Lake Bigelow, which filled the basin to 1,178 feet, about 33 feet higher than present day summer lake levels. This lake formed because a till deposit dammed the outlet near the present site of Long Falls Dam. Lake sediments accumulated during Lake Bigelow's tenure, and much of the land that was once under the lake now has a layer of thick clay sediments, while upland areas have more typical till deposits. The bedrock and surficial geologic history of the Bigelow area is covered in detail in the previous NRI (Caljouw 1981).

In the Spring Lake and Dead River Peninsula units, soils formed in glacial till or glaciofluvial deposits. Soils in this area tend to be very deep and range from somewhat poorly to excessively well drained. Colonel-Dixfield-Lyman is the dominant soil type. The soils on the slopes of Bigelow formed in loamy glacial till. They range from

moderately to very deep and well to excessively drained. Lower slopes tend to be dominated by the Colton-Adams-Vassalboro soil formation, while mid-slopes tend to have the Colonel-Dixfield-Lyman soil type. Soils on Bigelow's ridgeline are shallow, often consisting of a thin mantle of organic soil directly on bedrock. The soil formation dominant in this area is Enchanted-Saddleback-Ricker.

Hydrology and Water Quality

Flagstaff Lake, impounded in 1949 by Central Maine Power, covers 20,300 acres. Its maximum depth is 50 feet, while its average depth is 18 feet. The lake drains a total of 516 square miles, and Florida Power and Light owns to the 1150 foot elevation contour around Flagstaff Lake. The maximum reservoir drawdown is 35 feet. Normally, the lake is drawn down 20 to 25 feet in the spring and 10 to 15 feet in the fall (in advance of fall rains). Aquatic plants often can't tolerate water much more than six feet deep, so the impounded lake shoreline may fluctuate too much for many aquatic plants. Observations on other large, impounded lakes indicate that vegetation dynamics in dammed lakes are vastly different than in relatively undisturbed lakes (Don Cameron, MNAP). In 1980, a study of streams near hiking trails in the Bigelow Preserve showed high fecal coliform levels in some areas, indicating that these streams are carrying high nutrient loads (Caljouw 1981).

Wetlands

The Bigelow and Flagstaff Lake units have 1,645 acres of forested wetlands and 1,510 acres of open wetlands; wetlands constitute 7% of the total land area. Most of the open wetlands occur around or near Flagstaff Lake, though significant open wetlands also occur south of the Bigelow range, along Stratton Brook.



Open wetlands along Stratton Brook.

Ecological Processes

Ice, wind, and cold temperatures on the upper slopes of Bigelow limit the number of species that can successfully live there. “Krummholz” (meaning “crooked wood”) is the term used to describe the balsam fir, black spruce, and heart-leaf paper birch that populate this harsh environment. As the name implies, the growth form of these species under these conditions tend to be low, dense, and shrub-like. Often one tree will have multiple leaders that have died back, and much of its summer growth may be stripped by the ice and winds of winter. As anyone who has ever tried to bushwhack through such a community can attest, these dense growth forms create a virtually impenetrable, dwarfed forest of trees up to ten feet tall.

Elevational gradients are pronounced on Bigelow. Traveling up slope, wind increases, precipitation increases, and temperature decreases. These factors conspire to create distinct habitats – and therefore distinct plant communities – as one travels up slope. Low elevation flats are softwood dominated. Hardwoods dominate on the lower slopes on the mountain, while spruce and fir communities become more prominent as elevation increases. The transition zone between hardwood and spruce/fir takes place at a lower elevation on the northern side of the mountain than on the southern side, because the northern side is cooler and more shaded than the southern side. Growing conditions continue to become harsher as one gains elevation, and close to the summit, krummholz, as described above, appears. Lastly, few trees can survive on Bigelow’s exposed, windswept summit. Vegetation at the summit is characterized by small plants with specialized adaptations to cope with these challenging growing conditions.

Beavers have been active in the area both in many of the lower elevation wetlands surrounding Flagstaff Lake and in at least one of the higher elevation tarns. Beavers build dams to give them safe access to the hardwoods they prefer to eat. When active, beaver ponds flood adjoining uplands, enlarging wetlands and creating new areas for wetland species to colonize. Once the hardwoods within a safe distance of the pond are gone, beavers often abandon their dam and build a new dam in a different location. These abandoned ponds typically slowly fill with sediment and transition from marshy wetlands back to uplands. By creating and abandoning impoundments along the stream course, beavers create a mosaic of habitats for other plant and wildlife species such as wading bird and waterfowl habitat along Stratton Brook.

Fire has played a role in natural disturbance on the Bigelow Preserve, both in the northwest (1940s) and on the southern slopes (1830s) (Caljouw 1981). Forest fires in New England tend to be relatively small-scale events triggered by lightning strikes, in contrast to the large, sweeping fires in the western US. The fires open up patches of forest that are typically recolonized by fast growing, short lived species such as aspen and paper birch. This patchy disturbance contributes to an uneven and diverse forest canopy.

The higher elevations at Bigelow have spruce budworm damage. Since balsam fir is the preferred food of the budworm, a krummholz community dominated by fir is an easy target for the pest. The most recent outbreak occurred in the 1980s, though budworm

damage is difficult to assess against the backdrop of krummholz wind and ice damage. At higher elevations, budworm damage combines with wind and weather effects to create larger and more frequent gaps.

Land Use and Harvest History

The Bigelow Act, passed in 1976, established the 35,843 acre Bigelow Preserve as an area “to be retained in its natural state for the use and enjoyment of the public.” The act limits the types of timber harvests that can take place on the unit as well as what sorts of structures can be built and what types of vehicles can use the unit. Prior to being established as a Preserve, much of the unit – as with the rest of the region – was privately owned and had been harvested at least twice and sometimes as many as four times. Historically, the upper limit for cutting was around 3,400 feet in elevation, though the upper limit varied with topography and timber quality. By 1928, three sluices were constructed on the southern slopes of the mountain to transport timber from the steep uplands to the more level lowlands. Both Stratton Brook Pond and Jones Pond were dammed as holding ponds.

Most of the lands that comprise the Bigelow Preserve were harvested in 1960s and 1970s (prior to state acquisition), with the heaviest cuts in Bigelow Township. Some northern-aspect portions of Dead River Township have not been harvested since 1957 or earlier, when land was cleared in preparation for Flagstaff Lake. BPL began forestry operations in the Preserve in 1982, and harvesting has continued almost every year since. Almost all harvests on the unit have been selection harvests designed to maintain or enhance multi-aged stands. Softwood accounts for 13% of the operable acreage in the unit, while mixed wood is 42% and hardwood is 45%.

Soils in the Dead River/Spring Lake unit are less fertile than at Bigelow Preserve, but the unit still has some areas of hardwood in addition to abundant softwood and mixed wood stands. Softwood covers 27% of the unit; mixed wood covers 61%; and hardwood covers 12%. Spruce budworm outbreaks in the mid-1980s prompted the state to conduct the second largest clearcut (200 acres) ever managed by BPL. Over 38,000 cords have been harvested from this unit, and this rate slightly exceeds the sustainable harvest rate for the unit. By 2012, the harvest rate is expected to drop below the sustainable harvest level.

Fisheries and Wildlife

Fish found in Flagstaff Lake include blacknose dace, brook trout, brown bullhead, chain pickerel, common shiner, creek chub, fallfish, finescale dace, golden shiner, lake chub, landlocked salmon, northern redbelly dace, rainbow smelt, slimy sculpin, white sucker, and yellow perch (MDIFW).

A list of wildlife species likely to occur in the vicinity of Bigelow and a list of observed bird species are available in the previous NRI (Caljouw 1981). Mammals observed in the

Bigelow Preserve include coyote, red fox, black bear, marten, fisher, bobcat, white-tailed deer, and moose. Many birds and mammals depend on large areas of interior forest, and Bigelow Preserve provides this increasingly rare habitat.

Rare Animal and Plant Species

Three bald eagle nest sites are active along the shoreline of Flagstaff Lake (bald eagles are listed as Threatened by Inland Fisheries and Wildlife). Rock voles, a species of Special Concern, live in deep, cold, moist crevices in talus areas, typically at elevations above 3,000 feet in Maine. Also known as yellow nosed voles, rock voles are similar to meadow voles except for their distinctive yellow nose and different surface pattern on their molars. They feed on vegetation, roots, and berries, and their range is often restricted by water availability. Their range extends along the spine of the Appalachians, north to Labrador, and west to northern Minnesota. Bicknell's thrush, a species of Special Concern, nests in the unfragmented forests of Bigelow. This song bird requires large, unfragmented sub-alpine areas for nesting and is only known from 66 sites in Maine (Vermont Institute of Natural Science).

A large number of rare plants are known from the unit, including aquatic and alpine species (see Appendix 1).

Vasey's pondweed (*Potamogeton vaseyi*) (S1) has been found in the shallow margins of Flagstaff Lake, and little shinleaf (*Pyrola minor*) (S3) was found in the drainage

just west of East Nubble. A population of alga-like pondweed (*Potamogeton confervoides*) (S3) has been found in the Horns Pond. West Peak and Avery Peak host alpine species including boreal bentgrass (*Agrostis mertensii*) (S2), Bigelow's sedge (*Carex bigelowii*) (S2), mountain sandwort (*Minuartia groenlandica*) (S3), dwarf rattlesnake root (*Prenanthes nana*) (S1), alpine sweet-grass (*Hierochloa alpina*) (S1), Appalachian fir-clubmoss (*Huperzia appalachiana*) (S2), and alpine blueberry (*Vaccinium boreale*) (S2). In all, eleven populations of rare plants are located on West Peak and Avery Peak. Fragrant wood fern (*Dryopteris fragrans*) (S3) was found growing on seepy cliff walls on the south side of Little Bigelow.



Searching for rare plants on the cliffs of Little Bigelow.

Natural Communities: Wetlands

The lowlands surrounding Flagstaff Lake and the base of the Bigelow range support a number of wetlands up to 600 acres in size. The exemplary Mixed Tall Sedge Fen at Jones Pond south of Bigelow is technically not in BPL ownership, though BPL ownership surrounds the small parcel that contains the wetland.

The north side of Bigelow, south of Flagstaff Island, supports an extensive (525 acres) Streamshore Ecosystem along Hurricane and Trout Brooks. This exemplary ecosystem includes Alder Shrub Thicket, Spruce – Fir – Cinnamon Fern Forest, Tussock Sedge Meadow, and Northern White Cedar Woodland Fen natural communities. The slow moving streams that meander through the wetland are influenced by beavers.



A Tussock Sedge Meadow in Bigelow's Streamshore Ecosystem.

The Dead River Peninsula, used primarily for forest management, has several wetlands, though none are considered exemplary. A Northern White Cedar Swamp in the center of the peninsula is surrounded by recently harvested woods. In addition to the northern white cedar (*Thuja occidentalis*), there are areas of dense balsam fir (*Abies balsamea*) and red maple (*Acer rubrum*) regeneration, but neither of these species is in the canopy. There are also small openings in the canopy that are dominated by a dense growth of mountain holly (*Nemopanthus mucronata*). Common herb layer members included three-seeded sedge (*Carex trisperma*), cinnamon fern (*Osmunda cinnamomea*), creeping snowberry (*Gaultheria hispidula*), and twinflower (*Linnaea borealis*). A wetlands drainage cuts through the north-central portion of the peninsula and drains into Flagstaff Lake at a cove on the east side of the peninsula. This beaver controlled area consists of Alder Shrub Thickets alternating with Mixed Graminoid Shrub Marshes. A Spruce – Fir – Cinnamon Fern Forest was documented on the north side of the drainage, while a Leatherleaf Boggy Fen is south of the drainage. This area is also bordered by recent harvests.

Natural Communities: Uplands

The western end of Flagstaff Island is a Spruce – Northern Hardwood Forest that transitions to a White Pine – Mixed Conifer Forest further inland. This mature, upland forest is interrupted by significant patches of blowdowns, resulting from natural disturbance events in the last ten years. The forest has 60% canopy cover and is dominated by red maple (*Acer rubrum*), red spruce (*Picea rubens*), paper birch (*Betula papyrifera*), and white pine (*Pinus strobus*), with dense pine and fir (*Abies balsamea*) regeneration. Two large red spruce trees were determined to be 115 and 120 years old, with 14 inch and 17 inch diameters, respectively. The canopy is approximately 65 feet high, with the diameters for all species ranging from a 12 inch paper birch to a 31 inch white pine in the supercanopy. The average basal area of the non-blowdown portions of this mixed-wood stand is 110 ft²/acre, compared to the dramatically lower basal area of 60 ft²/acre in blowdown areas.

The central and eastern portion of the island is a roughly even-aged exemplary Spruce – Fir – Broom-moss Forest which occasionally grades into patches of White Pine – Mixed Conifer Forest. This 300 acre, mature, closed canopy forest is spruce dominated with scattered white pine, paper birch, and red maple. Large aggregations of *Lobaria pulmonaria* lichen (a species associated with late successional forests) are prevalent on many of the red maples. Most spruce is in the 12 to 16 inch diameter range, while white pine ranges from 16 to 25 inches in diameter. The overall basal area ranges from 140 to 170 ft²/acre. Two large spruces were found to be 155 and 125 years old, and a white pine was aged at 125 years old. The most common understory species include regenerating fir, wild sarsaparilla (*Aralia nudicaulis*), Canada mayflower (*Cornus canadensis*), evergreen wood fern (*Dryopteris intermedia*), and bracken fern (*Pteridium aquilinum*).

Flagstaff Peninsula, on the west side of the lake, contains a transitional White Pine – Mixed Conifer Forest that shows evidence of a harvest roughly 60 years ago followed by a burn. Scattered aspen and red pine are in the overstory, while the understory is comprised of red spruce, fir, and white pine.

East Nubble, a rocky knob on the north side of Cranberry Peak, has a small (48 acres) but exemplary Spruce – Fir – Broom-moss Forest and an exemplary Spruce Talus Woodland. The Spruce – Fir – Broom-moss Forest covers the East Nubble Summit. Core ages of spruce trees ranged from 115 to 260 years, and total basal area was found to be 140 ft²/acre. The dominant understory species include fir, paper birch, and red spruce regeneration, and Canada mayflower (*Maianthemum canadense*). The Spruce Talus Woodland, on the north side of East Nubble, is mostly open talus with a 70% slope. Scattered red spruce and heart-leaved paper birch are present along with small patches of Labrador-tea (*Ledum groenlandicum*).

The Wyman parcel, southwest of Bigelow, consists of mature hardwood forests that grade into spruce – fir forests, especially on the slopes of the southwest portion of the unit. Higher slopes are dominated by Beech – Birch – Maple Forests. In the northeast, the forest exhibits old growth characteristics including late successional indicator lichens

such as *Lobaria pulmonaria* and mature trees such as a 275 year old hemlock. This area, though remarkable for its age and structure, is quite small – around 24 acres in size. The late successional index was not calculated, but this area likely contains some old growth stands or old growth components.

On the south slope of Bigelow within the Ecological Reserve, between the Fire Warden’s Trail and the Horns Pond Trail, are two exemplary natural communities. A Spruce – Fir – Feathermoss Forest is dominated by red spruce with lesser amounts of white pine, balsam fir, and red maple. Most trees in this area are 12 to 16 inches in diameter, and one spruce was aged at 121 years. The exemplary Beech – Birch – Maple Forest is dominated by sugar maple, which comprises 75% of the basal area. Yellow birch (*Betula alleghaniensis*), hophornbeam (*Ostrya virginiana*), and beech (*Fagus grandifolia*) are also present in minor amounts. The oldest tree cored in the community was 152 years old.



A mature yellow birch in Wyman.

The southwest side of Little Bigelow Mountain is characterized by very steep and exposed vertical walls. A Beech – Birch – Maple Forest runs along the base of the cliffs down to the power lines. Portions of this forest have been harvested in the past; however, the steeper slopes show no evidence of recent harvests. The granitic cliffs have steep gullies cutting through them and areas of large, blocky talus below them in places. Rusty cliff fern (*Woodsia ilvensis*), common hairgrass (*Deschampsia flexuosa*), and pale corydalis (*Corydalis sempervirens*) grow among the talus, while fragrant wood fern (*Dryopteris fragrans*) (S3) was found on the seepy cliff walls. These cliffs constitute an exemplary Acidic Cliff – Gorge natural community.

The exemplary Beech – Birch – Maple Forest on the north side of Little Bigelow was harvested lightly in the 1940s but retains many of the structural attributes of late successional forests. Two hemlock (*Tsuga canadensis*) stumps, both 21 inches in diameter at breast height, were found to be 175 and 200 years old, and numerous hemlock and sugar maple trees are in the 150-200 year old range. Sugar maple (*Acer saccharum*) is dominant in all strata, with occasional yellow birch (*Betula alleghaniensis*), red spruce (*Picea rubens*), and hemlock. Lichens associated with late successional forests are frequent throughout the area. In general, the area doesn’t show

signs of enrichment, though one small seepy portion (less than three acres) includes some mild enrichment indicators such as Braun's holly fern (*Polystichum braunii*), zig-zag goldenrod (*Solidago flexicualis*), and red baneberry (*Actaea rubra*). Upslope of the Ecological Reserve boundary, these stands transition to smaller stature mixed forest and eventually to Fir – Heartleaf Birch Sub-alpine Forest.

A proposed harvest for the winter of 2005/2006 generated scrutiny and discussion among several parties about the old forest structure in approximately 200 acres of this forest. Although the stands do not meet BPL's working definition of "old growth," (more than half the basal area in trees over 150 years old), they do score very high (8, 9) on Manomet's Late-Successional Index, and they possess late successional lichens. Subtle signs of past harvest are evident. As of November 2005, plans were underway to selectively harvest approximately 200 acres of these stands while retaining many of the late successional features present in the stand (see BPL prescription for details).

Natural Communities: Alpine

An exemplary Fir – Heart-Leaved Birch Subalpine Forest tops Little Bigelow's acidic cliffs. This community consists of variously stunted to moderately sized balsam fir forests, depending largely on exposure. The shady understory is dominated by a dense growth of mosses with gold thread (*Coptis groenlandica*) and creeping snowberry (*Gaultheria hispidula*). Two more exemplary examples of this community are found on Cranberry Peak and on an area that covers the Horns and West and Avery Peaks.

An exemplary Dwarf Heath – Graminoid Alpine Ridge tops Avery and West Peaks. This rare natural community is ranked S3 in the state. The area is dominated by dwarf shrub heath and krummholz associates and is surrounded by sub-alpine spruce-fir forests.

The Horns Pond is considered an exemplary tarn, or small lake formed by glaciers. Steep sides of the pond and a shallow lip at the outlet helps create relatively stable water levels. Cranberry Pond is as a monomictic mesotrophic lake, a shallow lake with moderate nutrient levels and water that doesn't mix or turn over with changes in the seasons. This tarn's bouldery shoreline and shallow, organic lake bottom have been influenced by beavers in the past. Though the pond was probably fishless at one time, it is stocked with brook trout by Inland Fisheries and Wildlife (PEARL database). The shallow grade of the pond creates large areas of emergent aquatic plants that alternate with the mucky, unconsolidated pond bottom.

Management Considerations

- Alpine areas are uncommon in Maine, occurring only on the tops of Maine's tallest mountains. The plants that grow in these conditions grow very slowly, are often uncommon or rare, and can easily be damaged by a careless hiker. Because

these areas are also popular recreation destinations, they will benefit from continued efforts to keep hikers on trails and prevent trampling of large areas.

- Exemplary natural communities and rare plant populations are sensitive to neighboring activity and should be adequately buffered when forestry operations are taking place in the area.
- Forestry and recreation planning should take the habitat needs of rock voles, Bicknell's thrushes, and bald eagles into account. Keeping hikers on the trail will minimize impacts on rock voles and Bicknell's thrushes, which live in the alpine and subalpine zones. Bald eagle nests and the area around them are considered Essential Habitat. Follow MDIFW guidelines when managing areas around eagle nests.

References

Caljouw, Caren and Sarah Roeske. 1981. A natural resource inventory and critical areas survey of Bigelow Preserve. Department of Conservation, Bureau of Public Lands.

PEARL database website: pearl.spatial.maine.edu

Appendix 1: Exemplary Natural Communities and Rare Plant Species of the Bigelow and Flagstaff Lake Units

Bigelow/Flagstaff Region						
Feature Name	Location	S-rank	EO-Rank	Last Obs.	Size (ac)	EO number
Acidic Cliff-Gorge	Little Bigelow	S4	B	2004	158	.006
Beech-Birch-Maple Forest	Little Bigelow North	S4	B	2005	1236	.051
Beech-Birch-Maple Forest	Horns Pond Trail	S4	B	2002	30	.023
Dwarf Heath-Graminoid Alpine Ridge	West and Avery Peak	S2	B	2002	150	.009
Fir-Heartleaf Birch-Subalpine Forest	Bigelow Ridge	S3	A	2002	2475	.017
Fir-Heartleaf Birch-Subalpine Forest	Little Bigelow	S3	AB	1985	305	.016
Fir-Heartleaf Birch-Subalpine Forest	Cranberry Peak	S3	E	1985	290	.018
Mixed Tall Sedge Fen	Jones Pond (not in ownership)	S4	AB	1996	37	.012
Monomitic Mesotrophic Lake	Cranberry Pond	SU	E	2002	11	.005
Spruce Talus Woodland	East Nubble	S4	B	2004	16	.003
Spruce-Fir-Broom-moss Forest	East Nubble	S4	B	2004	47	.018
Spruce-Fir-Broom-moss Forest	Flagstaff Island	S4	B	2004	300	.028
Spruce-Fir-Wood-sorrel-Feather-moss Forest	Horns Pond Trail	S4	B	2002	49	.004
Streamshore Ecosystem	NW Wetland	S4	B	2004	526	.018
Tarn	Horns Pond	S2	A	2002	5	.001
<i>Agrostis mertensii</i>	Avery Peak	S2	C	2002		.012
<i>Agrostis mertensii</i>	West Peak	S2	C	2002		.001
<i>Carex bigelowii</i>	Avery Peak	S2	B	2002		.017
<i>Hierochloe alpina</i>	West Peak	S1	C	2002		.007
<i>Hierochloe alpina</i>	Avery Peak	S1	B	2002		.004
<i>Minuartia groenlandica</i>	Avery Peak	S3	C	2002		.001
<i>Minuartia groenlandica</i>	West Peak	S3	B	2002		.029
<i>Huperzia appalachiana</i>	Avery Peak	S2	B	2004		.015
<i>Huperzia appalachiana</i>	West Peak	S2	C	2004		new
<i>Prenanthes nana</i>	West Peak	S1	C	2004		.002
<i>Pyrola minor</i>	East Nubble	S3	E	2004		new
<i>Dryopteris fragrans</i>	Little Bigelow	S2	E	2004		.044
<i>Vaccinium boreale</i>	Avery Peak	S2	C	2002		.002
<i>Potamogeton vaseyi</i>	Flagstaff Lake west	S2	E	1999		.009

Appendix 2: Rare Plant Fact Sheets



Maine Department of Conservation
Natural Areas Program

Agrostis mertensii Trin.

Boreal Bentgrass

Habitat: Alpine areas, gravelly or rocky substrates.
[Alpine or subalpine (non-forested, upland)]

Range: Circumboreal, south to Quebec and the higher mountains of northern New England and northern New York.

Phenology: Fruits July - August.

Family: Poaceae

Aids to Identification: This densely tufted perennial grass grows to 50 cm in height, smaller in alpine areas. The majority of the leaves are clustered at the base and they are flat or curved in at the edges, 1-3 mm wide. The spikelets bear only one floret and are purplish, with the lemma bearing a bent awn.



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

Ecological characteristics: Growing in Maine on exposed rocky summits and balds.

Synonyms: Formerly known as *Agrostis borealis*.

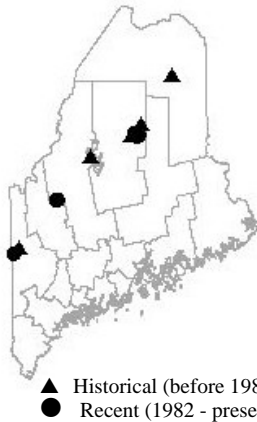
Rarity of *Agrostis mertensii*

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:	G5	Demonstrably widespread, abundant, and secure globally.

Status of *Agrostis mertensii*

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

Known Distribution in Maine:



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

Dates of documented observations are: 1877, 1900, 1919, 1953, 1980, 1981, 1984 (3), 1994, 1997, 2000, 2002 (2)

Reason(s) for rarity:

An arctic/alpine species disjunct from principal range; habitat naturally scarce.

Conservation considerations:

Populations could be threatened by heavy recreational (hiking) use.

The information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 11 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 bigelowii Torr. ex Schwein.

Bigelow's Sedge

- Habitat:** Alpine areas. [Alpine or subalpine (non-forested, upland)]
- Range:** Arctic regions, south to alpine regions of northern New England and northern New York.
- Phenology:** Flowers July - September.
- Family:** Cyperaceae

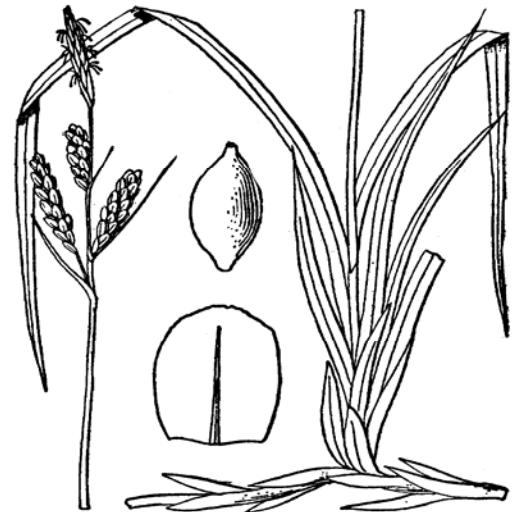


Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: *Carex* is a large and difficult genus, and technical characters must be relied upon to separate the species. The combination of bifid stigmas, leucular achenes, and separate staminate and carpellate spikes will separate this sedge from all others occurring in the alpine community. *Carex bigelowii* is a short (typically less than 50 cm) perennial herb that grows along creeping surface runners (stolons). The inflorescence, which usually exceeds the dark green leaves, contains a terminal staminate (male) spike on a slender stem and 1 to 6 lower pistillate (female) spikes that lack stems. The scales (small bracts that cover each perigynium) are distinctly purple with a pale midrib.

Ecological characteristics: Locally common above treeline with other alpine plants such as alpine bilberry (*Vaccinium uliginosum*). Rarely occurs below treeline. This sedge is the only *Carex* found commonly in alpine ridge communities and is often the dominant plant in certain patches forming a tuft.

Synonyms: Maine populations are *C. bigelowii* ssp. *bigelowii*

Rarity of *Carex bigelowii*

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

Status of *Carex bigelowii*

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 13 town(s) in the following county(ies): Franklin, Hancock, Oxford, Piscataquis, Somerset, Washington.

Dates of documented observations are: 1896, 1918, 1919, 1980, 1981, 1984 (4), 1991, 1994 (2), 1996, 1997 (2), 2000, 2001, 2002

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

Reason(s) for rarity:

Southern limit of range.

Conservation considerations:

Can occur in large populations, and appears to be fairly secure at some of its locations; however, populations could be threatened by heavy hiking use.



Rare Plant Fact Sheet

The information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 11 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

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

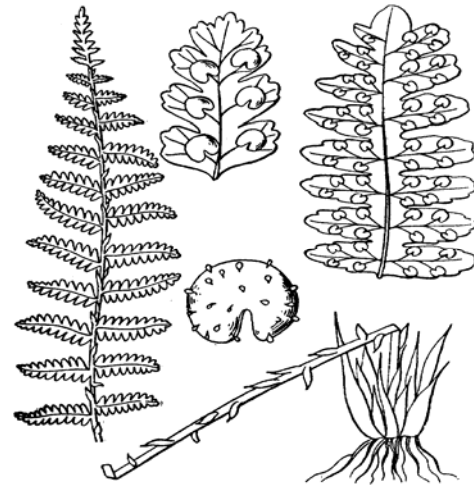


Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

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: Known as *Polypodium fragrans* L. in old treatments

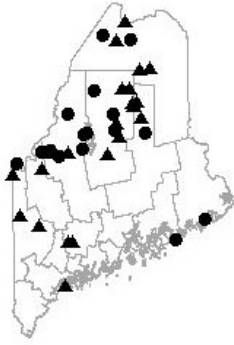
Rarity of *Dryopteris fragrans*

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 *Dryopteris fragrans*

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 36 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, 2000 (2), 2001 (3), 2003

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 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

Hierochloe alpina (Sw. ex Willd.) Roemer & J.A. Schultes

Alpine Sweet-grass

Habitat: On siliceous rock and dry peat and on mountains [Alpine or subalpine (non-forested, upland)]

Range: Circumboreal, south to alpine areas of New England and New York.

Phenology: Fruits July - August.

Family: Poaceae

Aids to Identification: Members of the grass family can be difficult to identify without careful examination of microscopic features and knowledge of general groups of species. The grasses of this genus are perennial with fragrant, flat leaf blades, and terminal flowering clusters. This species has smooth stems growing in tufts, 20-50 cm high. It has large (6-8 mm long), golden brown spikelets with conspicuous awns (slender bristles) that protrude from the flowers. The spikelets are aggregated into a compact inflorescence 3-5 cm long.



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

Ecological characteristics: This grass has been found in a variety of alpine habitats in Maine, from dry summits to high elevation mossy ravines.

Synonyms: Known as *Anthoxanthum monticola* (Bigelow) Y. Schouten & Veldkamp. Referred to in some very old treatments as *Savastana alpina* and *Hierochloe monticola*. Maine populations are represented by subspecies *orthantha* (Sorenson) G. Weim.

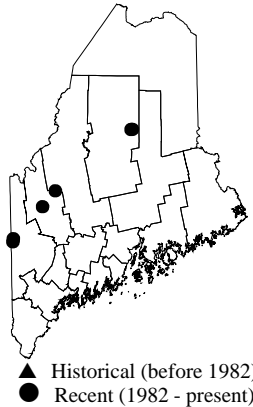
Rarity of *Hierochloe alpina*

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:	G5T3T5	Species demonstrably widespread, abundant, and secure globally. Subspecies seems secure globally, but possibly rare globally.

Status of *Hierochloe alpina*

Federal Status:	None	No Federal Status.
State Status:	Threatened	
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

Known Distribution in Maine:



This rare plant has been documented from a total of 5 town(s) in the following county(ies): Franklin, Oxford, Piscataquis, Somerset.

Dates of documented observations are: 1980, 1984, 1985, 1990, 1994, 1996, 2000, 2002 (2)

Reason(s) for rarity:

At southern limit of range.

Conservation considerations:

Populations could be threatened by heavy recreational (hiking) use.

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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Huperzia appalachiana Beitel & Mickel

Mountain Firmoss

Habitat: Damp or mossy rocks, cool woods, bare mountains.
[Rocky summits and outcrops (non-forested upland).
Alpine or subalpine (non-forested upland)]

Range: Greenland to southern Appalachian mountains.

Phenology: Sporates in summer.

Family: Huperziaceae (formerly in Lycopodiaceae)

Aids to Identification: Firmosses are recognized by their evergreen upright shoots, dichotomous branching and the presence of spores in the leaf axils and gemmae (small 6-leaved plantlets) in the apical portion of the plant. *Huperzia appalachiana* is very similar to *H. selago* (ranked S1 in Maine, see image on right) and the two are very difficult to tell apart. *H. appalachiana* occurs in exposed, harsh environments in alpine settings, whereas *H. selago* occurs in boreal, hydric environments including ditches, pondshores and other moist areas, but not in alpine environments. *H. appalachiana* has dimorphic leaves (trophophylls): Leaves towards the base of the plant are longer and spreading more so than the leaves in the apical portion of the plant. *H. selago* has monomorphic leaves.

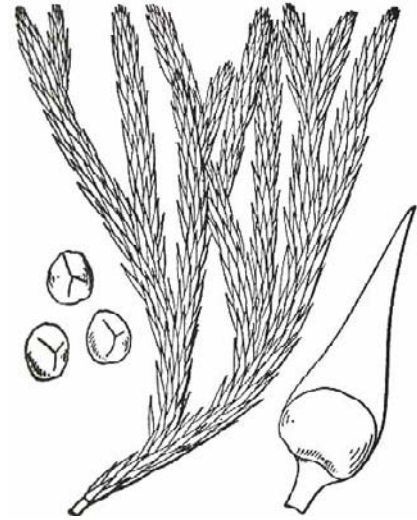


Illustration from Britton & Brown's
Illustrated Flora of the Northern United
States and Canada, 2nd ed.

Ecological characteristics: *Huperzia appalachiana* is restricted to Maine's highest mountains and a few coastal islands. Hybridization with *H. selago* is common and the hybrid is frequently encountered above treeline.

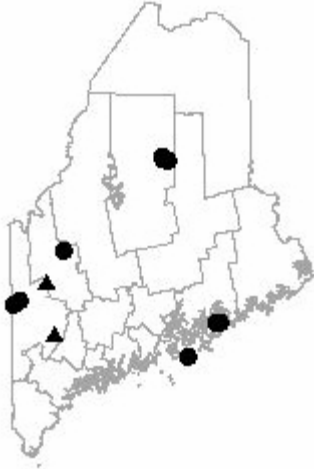
Synonyms: Formerly known as *Huperzia canadense* (Desv.) A. & D. Love, *Huperzia selago* (L.) Schrank & Mart. ssp. *appressum* Desv., *Lycopodium selago* L. var. *appressum* Desv., *Lycopodium selago* L. ssp. *appressum* (Desv.) Hulten.

Rarity of *Huperzia appalachiana*

State Rank:	S2	Imperiled in Maine because of rarity or 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:	G4G5	Widespread, abundant, and apparently secure globally but possibly with cause for long term concern.

Status of *Huperzia appalachiana*

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.



Know Distribution in Maine:

This rare plant has been documented from a total of 10 towns in the following counties: Franklin, Hancock, Knox, Oxford, Piscataquis.

Dates of documented observations are: 1847, 1878, 1889, 1893, 1918, 1941, 1967, 1975, 1983, 1984, 1990, 1992, 1995, 1996, 1997, 2000, 2001

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

Reasons for rarity:

Alpine habitat is scarce.

Conservation considerations:

Hikers should stay on trail and avoid trampling alpine vegetation.

The information in this fact sheet was downloaded from the Natural Areas Program's Biodiversity Tracking System on 20 Apr 2004. Nomenclature follows Haines and Vining's *Flora of Maine* (V.F. Thomas Press, 1998) and *Flora Novae Angliae* Tracheophyte Checklist (2004) available at: http://arthur_haines.tripod.com/checklist.htm. 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, threatened, and endangered plants and natural communities, and is a member of the Association of Biodiversity Information.

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Maine Department of Conservation
Natural Areas Program

Minuartia groenlandica (Retz.) Ostenf.

Mountain Sandwort

- Habitat:** Granitic ledges and gravel. [Rocky summits and outcrops (non-forested, upland); Alpine or subalpine (non-forested, upland)]
- Range:** Greenland and Labrador to northern New England, New York, along coast of Nova Scotia to eastern Maine.
- Phenology:** A perennial, flowers June - September, fruits July - October.
- Family:** Caryophyllaceae



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

Aids to Identification: Mountain sandwort is a low-growing perennial with dense tufts of linear opposite leaves at the base. Its slender flowering stems with cymes of 1-30 white, five-petaled flowers rise 5-10 cm above the matted foliage. *Minuartia groenlandica* differs from *M. glabra* in that it has larger flowers (petals 6-10 mm long compared to 4-6 mm long) and more densely tufted leafy basal shoots.

Ecological characteristics: Mountain sandwort most often grows on relatively dry wind-swept exposures of acidic rock or gravel. In such habitats it may be abundant, forming extensive mats where the irregularities of the rock substrate afford it a niche. While its occurrence in Greenland and Labrador and at elevations above 1200 m in Maine indicate its tolerance for climatic extremes, it is probably restricted from less severe habitats by competition from other plants.

Synonyms: Formerly known as *Arenaria groenlandica*. Maine populations are represented by the subspecies *groenlandica*.

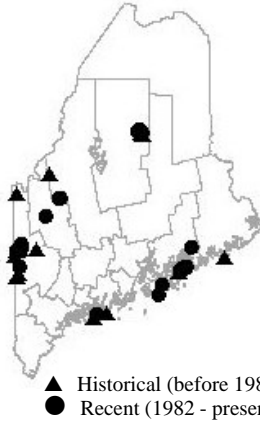
Rarity of *Minuartia groenlandica*

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

Status of *Minuartia groenlandica*

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 26 town(s) in the following county(ies): Franklin, Hancock, Knox, Lincoln, Oxford, Piscataquis, Sagadahoc, Somerset, Washington.

Dates of documented observations are: 1888, 1898, 1907, 1919, 1938, 1973, 1974, 1976, 1980 (4), 1981 (5), 1982, 1984 (4), 1985, 1986, 1988, 1990, 1991 (2), 1992 (4), 1996 (3), 1997, 2000, 2001 (2), 2002 (3)

Reason(s) for rarity:

At southern limit of range, habitat somewhat restricted.

Conservation considerations:

Some populations could be threatened by heavy recreational (hiking) use of its mountain-top habitat, but the plant appears to cope well with moderate disturbance.

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

Potamogeton confervoides Reichenb.

Alga-like Pondweed

- Habitat:** Acidic cold waters. [Open water (non-forested, wetland)]
- Range:** Newfoundland to Michigan, south to North Carolina and Pennsylvania. Listed as rare in CONnecticut, but more common elsewhere in New England.
- Phenology:** Fruits in late summer.
- Family:** Potamogetonaceae



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

Aids to Identification: Like other *Potamogeton* species, this pondweed is entirely aquatic and has small spikes of inconspicuous flowers, and later fruits, which protrude above the water. Unlike many other pondweeds, the leaves are all submersed and thread-like. Among other pondweeds sharing this characteristic, *P. confervoides* can be distinguished principally by its flower stem, which is long and a continuation of the main stem rather than one or more short stems arising from the axils; and by its long creeping rootstock. Also, the leaves have short stipules which are distinct from the leaf base, compared to similar species that have stipules that are long (> 1 cm) or stipules which are fused with the base of the leaf.

Ecological characteristics: *P. confervoides* is known from several acidic, clear-water ponds (oligotrophic ponds) in Maine. Substrate is usually at least partly organic (peaty), usually with an admixture of sand or gravel.

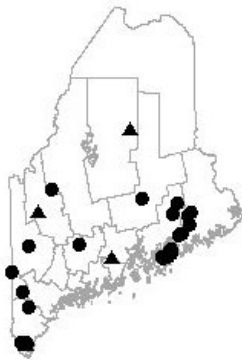
Synonyms:

Rarity of *Potamogeton confervoides*

State Rank:	S3	Rare in Maine.
New England Rank:	Division 1	Globally rare plant occurring in New England: Only a few occurrences exist within New England.
Global Rank:	G4	Widespread, abundant, and apparently secure globally but with cause for long term concern.

Status of *Potamogeton confervoides*

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.



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

Known Distribution in Maine:

This rare plant has been documented from a total of 21 town(s) in the following county(ies): Cumberland, Franklin, Hancock, Knox, Oxford, Penobscot, Piscataquis, Washington, York.

Dates of documented observations are: 1891, 1923, 1940, 1950, 1984 (2), 1988, 1991, 1992, 1993, 1994, 1995 (10), 1997 (2), 1999 (4), 2000 (5), 2001, 2002 (2)

Reason(s) for rarity:

Unknown; perhaps undercollected?

Conservation considerations:

Maintain water quality of the ponds in which it occurs.

The information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 10 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

Potamogeton vaseyi J.W. Robbins

Vasey's Pondweed

Habitat: Quiet muddy or calcareous waters. [Open water (non-forested, wetland)]

Range: Quebec to Wisconsin, south to southern New York.

Phenology: Flowers July - August.

Family: Potamogetonaceae



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

Aids to Identification: Podweeds are aquatic, perennial herbs with reduced, inconspicuous flowers, which in many species, are elevated above the surface of the water. *Potamogeton vaseyi* has dimorphic leaves: very narrow (0.2-1 mm wide), flaccid, submersed leaves and wider, thicker floating leaves (see illustration). This species, like the common *P. spirillus*, has small floating leaves, only 0.6-1.5 cm long for *P. vaseyi*. Small spikes (3-8 cm tall) and stipules that are distinct from the leaf blade will serve to separate *P. vaseyi* from other species of pondweeds in Maine.

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

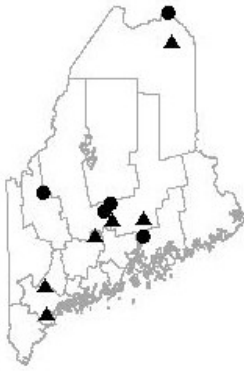
Synonyms:

Rarity of *Potamogeton vaseyi*

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:	G4	Widespread, abundant, and apparently secure globally, but with cause for long-term concern.

Status of *Potamogeton vaseyi*

Federal Status:	None	No Federal Status.
State Status:	Threatened	
Proposed State Status:	Threatened	Rare and, with further decline, could become endangered; or federally listed as Threatened. Listing criteria met: Special habitat



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

Known Distribution in Maine:

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

Dates of documented observations are: 1800, 1889, 1901, 1909, 1942, 1972, 1990, 1994, 1999 (3)

Reason(s) for rarity:

Scarcity of habitat.

Conservation considerations:

Unknown.

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Maine Department of Conservation
Natural Areas Program

Prenanthes nana (Bigelow) Torr.

Dwarf Rattlesnake Root

Habitat: Rocky or mossy exposed places in alpine areas. [Alpine or subalpine (non-forested, upland)]

Range: Northern New York to Newfoundland.

Phenology: Flowers July - August.

Family: Asteraceae

Aids to Identification: This rattlesnake root can be distinguished from other *Prenanthes* species by the following characteristics: bracts beneath the flowers are greenish-black to black and hairless; lower leaves are deeply lobed; there are 9-12 yellowish-white flowers; and it is found in alpine areas. It closely resembles a diminutive version of the common rattlesnake root (*P. trifoliolata*)



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

Ecological characteristics: All Maine occurrences of this species have been found in high elevation exposed areas on inland mountains.

Synonyms: Known as *Nabalus trifoliatus* Cass. Formerly known as *Prenanthes trifoliolata* var. *nana*, or in some very old treatments as *Nabalus nanus*.

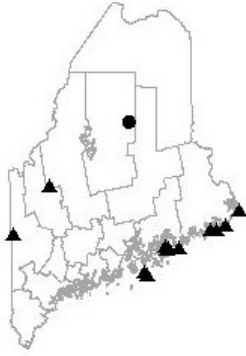
Rarity of *Prenanthes nana*

State Rank:	S1	Critically imperiled in Maine because of extreme rarity or vulnerability to extirpation.
New England Rank:	None	
Global Rank:	G5	Demonstrably widespread, abundant, and secure globally.

Status of *Prenanthes nana*

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: Special habitat, 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): Hancock, Knox, Oxford, Piscataquis, Somerset, Washington.

Dates of documented observations are: 1896, 1897, 1902, 1909, 1911, 1928, 1931, 1941, 1950, 1951, 1953, 1969, 1994

Reason(s) for rarity:

At southern limit of range.

Conservation considerations:

Populations could be threatened by heavy recreational (hiking) use.

The information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 14 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

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*.

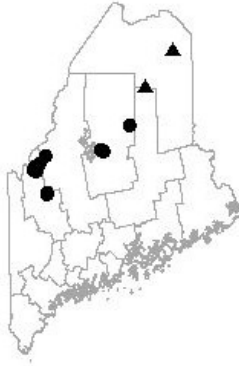
Rarity of *Pyrola minor*

- | | | |
|--------------------------|------|--|
| 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.





Maine Department of Conservation
Natural Areas Program

Vaccinium boreale Hall & Aalders

Alpine Blueberry

Habitat: Alpine meadows and exposed, rocky sites. [Alpine or subalpine (non-forested, upland); Rocky coastal (non-forested, upland)]

Range: Newfoundland, Labrador, and northern Quebec, south to the alpine summits of northern New England and northern New York.

Phenology: Flowers June - July.

Family: Ericaceae



Illustration from Crow's New England's Rare, Threatened, and Endangered Plants.

Aids to Identification: Blueberries are well known shrubs with alternate, simple leaves, white, urceolate (urn-shaped) flowers and sweet berry fruits. *Vaccinium boreale* is a diminutive blueberry of exposed environments. It occurs with, and looks very similar to, the common *V. angustifolium*, lowbush blueberry, at all known sites in Maine. *V. boreale* is a short (up to 9 cm tall), shrub with very narrow (2-6 mm wide) leaves. *V. angustifolium* is either taller or with wider leaves, or both. Additionally, the flowers of *V. boreale* are smaller (corolla is 3-4 mm long) and appear 10-20 days earlier than the flowers of *V. angustifolium* (corolla is 4-8 mm long).

Ecological characteristics: Often found growing in cracks in rocks in alpine environments, often with *Vaccinium* species.

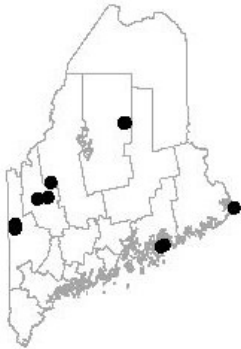
Synonyms: Formerly considered a variety of *Vaccinium angustifolium*; now known to be chromosomally and morphologically distinct..

Rarity of *Vaccinium boreale*

State Rank:	S2	Imperiled in Maine because of rarity or vulnerability to further decline.
New England Rank:	Division 1	Globally rare plant occurring in New England: Only a few occurrences exist within New England.
Global Rank:	G4	Widespread, abundant, and apparently secure globally, but with cause for long-term concern.

Status of *Vaccinium boreale*

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



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

Known Distribution in Maine:

This rare plant has been documented from a total of 9 town(s) in the following county(ies): Franklin, Hancock, Piscataquis, Somerset.

Dates of documented observations are: 1915, 1994, 1995 (2), 1996, 1997, 1998, 2000 (2), 2001 (3), 2002

Reason(s) for rarity:

At southern limit of range; habitat is naturally scarce. This plant is uncommon, but not as rare as previously believed.

Conservation considerations:

At some locations, small populations could be threatened by heavy hiker or tourist use.

The information in this fact sheet was downloaded from the Natural Areas Program's Biological and Conservation Database on 10 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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Appendix 3: Maps of the Bigelow and Flagstaff Lake Units