

Mt. Abraham Unit

Property Description	1
Geology and Soils	1
Hydrology and Water Quality	2
Wetlands	2
Ecological Processes.....	2
Land Use and Harvest History	3
Fisheries and Wildlife.....	4
Rare Animal and Plant Species	4
Natural Communities	5
Management Considerations	6
References.....	6
Appendix 1: Exemplary Natural Communities and Rare Plant Species of the Mt. Abraham Unit.....	7
Appendix 2: Rare Plant Fact Sheets	11
Appendix 3: Maps of the Mt. Abraham Unit	27

Mt. Abraham Unit

Property Description

Mt. Abraham, also called Mt. Abram, is the 9th tallest mountain in Maine. Reaching a height of 4,050 feet, Mt. Abraham has a striking and rugged appearance from the valley below. With an extensive treeless alpine area covering 200 acres at the northwest summit and 150 acres on the southeast summit, Mt. Abraham is characterized by very steep and rugged talus slopes on all sides of the mountain, with the most impressive slopes on the northern and eastern sides. The mountain is noteworthy for the abundance of talus at the summit, which distinguishes it from other mountains in Maine. The Mt. Abraham BPL unit encompasses 6,629 acres, including both summits and most of the northeast side of the mountain. Most of this unit, 5,377 acres, has been designated as Ecological Reserve. The Ecological Reserve encompasses the treeless ridge top and a majority of the northern and eastern slopes.

Geology and Soils

Prior to the Acadian orogeny (375 million years ago), one of the three major mountain building events in New England, sediments accumulated in an ocean basin between two of the earth's plates. Once these plates collided, the sandstone and mudstone from the basin were folded and deformed under pressure, building mountains. These folded rocks form the bedrock of Mt. Abraham.

Glaciers have also left their mark on Mt. Abraham. The most recent ice sheet in New England, 12,500 years ago, moved from northwest to southeast. As a consequence, the ice smoothed the northwest side of the mountain and left the southeast side relatively rough. Glaciers also left a layer of till on the mountain, with thin deposits near the summit and thicker deposits downslope. Once the ice retreated, the relatively porous metamorphosed sandstone on the summit of Mt. Abraham was exposed to the weather. Repeatedly, water seeped in to small cracks and pores in the rock, then froze and expanded, wedging the rock apart and



Mt. Abraham's distinctive talus summit was created by frost wedging.

deepening the formerly small cracks. This process, called frost wedging, is responsible for Mt. Abraham's distinct mound of talus at the summit (Cogbill 1998).

Soils on the unit reflect their glacial heritage; many of the soils are based in glacial till or other glacial deposits and are very stony. Soils at the summit and along the upper ridgeline are well drained, and tend to have a thin organic layer overlying rock fragments and till. Further down slope, soils become more variable, with drainage ranging from somewhat poorly to somewhat excessively drained and soil depth varying with topography. The Enchanted-Saddleback-Ricker soil formation dominates on the western half of the unit, while Colonel-Dixfield-Lyman dominates in the east.

Hydrology and Water Quality

Numerous small, forested headwater streams drain Mt. Abraham, occasionally forming small pools below steep drops in elevation. Most of the unit drains to the Carrabassett River, while the southeast side drains to the Sandy River.

Wetlands

There are no mapped wetlands on the unit, though small woodland seeps (less than ¼ acre) are frequent at breaks in the slope.

Ecological Processes

Ice, wind, and cold temperatures at the top of Mt. Abraham 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.

Spruce budworm damage is evident along the ridge of Mt. Abraham. 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.

The hardwood communities on the unit show evidence of typical small gap disturbances from ice, windthrow, or natural tree mortality. These gaps increase to complexity of forest structure and add to the diversity of microhabitats in the forest for plants and animals.

Land Use and Harvest History

Logging in the area was accelerated in 1871 by the arrival of the Sandy River Railroad to the region. According to Austin Cary's survey in 1895, of the 335 square miles in the drainages of the Sandy and Carrabassett Rivers, only 15% of the total land remained uncut. Mt. Abraham township was settled only in the late 1800s, with a logging camp at Barnjum near the Madrid line. Mt. Abraham tended to have medium sized parcels owned by small companies. In the 1950s, 15,000 acres surrounding Barnjum was purchased as a country estate. Much of this and other land was acquired by Boise Cascade after 1979 and thereafter by Mead Corp (Cogbill 1998). The state acquired the first piece of the Mt. Abraham unit in 2001 from Plum Creek Timberlands. A second piece was acquired in 2002 from Plum Creek via the Appalachian Trail Conference. The remaining western summit area (1,153 acres) was acquired in 2004 from Mead/Westvaco Oxford.

The eastern part of the unit outside of the Ecological Reserve has several hundred acres of softwood plantations, including red pine, white spruce, and some black spruce. This area also has areas of dense hardwood regeneration. Areas within the Ecological Reserve tend to be steep and/or infertile lands. The Ecological Reserve does include, however, 1,500 acres of mature hardwood and mixed wood forest. Areas within the Ecological Reserve show few signs of past harvest.

The Appalachian Trail runs just to the north of the unit, and a spur trail leads to Mt. Abraham's northwest summit. A separate hiking trail leads to the northwest summit from the east side of the mountain. This popular trail follows a gentle grade to a derelict cabin maintained by Bates College Outing Club, then steeply ascends to the summit. Hikers have bushwhacked trails from the northwest summit to the southeast summit, and small areas of vegetation at the summits have been trampled. An ad hoc snowmobile and ATV trail travels to the ridge from the west side of the mountain. This trail has caused significant erosion in places in addition to crushing fragile subalpine vegetation.



An ATV trail in the fragile alpine area has caused significant damage.

Fisheries and Wildlife

Due to relative scarcity of early-successional forest within the unit, populations of most large animal species are probably modest, though some areas hold sufficient beech to be attractive on bumper nut crop years, especially for bear. Surrounding early successional forest may provide more foraging options for large animals. Deer probably use the unit, though the lack of deer wintering areas on the unit limit its attractiveness during times with deep snow. Moose have been seen in the unit, including one seen on the ridge line near the northwest summit in 2004. The thick softwood growth in the subalpine area provides habitat for snowshoe hares and should also be suited to lynx, though none have been documented in the area. Bicknell's thrush, a species of Special Concern, nests in the higher elevation forests of Mt. Abraham.

There are no fisheries on the unit.

Rare Animal and Plant Species

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, and the talus-rich alpine area of Mt. Abraham provides known habitat for this species. 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, also a species of Special Concern, has been found on the forested slopes of Mt. Abraham. This song bird requires large, unfragmented subalpine areas for nesting and is only known from 66 sites in Maine (Vermont Institute of Natural Science). For the past eight years, BPL has run a Bicknell's thrush survey route in cooperation with the Vermont Institute for Natural Science on the trail from the cabin to the summit, documenting the population levels on the mountain.



One of the rocky drainages that hosts a population of Hornemann's willow-herb.

Both the northwest and southeast summits of Mt. Abraham host a number of rare alpine plant species. Lapland diaspensia (*Diapensia lapponica*), a plant with a low, “pincushion” shape, is found on both summits. Alpine blueberry (*Vaccinium boreale*) and northern comandra (*Geocaulon lividum*) are also on both summits. The northern comandra tends to have a patchy distribution in the alpine area, tucked in among sheep laurel, blueberry, and krummholz vegetation. In addition, the northwest summit hosts a small patch of Bigelow’s sedge (*Carex bigelowii*) near the fire tower, which has been partially trampled by hikers. Lastly, a single individual of a rare hybrid birch (*Betula x minor*) (S1) has been found on the southeast slope of the northwest summit.

Hornemann’s willow-herb (*Epilobium hornemannii*) (S1) has been found in several shaded, moist, rocky drainages on the east side of the mountain including Norton Brook. Northern firmoss (*Hypersia selago*) (S1) was also found along the margins of Norton Brook.

Of note is the state’s largest mountain ash (*Sorbus americana*), which grows on the slopes of Mt. Abraham. Though not a rare species, this remarkable tree has a circumference of 47 inches and a height of 49 feet.

Natural Communities

The most distinctive feature of Mt. Abraham is, of course, its summit, and a host of exemplary natural communities are found there. All of the communities described below are considered exemplary, and collectively they form an exemplary Alpine Ecosystem.

The majority of the northwest alpine area can be classified as a Crowberry-Bilberry Summit Bald. Alpine bilberry (*Vaccinium uliginosum*), Labrador tea (*Rhododendron groenlandicum*), sheep laurel (*Kalmia angustifolia*), low sweet blueberry (*Vaccinium angustifolium*), mountain cranberry (*Vaccinium vitis-idea*), heart-leaved birch (*Betula cordifolia*), and fruiticose lichens dominate the treeless area. Small patches of Spruce – Fir – Birch Krummholz, with black spruce (*Picea mariana*) and balsam fir (*Abies balsamea*), are common in this area and form a lower elevation apron around the exposed alpine habitat.

A small example (four acres) of a Diapensia Alpine Ridge occurs on the northeast slope along either side of the Fire Wardens Trail. Abundant amounts of *Diapensia lapponica* and purple crowberry (*Empetrum eamesii*) are characteristic of this area.

The southeast summit of Mt. Abraham is much like the main summit. Steep talus slopes dominate the alpine zone with beds of ericaceous vegetation and krummholtz mixed throughout the community. The area above treeline is again a Crowberry-Bilberry Summit Bald, with alpine bilberry (*Vaccinium uliginosum*), Labrador tea (*Ledum groenlandicum*), mountain cranberry, black spruce, and heart-leaved birch. Spruce-Fir-Birch Krummholtz and Subalpine Heath Krummholz are found at the bottom of the talus slopes and in the saddle between knolls. A dense thicket of stunted black spruce, balsam fir, and heart-leaved birch characterize these areas. The substrate is organic with peat and

lichens. A line of cairns passed through this area and a small amount of trampling was noted.

The base of the talus slope along the Fire Warden's trail on the north slope has several patches of a one to two acre Labrador Tea Talus Dwarf-Shrubland. Dense patches of Labrador tea (*Rhododendron groenlandicum*), black crowberry (*Empetrum nigrum*), and sheep laurel (*Kalmia angustifolia*) with six to ten foot tall black spruce (*Picea mariana*) characterize this area.

Management Considerations

- Fragile alpine areas can be trampled by hikers who stray off trail. Efforts should be made to keep hikers on established trails and keep trampling at the summit to a minimum.
- Snowmobile and ATV use has been noted in the subalpine forest and even into the alpine zone in violation of Ecological Reserve guidelines. Vegetation in these areas grows slowly and is slow to recover from damage. ATV use in alpine areas is prohibited by law, and these trails should be discontinued and repaired.
- All of the rare plants and animals and exemplary natural communities occur within the Ecological Reserve portion of the unit, so the recreation impacts described above are the primary concern for maintaining the quality of these areas.
- Roads on the unit have some rutting and erosion; they should be either closed or improved.

References

Cogbill, Charles. 1998. An Ecological Assessment of Mead and SAPPI Corps. on Mounts Abraham and Saddleback, Maine, a final report for The Appalachian Trail Conference.

Appendix 1: Exemplary Natural Communities and Rare Plant Species of the Mt. Abraham Unit

Mt. Abraham						
Feature Name	Location	S-rank	EO-Rank	Last Obs.	Size (ac)	EO number
Alpine Ecosystem	NW and SE summits	S2	B	2004	450	.002
Crowberry-Bilberry Summit Bald	SE summit	S3	A	2004	148	.007
Crowberry-Bilberry Summit Bald	NW summit	S3	C	2004	87	.009
Diapensia Alpine Ridge	NW summit	S1	C	2004	4	.001
Labrador Tea Talus Dwarf-Shrubland	NW slopes	S2	B	2004	8	.004
<i>Diapensia lapponica</i>	NW Peak	S2	B	2004		.001
<i>Diapensia lapponica</i>	SE Peak	S2	C	2004		.015
<i>Vaccinium boreale</i>	NW Peak	S2	B	2004		.006
<i>Vaccinium boreale</i>	SE Peak	S2	A	2004		.014
<i>Geocaulon lividum</i>	NW Peak	S2	B	2004		.015
<i>Geocaulon lividum</i>	SE Peak	S2	A	2004		.024
<i>Carex bigelowii</i>	NW Peak	S2	CD	2004		.007
<i>Epilobium hornemanii</i>	Norton Brook	S1	AB	2004		.006
<i>Epilobium hornemanii</i>	Unnamed Stream	S1	A	2004		.003
<i>Huperzia selago</i>	Norton Brook	S1	C	2004		.005
<i>Betula minor</i>	NW Peak	S1	B	1997		.002

Appendix 2: Rare Plant Fact Sheets



Maine Department of Conservation
Natural Areas Program

Betula minor (Tuckerman) Fern.

Dwarf White Birch

Habitat: Acidic rocky barrens, peats and alpine summits of higher mountains. [Alpine or subalpine (non-forested, upland)]

Range: Labrador to Newfoundland, south to the mountains of Gaspé Peninsula, Quebec, northern New England, and northern New York.

Phenology: Flowers June - July.

Family: Betulaceae

Aids to Identification: *Betula minor* is an erect or irregularly spreading shrub up to 5 m with reddish brown bark. *Betula minor* has characters of both *Betula cordifolia* and *B. glandulosa*, thus complicating identification. The twigs are sparsely pubescent to glabrous, the leaves are coarsely doubly serrate with pubescence on the major veins. As compared to *B. cordifolia*, the catkins are longer, the wings of the samaras (fruit) are wider, and the flowers appear slightly earlier. Compared to *Betula glandulosa*, the leaves are larger, relatively more pointed, and with a subcordate base.



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

Ecological characteristics: This birch may have arisen through hybridization between dwarf birch (*B. glandulosa*) and mountain paper birch (*B. cordifolia*). This plant occurs on Maine's highest mountains.

Synonyms: Taxonomy and origin of *B. minor* are not fully understood and many names have been misapplied or rejected in past treatments. Formerly referred to as *Betula x minor*, *Betula borealis* Spach., *Betula pubescens* ssp. *minor* (Tuckerman) A. & D. Love

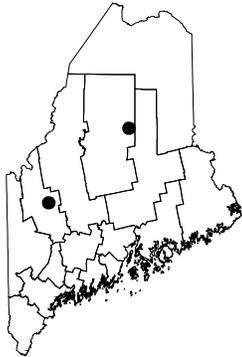
Rarity of *Betula minor*

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:	G4?Q	Rare globally, or abundant and apparently secure globally but with cause for long-term concern (uncertain, questionable taxonomy).

Status of *Betula minor*

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, Special habitat, At edge of range, Vulnerable to human activity

Known Distribution in Maine:



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

This rare plant has been documented from a total of 2 town(s) in the following county(ies): Franklin, Piscataquis.

Dates of documented observations are: 1994, 1997, 2000

Reason(s) for rarity:

Disjunct from principal 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 05 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

Rare Plant Fact Sheet
PMCYP031R0

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

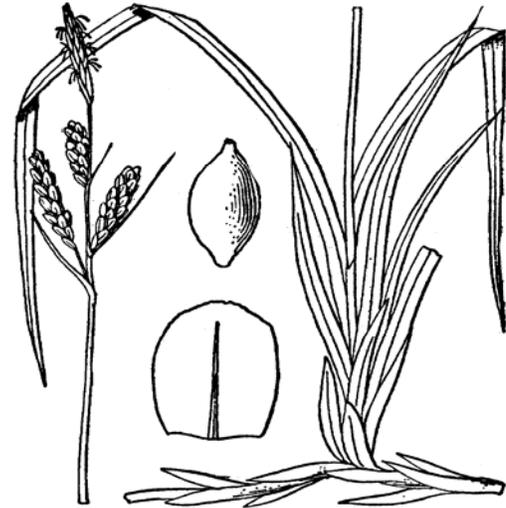


Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

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, leucicular achenes, and separate staminate and carpelate 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.

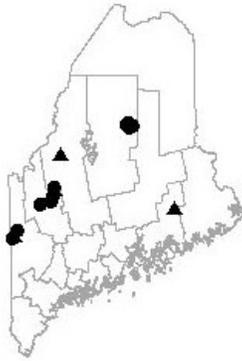
Synonyms: Maine populations are *C. bigelowii* ssp. *bigelowii*

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.



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

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

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.

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.





Diapensia lapponica L.

Lapland Diapensia

- Habitat:** Alpine areas, bare ledges and gravel [Alpine of subalpine (non-forested upland)]
- Range:** Circumboreal. South to ME, NH, VT, and NY.
- Phenology:** Flowering June and July.
- Family:** Diapensiaceae

Aids to Identification: *Diapensia* is a tufted alpine sub-shrub with white 5-lobed flowers and opposite leaves. This species grows in very dense "cushions" and mats above treeline. The leaves are small and ovate in shape. Colloquially called a cushion plant.



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

Ecological characteristics: Found above treeline on Maine's highest mountains. Grows on bare rock and gravel. Maine's populations are *Diapensia lapponica* var. *lapponica*.

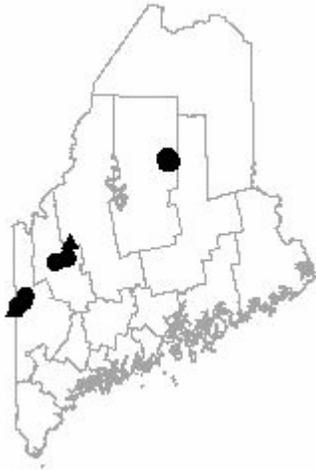
Synonyms: none

Rarity of *Diapensia lapponica*

- State Rank:** S2 Imperiled in Maine because of rarity or vulnerability to further decline.
- New England Rank:** None
- Global Rank:** G5 Species is demonstrably widespread, abundant, and apparently secure globally.

Status of *Diapensia lapponica*

- 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 to present)

Known Distribution in Maine:

This rare plant has been documented from a total of 9 towns in the following counties: Franklin, Oxford, Piscataquis, Somerset.

Dates of documented observations are: 1926 (2), 1947, 1962, 1964, 1965, 1967, 1974, 1981, 1982, 1984 (4), 1996, 1997 (2), 1998, 2000, 2001 (2)

Reasons for rarity:

Alpine habitat is scarce in Maine, at southern limit of range.

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.

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

Epilobium hornemannii Reichenb.

Hornemann's Willow-herb

Habitat: Damp rocks, margins of small brooks.
[Alpine or subalpine (non-forested, upland)]

Range: Arctic America south to Labrador and Newfoundland, Gaspé, Cape Breton, mountains of Maine, New Hampshire, New York, Colorado, Utah, Nevada and California. Also Greenland, Iceland, Scandinavia, northeast Asia.

Phenology: Flowers July - August.

Family: Onagraceae

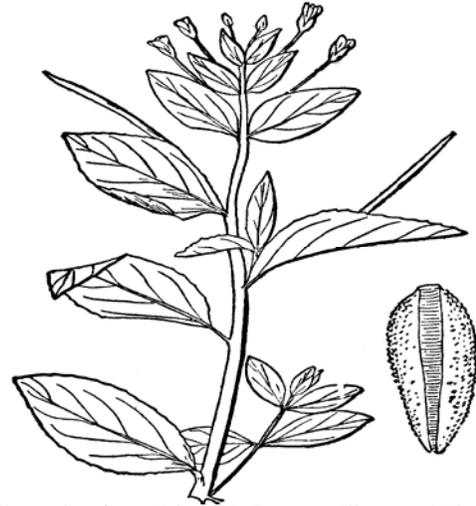


Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: Hornemann's willow-herb is a matted perennial with slender stems, 0.5-4.5 cm. It usually has five pairs of thin, smooth, slightly toothed ovate leaves 1.5-5 cm long, 0.1-2.5 cm broad, on short petioles. Its flowers have four pink petals, 5-8 mm long. The slender seed pods are sparsely pubescent, 2-7 cm. The seeds, under a magnifying glass, are distinctly pebbled.

Ecological characteristics: Other than its restriction to damp places, usually along streams, very little is known about the ecology of this species.

Synonyms: Former names include *Epilobium alpinum* L. var. *nutans* Hornem. Maine populations are *E. hornemannii* var. *hornemannii*.

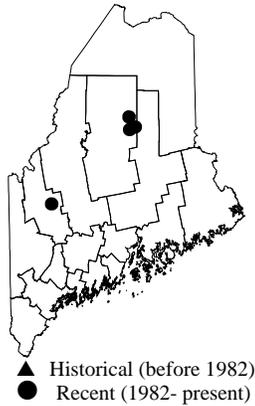
Rarity of *Epilobium hornemannii*

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 in New England.
Global Rank:	G5	Demonstrably widespread, abundant, and secure globally.

Status of *Epilobium hornemannii*

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, Special habitat, At edge of range, Vulnerable to human activity

Known Distribution in Maine:



This rare plant has been documented from a total of 3 town(s) in the following county(ies): Franklin, Piscataquis.

Dates of documented observations are: 1984 (2), 1985, 1997, 2000

Reason(s) for rarity:

Disjunct from principal range, possible scarcity of suitable habitat.

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 12 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

Geocaulon lividum (Richards.) Fern.

Northern Comandra

Habitat: In moss or damp humus, often in alpine or subalpine areas. [Coastal non-tidal wetland (non-forested, wetland); Alpine or subalpine (non-forested, upland)]

Range: Labrador and Newfoundland to Alaska, south to northern New England and northern New York.

Phenology: Flowers June - August.

Family: Santalaceae

Aids to Identification: This perennial herb grows to 10-30 cm, with veiny, rounded or blunt leaves, 1-4 cm long. The flowers grow on stalks from the leaf-axils in groups of 3, usually 2 of the 3 flowers bear pollen only, so only one flower of each cluster will actually develop into a fruit. The petals are greenish-purple and triangular. The fleshy fruit is juicy, 5-10 mm thick, and orange-yellow to red in color.



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

Ecological characteristics: In Maine this species typically occurs in nutrient poor areas, such as peatlands or krummholz, often in association with ericaceous vegetation.

Synonyms: Referred to in some very old treatments as *Comandra livida*.

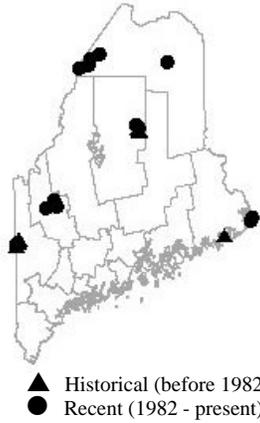
Rarity of *Geocaulon lividum*

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

Status of *Geocaulon lividum*

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 14 town(s) in the following county(ies): Aroostook, Franklin, Oxford, Piscataquis, Washington.

Dates of documented observations are: 1900 (2), 1907, 1950, 1957, 1978, 1982 (5), 1984, 1985, 1989, 1990, 1996 (3), 1997, 1999 (3), 2000 (2), 2002 (2)

Reason(s) for rarity:

Disjunct from principal range. Inconspicuous and easily overlooked when not in fruit.

Conservation considerations:

Maintain hydrology of its wetland habitats. Some populations in the Mahoosucs may be subject to heavy recreational (hiking) impacts.

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.

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

Huperzia selago (L.) Bernh. ex Mart. & Schrank

Northern Firmoss

- Habitat:** Damp or mossy rocks, barrens, cold woods
- Range:** Circumboreal; Labrador and Greenland to Alaska, south to the mountains of Maine, New Hampshire, Vermont and northern New York, on the summits of the higher Alleghenies to North Carolina, and to Michigan and Washington. Also in Europe and Asia.
- Phenology:** Sporates July - September.
- Family:** Huperziaceae (formerly in Lycopodiaceae)

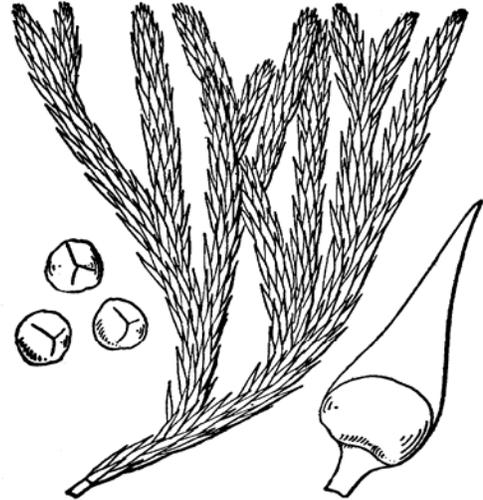


Illustration from Britton & Brown's Illustrated Flora of the Northern United States and Canada, 2nd ed.

Aids to Identification: Northern firmoss is similar in appearance to some other, more common, firmosses. Its dense, leafy stems grow 5-10 cm high, in close tufts, giving the clumps a flat-topped appearance. The scale-like leaves bear the sporangia (spore-producing bodies) in their axils, so that the yellowish spikes characteristic of most clubmosses are lacking. *Huperzia selago* is very similar to *H. appalachiana* and the two species are very difficult to separate. *H. appalachiana* has smaller, more upward oriented leaves and determinate stems (i.e., the entire stem dies and turns yellow). *H. selago* has larger, more spreading or recurved leaves and indeterminate stems.

Ecological characteristics: *Huperzia selago* is not an alpine species, contrary to previous thought. Popular sites for *H. selago* in New England include disturbed sites near water, such as shores, ditches, and coniferous forests. Hybrids with *H. appalachiana* are frequent above treeline on New England's higher alpine summits. But *H. selago* is not found above treeline.

Synonyms: Formerly known as *Lycopodium selago*.

Rarity of *Huperzia selago*

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

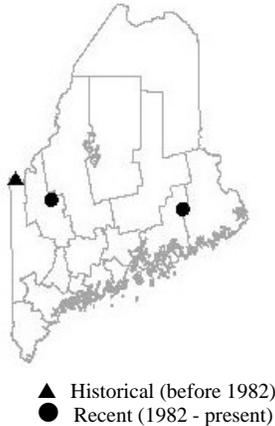
Status of *Huperzia selago*

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 3 town(s) in the following county(ies): Franklin, Oxford, Washington.

Dates of documented observations are: 1975, 1990, 1999



Reason(s) for rarity:

At southern limit of its 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.

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.

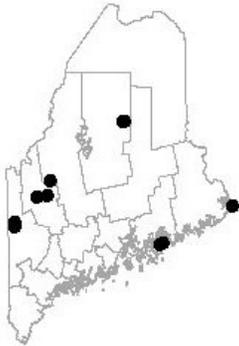
Synonyms: Formerly considered a variety of *Vaccinium angustifolium*; now known to be chromosomally and morphologically distinct.

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.

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.



Appendix 3: Maps of the Mt. Abraham Unit