

Appendix 8

Maine's Natural Community Profiles

FCU1

State Rarity Rank: S4

White Pine - Mixed Conifer Forest

White Pine Forest

Community Description

This is a closed-canopy forest type in which white pine is dominant. Occasionally red spruce, red pine, hemlock or (coastally) northern white cedar may be nearly co-dominant with the white pine; in fact, because the pine trees tend to be larger and the other trees smaller, the smaller trees may be more numerous. In many of these forests, the dense and strongly coniferous canopy limits understory growth. Shrub cover is rarely >20%, and the herb layer rarely exceeds 30%. The herb layer can include a spotty mixture of dwarf shrubs like lowbush blueberry, forbs, or ferns, but graminoids are very uncommon. Canada mayflower is ubiquitous. The ground layer is mostly conifer litter, with bryoid cover <25%; large hair-cap moss and red-stemmed moss are common species.

This type occurs on sandy to loamy mesic soils (usually well drained, occasionally imperfectly drained or very well drained), often with a slowly decomposing duff layer of conifer needles. Soils are generally shallow (<40 cm) and moderately acidic (pH 5.0 - 6.0). These forests are usually at low elevations (< 900'), on slopes or coarse-textured flats.

Diagnostics

White pine is dominant (highest basal area), > 33% RD; red oak and northern hardwood species (beech, sugar maple, yellow birch) total < 25% RD; sparse herbaceous / heath shrub layer.

Similar Types

Red Pine - White Pine Forest has red pine > white pine. Hemlock Forest has hemlock > white pine. Where red spruce is co-dominant, this type can grade into Spruce - Fir forest types. Oak - Pine Forests and Red Oak - Northern Hardwoods - White Pine Forests have red oak at > 33% RD.

Characteristic Species**Canopy:**

Red maple	(F,C)
Eastern hemlock	(C)
Red spruce	(F,C)
Northern white cedar	(C)
White pine	(F,C)

Sapling/Shrub:

Balsam fir	(F,C)
Red maple	(F,C)
Red spruce	(F,C)
Beaked hazelnut	(C)
Red pine	(C)
White pine	(C)
Wild-raisin	(C)

Dwarf Shrub:

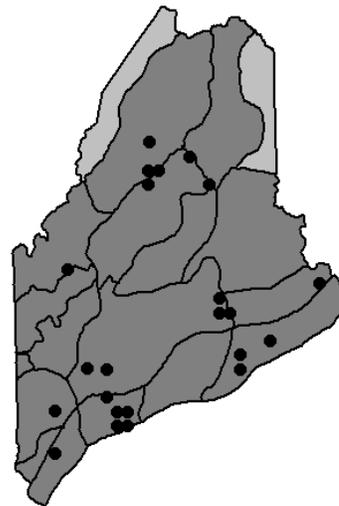
Lowbush blueberry	(F,C)
Swamp dewberry	(C)

Herb:

Canada mayflower	(F,C)
Starflower	(F)
Balsam fir	(C)

Bryoid:

<i>Dicranum</i> moss	(F,C)
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Distribution: Statewide, less common northward; extends in all directions from Maine.

Landscape Pattern: Large Patch

FCU1

State Rarity Rank: S4

White Pine - Mixed Conifer Forest

White Pine Forest

Conservation, Wildlife and Management Considerations

Demand for white pine has reduced mature, undisturbed examples of this type considerably. Most sites known to be of high ecological quality lack formal protection. Maintaining the surrounding lands as forest is important in conserving particular stands of this type, particularly given that many known examples are small (< 50 acres).

This community type may be used as nesting habitat by a number of coniferous or mixed forest specialist bird species such as the sharp-shinned hawk, pine warbler, black-throated green warbler, blackburnian warbler, and red crossbill.

Examples on Conservation Lands

Chamberlain Lake Public Lands
 Bearce Lake, Moosehorn National Wildlife Refuge
 Scientific Forest Management Area, Baxter State Park
 Gero Island Public Lands
 Wassataquoik Public Lands
 Bigelow Preserve Public Lands

Piscataquis Co.
 Washington Co.
 Piscataquis Co.
 Piscataquis Co.
 Penobscot Co.
 Franklin Co.

Cross-reference to Other Classifications**New Hampshire**

Hemlock - beech - oak - pine forest S5

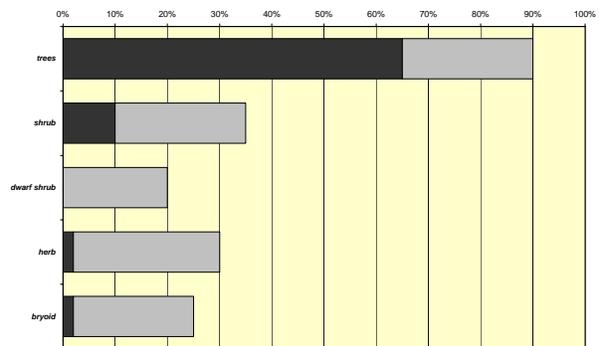
National Vegetation Classification

CEGL006324 Pinus strobus - Tsuga canadensis - Picea rubens Forest G?

CEGL006328 Pinus strobus - Tsuga canadensis Lower New England / Northern Piedmont Forest G5

SAF Type

21 Eastern white pine ?
 22 White pine - hemlock ME > SAF

Vegetation Structure (total cover by stratum)***Literature References***

Nichols 1935
 Bromley 1935
 Brown et al. 1982

Community Description

This closed-canopy forest type is dominated by hemlock (> 50% RD) or, less often, hemlock is co-dominant with red spruce, red oak, yellow birch, red maple, or sugar maple (very rarely with northern white cedar, near the coast). White pine is an important associate in some stands. The conifer canopy allows little light to reach below, and the shrub, herb, and bryoid layers are sparse (each usually < 25%, and sometimes absent altogether). Small conifers are present in the herb layer, as well as scattered individuals of typical upland conifer forest plants: Canada mayflower, starflower, Indian cucumber-root, partridgeberry, wild sarsaparilla, and wintergreen. Graminoids are rarely very apparent. The ground layer is mostly conifer litter, with spotty bryophyte cover.

Hemlock forests are usually on slopes (typically 5-50%) and ravines, with well-drained sandy to loamy soil. On lower slopes and flats, soils may grade to imperfectly drained. Soils tend to be shallow (< 50 cm) and acidic (pH 4.8 - 5.6). Sites are from sea level to 1200' and often in cool microsites, although aspect varies.

Diagnostics

Hemlock is the dominant tree, occasionally co-dominant with red spruce or red maple; soils are typically not saturated; sparse herbaceous and bryoid layers.

Similar Types

White Pine - Mixed Conifer Forests have more white pine than hemlock. Mixed examples of this type can be transitional to Beech - Birch - Maple Forests but hemlock RD will be greater than 33%. Hemlock - Hardwood Pocket Swamps have wetland soils and vegetation, red maple and/or black gum co-dominant with the hemlock, and more well-developed shrub, herb, and bryoid layers.



Distribution: Statewide, less common northward; extends in all directions from Maine.

Landscape Pattern: Small to Large Patch

Characteristic Species

Canopy:		Sapling/Shrub:	
Red maple	(F)	American beech	(C)
Paper birch	(F)		
Red spruce	(F,C)	Herb:	
Eastern hemlock	(F,C)	Canada mayflower	(F)
Yellow birch	(C)		
Red oak	(C)	Bryoid:	
Sugar maple	(C)	Three-lobed bazzania	(F)
White pine	(C)	<i>Dicranum</i> moss	(F)

Conservation, Wildlife and Management Considerations

Demand in the 1700s -1800s for hemlock reduced mature, undisturbed examples of this type considerably, yet poor market conditions more recently have caused hemlock to be left in partial harvests; many of these legacy trees are quite old. Some evidence suggests that hemlock is less successful at maintaining itself in the face of human-caused disturbance than are northern hardwoods. Most sites known to be of high ecological quality lack formal protection. Maintaining the surrounding lands as forest is important in conserving particular stands of this type, particularly given that many known examples are small (< 50 acres).

This community type may be used as nesting habitat by a number of coniferous forest specialist bird species, such as the yellow-bellied flycatcher, black-throated green warbler, blackburnian warbler, red crossbill, and northern parula.

Examples on Conservation Lands

Nesuntabunt Mountain, Nahmakanta Public Lands	Piscataquis Co.
Scraggly Lake Public Lands	Penobscot Co.
Cooper Brook, Appalachian Trail	Piscataquis Co.
Magoon Pond Public Lands	Penobscot Co.
Fourth Machias Lake, Duck Lake Public Lands	Washington Co.
Little Concord Pond Public Lands	Oxford Co.
Tilden Pond, Donnell Pond Public Lands	Hancock Co.
Squa Pan Mountain, Squa Pan Public Lands	Aroostook Co.
North of Carlton Notch, White Mountain National Forest	Oxford Co.

Cross-reference to Other Classifications

New Hampshire

Hemlock - beech - northern hardwood forest	S4
Hemlock forest	S4

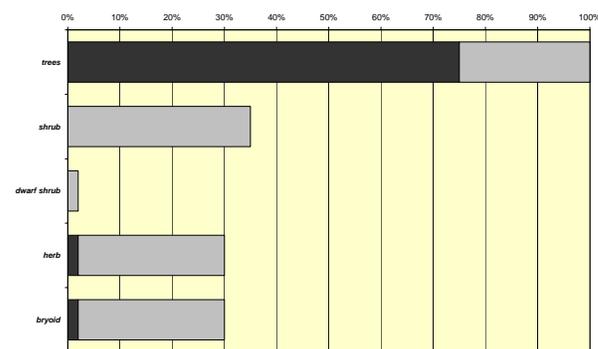
National Vegetation Classification

CEGL006129	Tsuga canadensis - Betula alleghaniensis - Picea rubens / Cornus canadensis Forest	G?
CEGL006109	Tsuga canadensis - Betula alleghaniensis Lower New England / Northern Piedmont Forest	G4?

SAF Type

23	Eastern hemlock	ME > SAF
24	Hemlock - yellow birch	?

Vegetation Structure (total cover by stratum)



Literature References

Nichols 1935
 Rogers 1980
 Rogers 1978
 Bard 1967
 Brown et al. 1982
 Coffman and Willis 1977
 Singleton et al. 2000

FCU3

State Rarity Rank: S3

Red Pine - White Pine Forest

Red and White Pine Forest

Community Description

These are upland forests with red pine the dominant tree; white pine, red spruce, or, near the coast, northern white cedar may be co-dominant. The canopy closure may be somewhat sparse but closure is >70%. Especially in post-fire sites, the canopy may include deciduous trees, typically red maple or big-toothed aspen. Lower layers are generally sparse (<25% cover) and with few species; some sites may have scattered heath shrubs such as black huckleberry, lowbush blueberry, or sheep laurel. Bracken fern and wintergreen are almost always present in the herb layer, but at low cover. Graminoids are virtually absent. The ground is typically covered with conifer litter and patches of bryophytes, or less commonly, lichens.

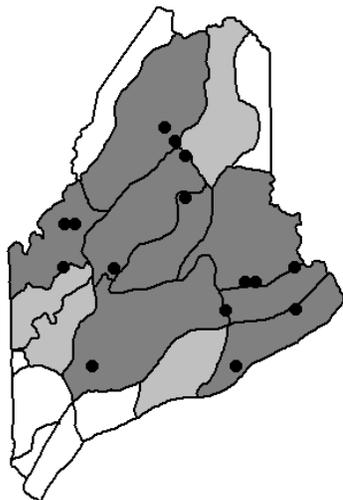
Sites are usually on slopes of <25% or low ridges (< 1000'), on dry-mesic to xeric soils that are somewhat to very shallow (10-50 cm to obstruction, usually bedrock). Soils are coarse (sandy loams to sands) and acidic (pH typically 4.8 - 5.2). Many sites have evidence of past fires.

Diagnostics

The forest canopy typically exceeds 65%; red pine dominant; heath shrub layer usually sparse (< 15%).

Similar Types

Red Pine Woodlands have a more open canopy (usually <50%) and a more well developed heath shrub layer (> 25%), and are usually on sites with only a very thin soil layer, or merely an organic layer, over bedrock. White Pine - Mixed Conifer Forests may contain red pine, but white pine is more dominant.



Distribution: Eastern Broadleaf Forest Province and New England - Adirondack Province, extending both east and west from Maine.

Landscape Pattern: Small Patch

Characteristic Species**Canopy:**

Red spruce (F,C)
 Red pine (F,C)
 White pine (F)
 Big-toothed aspen (C)
 Northern white cedar (C)

Sapling/Shrub:

Balsam fir (F)
 Red spruce (F)

Dwarf Shrub:

Black huckleberry (C)

Herb:

Wintergreen (F)
 Canada mayflower (F)
 Bracken fern (F)
 Starflower (F)

Bryoid:

Red-stemmed moss (F)
Dicranum moss (F)

FCU3

State Rarity Rank: S3

Red Pine - White Pine Forest

Red and White Pine Forest

Conservation, Wildlife and Management Considerations

Red and white pine are both widely planted, but natural occurrences of this type are fairly rare. These forests apparently require fire for persistence or regeneration, but community dynamics are not well documented. Most known sites are small, lack formal protection, and could be maintained within a forested matrix.

This community type may be used as nesting habitat by a number of coniferous forest specialist bird species, such as the pine warbler and red crossbill. It may also include rare moths such as the oblique zale and the pine sphinx, whose larvae feed on red pine.

Examples on Conservation Lands

Fifth Lake Stream, Duck Lake Public Lands	Hancock Co.
Wadleigh Mountain, Baxter State Park	Piscataquis Co.
Moose River	Somerset Co.
Gassabias Lake, Duck Lake Public Lands	Hancock Co.
East Machias River, Rocky Lake Public Lands	Washington Co.
Attean Pond At Moose River	Somerset Co.

Cross-reference to Other Classifications**New Hampshire**

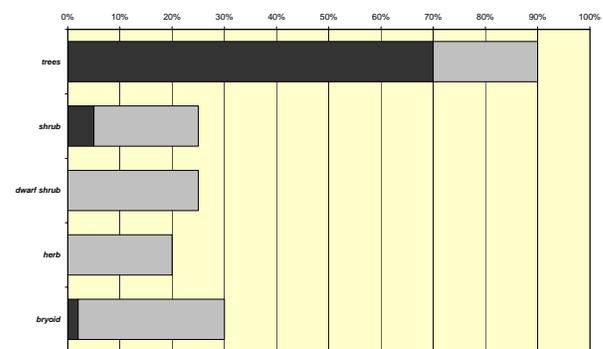
Red pine forest/woodland, forest phase	S2
Red pine-white pine-balsam fir forest	S3

National Vegetation Classification

CEGL002444	Pinus strobus / Vaccinium spp. Forest	G3G4
CEGL006253	Pinus strobus - Pinus resinosa / Cornus canadensis Forest	G?

SAF Type

15	Red pine	ME < SAF
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Vegetation Structure (total cover by stratum)***Literature References***

FCU4

State Rarity Rank: S4

Maritime Spruce - Fir Forest

Maritime Spruce - Fir Forest

Community Description

Red spruce, white spruce, balsam fir, and/or larch are dominant in this coastal type. Composition is variable from the southwest to downeast coast. Red and white spruce are the most typical dominants; northern white cedar or hemlock are rarely co-dominant. The patchy canopy may contain gaps with red maple or paper birch. Extreme maritime sites have large amounts of mountain ash and heart-leaved paper birch, and fir more abundant than spruce. Spruce and fir regeneration is common in the shrub and herb layers. Herbs and dwarf shrubs are <10% cover each, though in the extreme maritime type, montane herbs such as northern wood-sorrel and whorled aster may be locally abundant. The bryoid layer is >15% cover, dominated by bryophytes rather than by lichens.

Sites are along the immediate coast, often foggy and cool, on flats or lower to mid slopes (0-15%, may be steeper); aspect varies. Soils are shallow (<40 cm) over bedrock or till, with a well developed organic layer; acidic (pH 4.8 - 5.2) and mesic (well drained to somewhat poorly drained); texture is sandy to loamy.

Diagnostics

The variant dominated by fir and mountain ash is distinct. Otherwise, white spruce is an indicator, though not always present. Little or no blue-bead lily, wood-ferns, painted trillium. Broom-mosses do not dominate the bryoid layer (though they may be present).

Similar Types

Spruce - Fir - Broom-moss Forests are the most similar. They occur in more inland settings and, like this type, often have only sparse herbs, but unlike this type their bryoid layer is dominated by broom-mosses. In poorly drained areas, this type may grade into the Spruce - Fir - Cinnamon Fern Forest, which is distinguished by having seasonally flooded or saturated soils and a more prominent cover of herbs and bryoids; along the coast, it usually occurs in small basins.

Associated Rare Plants

Swarthy sedge
White adder's-mouth

Characteristic Species

Canopy:

Red spruce	(F,C)
Balsam fir	(F,C)
Eastern hemlock	(C)
Mountain ash	(C)
Northern white cedar	(C)
Paper birch	(C)
Red maple	(C)
White spruce	(C)

Sapling/Shrub:

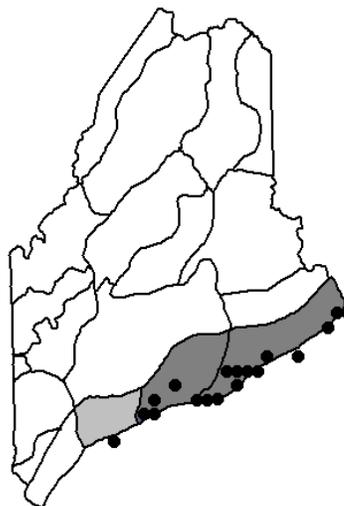
Red spruce	(F,C)
Balsam fir	(F,C)

Herb:

Starflower	(F)
Canada mayflower	(F)
Balsam fir	(C)
Red spruce	(C)

Bryoid:

Pincushion moss	(F)
<i>Dicranum</i> moss	(F)
<i>Sphagnum</i> mosses	(F)
Three-lobed bazzania	(F)



Distribution: Coastal, primarily from mid-coast Maine eastward into the Canadian Maritimes (Laurentian Mixed Forest Province).

Landscape Pattern: Large Patch

FCU4

State Rarity Rank: S4

Maritime Spruce - Fir Forest

Maritime Spruce - Fir Forest

Conservation, Wildlife and Management Considerations

After centuries of intensive use, almost no original forest remains. Many now-mature forests are on old pastureland. Many good (albeit secondary-growth) sites are in conservation ownership. Acadia National Park contains a variety of successional stages of this type, including stands that burned in 1947 and stands that did not.

This community type may be used as nesting habitat by a number of coniferous forest specialist bird species, such as the pine warbler and red crossbill. It may also include rare moths such as the oblique zale and the pine sphinx, whose larvae feed on red pine.

Examples on Conservation Lands

Petit Manan Point, Petit Manan National Wildlife Refuge	Washington Co.
Otter Point and other sites, Acadia Natational Park	Hancock Co.
North Cutler Coast, Cutler Public Lands	Washington Co.
Turtle Island Preserve	Hancock Co.
Black Point Brook, Cutler Public Lands	Washington Co.
Fairy Head, Cutler Public Lands	Washington Co.
West Quoddy Head State Park	Washington Co.
Morse Mountain Preserve	Sagadahoc Co.
Hog Island Sanctuary	Lincoln Co.
Great Wass Island Preserve	Washington Co.

Cross-reference to Other Classifications**New Hampshire**

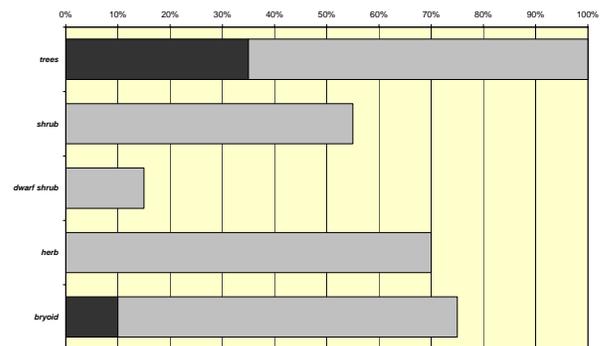
N/A

National Vegetation Classification

CEGL006151 Picea rubens - Picea glauca Forest G4G5

SAF Type

107	White spruce	ME > SAF
38	Tamarack	ME > SAF
33	Red spruce - balsam fir	ME > SAF
35	Paper birch - red spruce - balsam fir	?

Vegetation Structure (total cover by stratum)***Literature References***

- Davis 1966
 Davis 1964
 Mittlehauser et al. 1996

FCU5

State Rarity Rank: S3

Fir - Heart-leaved Birch Subalpine Forest

Subalpine Fir Forest

Community Description

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

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

Diagnostics

Fir or heart-leaved birch (occasionally paper birch) are dominant in a subalpine setting.

Similar Types

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

Associated Rare Plants

Northern comandra

Characteristic Species**Canopy:**

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

Sapling/Shrub:

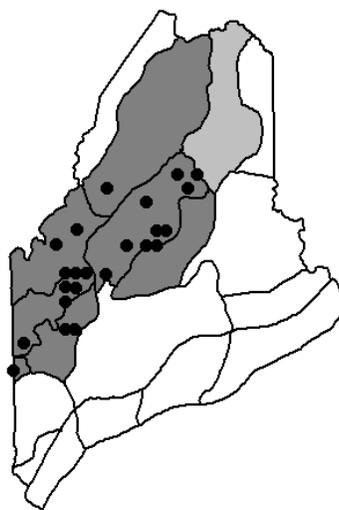
Balsam fir	(F,C)
Mountain ash	(F,C)
Black spruce	(C)
Heart-leaved paper birch	(C)
Wild-raisin	(F)

Herb:

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

Bryoid:

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



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

Landscape Pattern: Large Patch

FCU5

State Rarity Rank: S3

Fir - Heart-leaved Birch Subalpine Forest

Subalpine Fir Forest

Conservation, Wildlife and Management Considerations

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

A number of high elevation and/or coniferous forest specialist bird species nest in this habitat, including spruce grouse, dark-eyed junco, bay-breasted warbler, black-backed woodpecker, white-throated sparrow, and blackpoll warbler. The uncommon Bicknell's thrush inhabits structurally complex forests above 2500 ft. The rock vole and long-tailed shrew inhabit cool moist crevices in rocky habitat at high elevations. Northern bog lemmings may inhabit wet sub-alpine spruce-fir forests in which sphagnum moss is present.

Examples on Conservation Lands

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

Cross-reference to Other Classifications**New Hampshire**

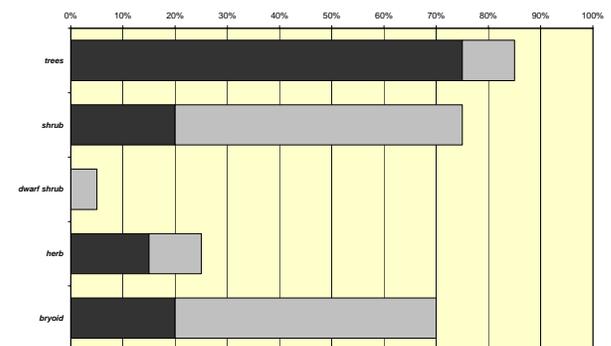
High-elevation balsam fir forest S3S4

National Vegetation Classification

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

SAF Type

5	Balsam fir	ME > SAF
18	Paper birch	?

Vegetation Structure (total cover by stratum)***Literature References***

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

FCU6

State Rarity Rank: S4

Spruce - Fir - Broom-moss Forest

Lower-elevation Spruce - Fir Forest

Community Description

These closed-canopy (>75% closure) forests are dominated by red spruce (>60% RD), typically with very few other species in any of the layers. Fir is often a minor canopy component (up to 20% RD). Hemlock is occasionally mixed with the spruce. The lower layers are sparse or patchy, consisting mostly of tree regeneration. In the sparse herb layer, dwarf shrubs are virtually absent except for spotty lowbush blueberry; herbaceous species cover well under 10% of the ground surface, usually consisting of scattered plants of Canada mayflower, starflower, and bunchberry. Most of the ground surface is bare conifer litter, although at some sites, bryophytes may form patchy cover. Broom-mosses are the most frequent and abundant (in relative terms) bryophytes.

Sites are typically on hill slopes (lower, middle, or upper) at elevations up to 2200'. Slopes are gentle to moderately steep; aspect is various. The podzolic soils are quite rocky and/or shallow (<40 cm to obstruction) and may be very acidic (pH 4.1 to 5.2), creating low-nutrient conditions. The somewhat xeric to mesic soils range from well drained to imperfectly drained; mottling is often present. Many sites have charcoal in the soil.

Diagnostics

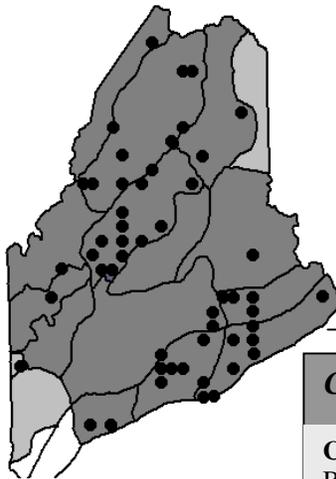
Red spruce is dominant; fir is usually present but much less abundant; regeneration is dense in patches; herbaceous species are almost absent (< 2% cover, up to 10%); bryoids are more abundant than herbs and dominated by broom-moss species.

Similar Types

Maritime Spruce - Fir Forests that are not the extreme fir - mountain ash type may be very similar, but generally feature bryoids other than broom-mosses (typically three-lobed bazzania or red-stemmed moss) and are within one-half mile of the coast. Spruce - Fir - Wood-sorrel - Feather-moss Forests have more herbs and a bryoid layer dominated by feather-mosses. Spruce - Heath Barrens have patchier canopies and more extensive shrub and herb layers. At higher elevations, this type can grade into Fir - Heart-leaved Birch Subalpine Forest, where spruce is far less abundant than fir.

Associated Rare Plants

Pink pyrola



Distribution: Statewide, characteristic of the Laurentian Mixed Forest Province and New England - Adirondack Province. Extends eastward, westward, and northward from Maine.

Landscape Pattern: Matrix

Characteristic Species

Canopy:		Herb:	
Balsam fir	(F)	Balsam fir	(C)
Red spruce	(F,C)	Red spruce	(C)
Eastern hemlock	(C)		
Sapling/Shrub:		Bryoid:	
Red spruce	(F,C)	Reindeer lichen	(F)
Balsam fir	(F,C)	Three-lobed bazzania	(C)
		<i>Dicranum</i> moss	(F)
		Red-stemmed moss	(F)
		Three-lobed bazzania	(F)

FCU6

State Rarity Rank: S4

Spruce - Fir - Broom-moss Forest

Lower-elevation Spruce - Fir Forest

Conservation, Wildlife and Management Considerations

This is the dominant spruce-fir type in Maine, and therefore extensively harvested and managed. Large (>1000 acres) examples free from human disturbance are scarce. Some areas of high ecological quality, in the hundreds of acres, are known but not necessarily designated as areas reserved from cutting. Almost all are within a landscape of managed forest rather than being surrounded by land that has been permanently cleared and converted to other uses.

This community type may be used as nesting habitat by a number of coniferous forest specialist bird species, such as the yellow-bellied flycatcher, black-throated green warbler, Blackburnian warbler, red crossbill, and northern parula.

Examples on Conservation Lands

East Nubble, Bigelow Preserve
 East Branch Pleasant River, Appalachian Trail
 Squa Pan Mountain, Squa Pan Public Lands
 Deboullie Ponds Public Lands
 Borestone Mountain Sanctuary
 Spruce Hill, White Mountain National Forest
 Ducktrap Mountain, St. Clair Preserve
 Tunk Mountain & Wizard Pond, Donnell Public Lands
 Big & Little Squaw Mountain Public Lands

Somerset Co.
 Piscataquis Co.
 Aroostook Co.
 Aroostook Co.
 Piscataquis Co.
 Oxford Co.
 Waldo Co.
 Hancock Co.
 Piscataquis Co.

Cross-reference to Other Classifications**New Hampshire**

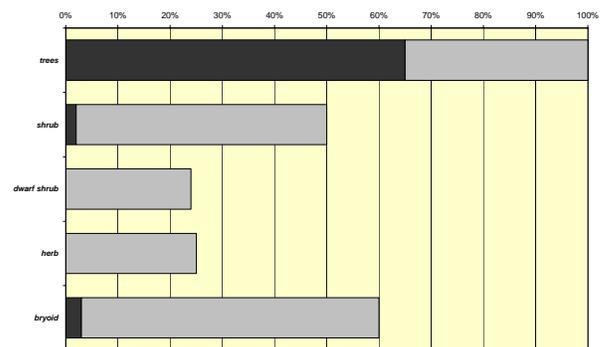
Lowland spruce - fir forest S2S3

National Vegetation Classification

CEGL006273 Picea rubens - Abies balsamea - Betula papyrifera Forest G?
 CEGL006505 Picea rubens - Betula spp. - Acer rubrum Forest G?

SAF Type

32 Red spruce ME > SAF
 33 Red spruce - balsam fir ME > SAF
 35 Paper birch - red spruce - balsam fir ?

Vegetation Structure (total cover by stratum)***Literature References***

Maycock 1961
 Chokkalingham 1999
 Fahey and Reiners 1981
 Cogbill 1985
 Oosting and Reed 1944
 Lorimer 1977

FCU7

State Rarity Rank: S4

Spruce - Fir - Wood-sorrel - Feather-moss Forest

Montane Spruce - Fir Forest

Community Description

These closed-canopy or sometimes patchy-canopy forests are dominated by red spruce (50-95% RD); fir is a common associate (up to 35% RD). Other conifers (northern white cedar, hemlock, or white pine) occasionally reduce the spruce dominance to as low as 40% RD. Striped maple is typical in the shrub layer, along with tree saplings. The herb layer is well developed (> 15%, and often >30%), with tree regeneration and an assortment of herbs. Dwarf shrubs are conspicuously absent, except for a bit of velvet-leaf blueberry. Herbs reflect a boreal or montane component, with bluebead lily, northern wood-sorrel, and creeping snowberry locally abundant. Most of the ground surface is a lush mosaic of feather-mosses and leafy liverworts.

These forests occur on cool and moist microsites at moderate elevations (600' - 2500', maybe slightly higher), and north of the 45th parallel. Slopes are moderate to steep (5-50%), north, west, or east facing. Soils are mostly well drained (some imperfectly drained) sandy to loamy and of moderate depth (25-50 cm) with a pH 5.0 - 5.5.

Diagnostics

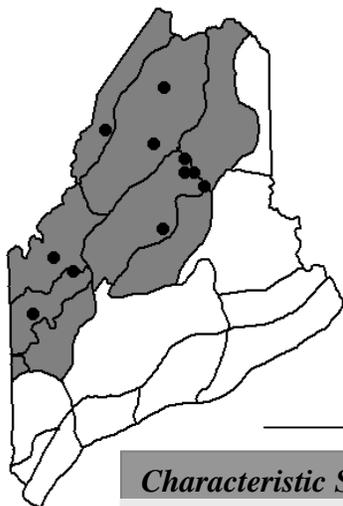
Red spruce is dominant; herbaceous species exceed 15% cover, with montane/boreal herbs (bluebead lily, northern wood-sorrel, creeping snowberry, mountain woodfern, and/or rose twisted stalk) locally common; bryophytes exceed 40% cover, with a large proportion of feathermosses.

Similar Types

Fir - Heart-leaved Birch Subalpine Forests can share many species, and often grade into this type as elevation decreases, but will have fir more abundant than spruce in the canopy, shorter trees, and canopy gaps more frequent. Spruce - Fir - Broom-moss Forests have similar canopies but much more depauperate herb and bryophyte layers. They lack the assortment of montane/boreal herbs and the most common mosses will be broom-mosses rather than feather-mosses. Some Maritime Spruce-Fir Forests have a similar herb layer, but if so have more canopy fir and occur along the immediate coast.

Associated Rare Plants

Boreal bedstraw
 Lesser wintergreen
 Northern firmoss
 Squashberry



Distribution: Western Maine westward (New England - Adirondack Province).

Landscape Pattern: Large Patch, mostly as hundreds of acres.

Characteristic Species

Canopy:		Herb:		Bryoid:	
Balsam fir	(F,C)	Bluebead lily	(F,C)	Red-stemmed moss	(F)
Red spruce	(F,C)	Goldthread	(F)	Mountain fern moss	(F)
		Bunchberry	(F)	Common broom-moss	(F,C)
Sapling/Shrub:		Creeping snowberry	(F,C)	Three-lobed bazzania	(F)
Red maple	(F)	Canada mayflower	(F)		
Balsam fir	(F,C)	Northern wood-sorrel	(F,C)		
Striped maple	(F)	Starflower	(F)		
Dwarf Shrub:		Painted trillium	(F)		
Velvet-leaf blueberry	(F)				

FCU7

State Rarity Rank: S4

Spruce - Fir - Wood-sorrel - Feather-moss Forest

Montane Spruce - Fir Forest

Conservation, Wildlife and Management Considerations

This is the characteristic spruce-fir type of mountain slopes just below the subalpine zone; it is extensively harvested and managed. Some areas of high ecological quality, in the hundreds of acres, are known but not necessarily designated as areas reserved from cutting. Almost all are within a landscape of managed forest rather than being surrounded by land that has been permanently cleared and converted to other uses.

This community type may be utilized as nesting habitat by a number of coniferous forest specialist bird species like the sharp-shinned hawk, yellow-bellied flycatcher, bay-breasted warbler, Cape May warbler, blackpoll warbler, northern parula warbler, blackburnian warbler, boreal chickadee, Swainson's thrush, red crossbill, and white-winged crossbill.

Examples on Conservation Lands

Chamberlain Lake Public Lands	Piscataquis Co.
Deboullie Ponds Public Lands	Aroostook Co.
Green Falls, Baxter State Park	Piscataquis Co.
Elephant Mountain, Appalachian Trail	Franklin Co.
Wassataquoik Public Lands	Penobscot Co.
Whitecap Mountain, Appalachian Trail	Piscataquis Co.
Lower Horns Pond Trail, Bigelow Preserve	Franklin Co.
Traveler Mountain, Baxter State Park	Piscataquis Co.

Cross-reference to Other Classifications**New Hampshire**

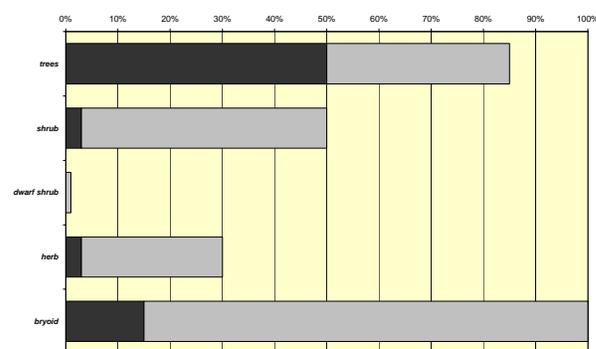
High-elevation montane spruce - fir forest S4

National Vegetation Classification

CEGL006128 Picea rubens - Abies balsamea - Sorbus americana Forest G3G5

SAF Type

32	Red spruce	ME > SAF
33	Red spruce - balsam fir	ME > SAF
35	Paper birch - red spruce - balsam fir	?

Vegetation Structure (total cover by stratum)***Literature References***

Foster and Reiners 1983
Fahey and Reiners 1981

FCU8

State Rarity Rank: S1

Jack Pine Forest

Jack Pine Forest

Community Description

This closed-canopy forest is dominated by jack pine in the canopy. Black spruce is a common associate (up to 20% RD, may be more common in the understory); red pine may be mixed with the jack pine in some areas. With the dense canopy, shrubs and herbs are limited in extent. Lowbush blueberry and boreal herbs such as bunchberry and Canada mayflower are typically present. The bryoid layer is very well developed, in places almost a continuous carpet of feather-mosses. In these forests, jack pine requires natural or human-caused disturbance to stimulate seed germination, and hence to regenerate. Jack pine forests would eventually succeed to spruce and fir without clearcuts or fire.

These forests are found on flat or rolling terrain at moderate elevations, north of 45 degrees latitude. The coarse-textured soils are acidic, nutrient poor, and well drained to excessively well drained. In the one area sampled, charcoal was found between the shallow organic layer and the mineral soil horizons.

Diagnostics

These are closed-canopy forests with jack pine dominant in canopy; black spruce and/or red pine are common and locally abundant associates.

Similar Types

Jack Pine Woodlands occur on bedrock, have a partial canopy with a well-developed shrub or dwarf shrub layer, and are found either near the downeast coast or on the shores of certain inland lakes. Spruce - Heath Barrens are ecologically similar, with many of the same species of boreal affinities. They may be either open- or closed-canopy, and lack jack pine.



Distribution: Limited to a small portion of northwestern Maine (New England-Adirondack Province); widespread in the uppermost midwest and adjacent Canada

Landscape Pattern: Large Patch

Characteristic Species**Canopy:**

Balsam fir (F,C)
Heart-leaved paper birch (F)
Jack pine (F,C)
Red pine (C)
Black spruce (F)

Sapling/Shrub:

Black spruce (F)

Dwarf Shrub:

Sheep laurel (F)
Lowbush blueberry (F)

Herb:

Creeping snowberry (F)
Bunchberry (F)
Bracken fern (F)
Canada mayflower (F)

Bryoid:

Red-stemmed moss (F,C)

FCU8

State Rarity Rank: S1

Jack Pine Forest

Jack Pine Forest

Conservation, Wildlife and Management Considerations

In the limited area from which this type is known in Maine, most of the jack pine forest has been clearcut within the last 25 years, and is coming back into young jack pine forest. Jack pine does not appear to be regenerating under its own dense canopy. This is likely a disturbance-dependant community, with fire the primary natural disturbance agent. Most of the known jack pine forest is on industrial forest land, with a small proportion on public land.

Jack pine forests provide nesting habitat for coniferous forest specialists. They may also be inhabited by rare moths such as the Western pine elfin, which often uses jack pine as a larval host plant in the Midwest and black spruce in the east.

Examples on Conservation Lands

Holeb - Attean Pond Public Lands

Somerset Co.

Cross-reference to Other Classifications**New Hampshire**

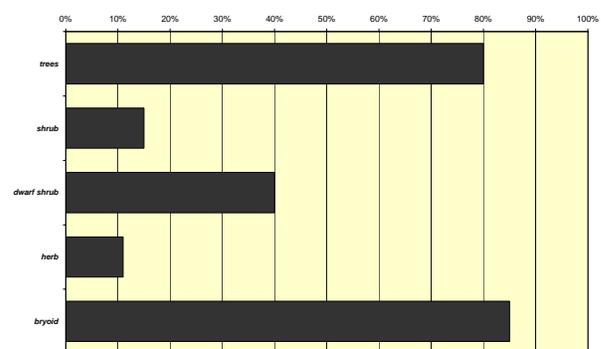
N/A

National Vegetation Classification

CEGL002441 Pinus banksiana / Vaccinium spp. / Pleurozium schreberi Forest G4G5

SAF Type

1 Jack pine - balsam fir - black spruce ME > SAF

Vegetation Structure (total cover by stratum)***Literature References***

Tyler and Davis 1982

FDU1

State Rarity Rank: S4

Beech - Birch - Maple Forest

Northern Hardwoods Forest

Community Description

These closed-canopy forests are dominated by a combination of beech, yellow birch, and sugar maple. Paper birch and red maple may be present at lower cover. Conifers and red oak are each <25% RD. Striped maple is a common subcanopy tree. The sparse shrub layer is dominated by tree regeneration. Dwarf shrubs are absent (lowbush blueberry occasional). The herb layer may be dominated by tree seedlings; herbs are sparse, usually <15% cover; but cover, richness and composition vary with site conditions. Nutrient-rich sites, such as many areas of northern Maine, tend to be dominated by sugar maple and have herbs like yellow violet, round-leaved violet, zig-zag goldenrod, and common grapefern that are absent elsewhere. The patchy bryoid layer (<20% cover) has broom-mosses and pincushion moss most common, and lacks lichens.

In central to southern Maine, sites are found on the lower to middle portion of hillslopes (slopes generally 10-50%), while northward sites tend to occur on mid-elevation ridges. Soils are generally mesic and well drained, though not deep (typically 15-50 cm), silt loams, sandy loams to loamy sands formed over glacial till; some occur on stabilized talus. Soil pH ranges from 5.0 - 5.6. Elevations range up to 2000'.

Diagnostics

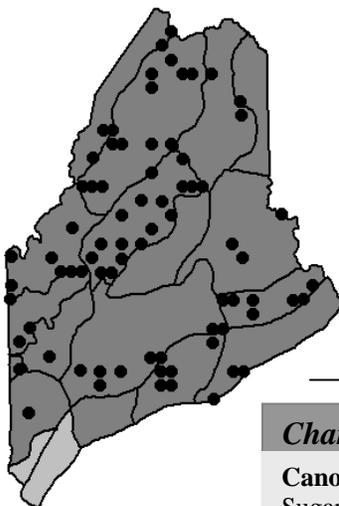
A combination of beech with sugar maple, yellow birch, or both distinguish this type. Conifers are less than 25% RD, as is red oak (which is often entirely absent). The herb layer lacks rich site indicators such as Dutchman's breeches, maidenhair fern, and pale jewel-weed.

Similar Types

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

Associated Rare Plants

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



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

Landscape Pattern: Matrix: typically hundreds of acres; high-quality patches usually now smaller.

Characteristic Species

Canopy:		Sapling/Shrub:		Herb:	
Sugar maple	(F,C)	American beech	(F,C)	Canada mayflower	(F)
Yellow birch	(F,C)	Striped maple	(F,C)	Starflower	(F)
American beech	(F,C)	Balsam fir	(C)	Bluebead lily	(C)
Eastern hemlock	(C)	Sugar maple	(C)	Shining clubmoss	(C)
Paper birch	(C)	Yellow birch	(C)	Sugar maple	(C)
		Hobblebush	(C)	Striped maple	(C)

FDU1

State Rarity Rank: S4

Beech - Birch - Maple Forest

Northern Hardwoods Forest

Conservation, Wildlife and Management Considerations

This is the dominant hardwood type in Maine, and therefore extensively harvested and managed. Large (>1000 acres) examples free from human disturbance are scarce. Some areas of high ecological quality, in the hundreds of acres, are known but not necessarily designated as areas reserved from cutting. Almost all are within a landscape of managed forest rather than being surrounded by land that has been permanently cleared and converted to other uses. Examples in central and southern Maine tend to be smaller and more isolated.

This broad type provides nesting habitat for a large number of passerine bird species, such as the black-throated green warbler, rose-breasted grosbeak, scarlet tanager, and ovenbird. A large proportion of the global population of black-throated blue warblers nest in this community type in Maine. The globally uncommon early hairstreak butterfly uses beech as its larval host plant.

Examples on Conservation Lands

Big & Little Squaw Mountain Public Lands	Piscataquis Co.
Round Pond Public Lands	Aroostook Co.
Deboullie Ponds Public Lands	Aroostook Co.
Nahmakanta Public Lands	Piscataquis Co.
Baxter State Park	Piscataquis Co.
Wassataquoik Public Lands	Penobscot Co.
Grafton Notch State Park & Mahoosuc Public Lands	Oxford Co.
White Mountain National Forest	Oxford Co.
Bigelow Preserve Public Lands	Franklin/Somerset Co.

Cross-reference to Other Classifications**New Hampshire**

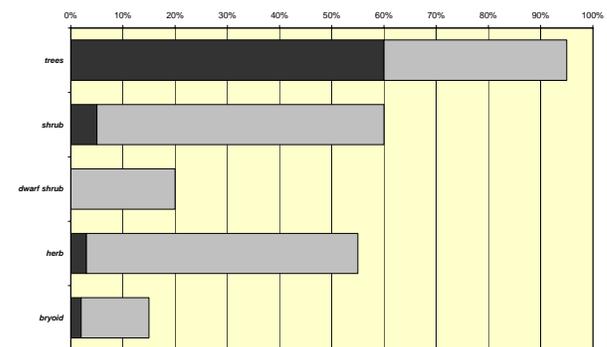
Sugar maple - beech - yellow birch forest	S5
Beech forest	S4?
Semi-rich mesic sugar maple - beech forest	S3S4

National Vegetation Classification

CEGL005005	Acer saccharum - Pinus strobus / Acer pensylvanicum Forest	G?
	Acer saccharum - Betula alleghaniensis - Fagus grandifolia / Viburnum lantanoides Forest	G3G5
CEGL006252		
CEGL006211	Acer saccharum - (Fraxinus americana) / Arisaema tryphyllum Forest	G?
CEGL002464	Betula papyrifera / Acer saccharum - Mixed Hardwoods Forest	G4?

SAF Type

27	Sugar maple	ME > SAF
31	Red spruce - sugar maple - beech	ME > SAF
25	Sugar maple - beech - yellow birch	ME > SAF
60	Beech - sugar maple	ME > SAF

Vegetation Structure (total cover by stratum)***Literature References***

Siccama et al. 1970
 Bormann and Buell 1964
 Beatty 1984
 Coffman and Willis 1977
 Cogbill 1985
 Leak 1987
 Lorimer 1977

FDU2

State Rarity Rank: S3

Maple - Basswood - Ash Forest

Enriched Northern Hardwoods Forest

Community Description

Sometimes referred to as “cove forests,” these closed-canopy forests are dominated by sugar maple, with beech and/or yellow birch subordinate, and with basswood and ash as typical indicators but not necessarily abundant. (Basswood and white ash are often absent in northwest Maine.) The shrub layer is usually sparse and dominated by saplings of the canopy species. The lush herb layer may contain species that are strong indicators of this forest type, such as maidenhair fern, blue cohosh, Dutchman's breeches, and silvery spleenwort. These and many rare species are characteristic of forests with relatively nutrient-rich soils. Bryoids are virtually absent.

Sites occur on sheltered (concave) hillsides, ravines, or slope bases where nutrients accumulate, often over calcium-bearing bedrock. Slopes often grade from moderate to flat as these forests straddle the base of a hillslope. Small drainage channels may occur in the lower portions, maintaining saturated soils over at least part of the site. Forests upslope often grade to typical northern hardwood forest (beech-birch-maple).

Diagnostics

Sugar maple is dominant or co-dominant; ash and basswood are present in central and southern Maine sites (basswood absent in northwest Maine); conifers and oaks sparse or absent. Silvery spleenwort, maidenhair fern, blue cohosh, Braun's holly fern, and Dutchman's breeches are good herb indicators.

Similar Types

The more typical and extensive Beech - Birch Maple Forest is dominated by beech, birches and sugar maple, occurs on less nutrient-rich sites, and lacks substantial ash.

Associated Rare Plants

American ginseng
 American stickseed
 Broad beech fern
 Goldie's fern
 Male fern
 Mountain sweet-cicely
 Pale jewel-weed
 Squirrel-corn
 Wild ginger
 Wild leek

Characteristic Species**Canopy:**

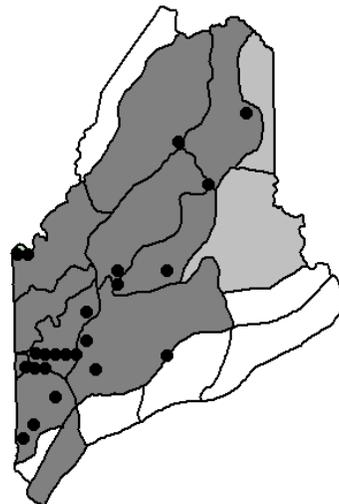
Sugar maple	(F,C)
Yellow birch	(F,C)
Paper birch	(F)
American beech	(F)
White ash	(F)
Ironwood	(F)
White pine	(C)

Sapling/Shrub:

Balsam fir	(F)
Sugar maple	(F)
Yellow birch	(F)
Striped maple	(C)
American beech	(C)

Herb:

Doll's eyes	(F)
Christmas fern	(F)
Lady fern	(F,C)
Maidenhair fern	(F)
Silvery spleenwort	(F,C)
Wild sarsaparilla	(F)
Marginal woodfern	(F)
Round-leaved violet	(F)



Distribution: New England - Adirondack Province and Laurentian Mixed Forest Province, with the known sites concentrated in the western mountain region of the state.

Landscape Pattern: Small Patch, typically occur as 5-25 acres within a larger matrix of northern hardwood forests.

FDU2

State Rarity Rank: S3

Maple - Basswood - Ash Forest

Enriched Northern Hardwoods Forest

Conservation, Wildlife and Management Considerations

There are many known mature occurrences of Maple -Basswood - Ash Forests in the state, most with a history of light cutting. However, the market pressures for hardwoods have recently led to heavy cutting of several sites. Typical sites where this community occurs are naturally small and should be buffered from surrounding forest uses.

Since this natural community type is most often an inclusion within larger northern hardwood forests, many of the species using northern hardwood forests will also use this type.

Examples on Conservation Lands

Evans Notch, White Mountain National Forest	Oxford Co.
Big Reed Pond Preserve	Piscataquis Co.
Square Dock Mountain, White Mountain National Forest	Oxford Co.
Albany Mountain, White Mountain National Forest	Oxford Co.
Albany Notch, White Mountain National Forest	Oxford Co.
Miles Notch, White Mountain National Forest	Oxford Co.
Hastings Mountain, White Mountain National Forest	Oxford Co.
Squa Pan Public Lands	Aroostook Co.
Peter Mountain, White Mountain National Forest	Oxford Co.

Cross-reference to Other Classifications**New Hampshire**

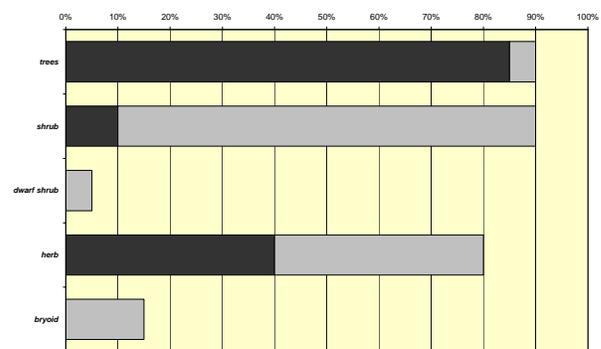
Rich mesic forest S3

National Vegetation Classification

CEGL005008 Acer saccharum - Fraxinus spp. - Tilia americana / Osmorhiza claytonii - Caulophyllum thalictroides Forest G?

SAF Type

26 Sugar maple - basswood 1:1

Vegetation Structure (total cover by stratum)***Literature References***

Singleton et al. 2000
MacDougall 2001

FDU3

State Rarity Rank: S3

White Oak - Red Oak Forest

White Oak - Red Oak Forest

Community Description

This type is a deciduous forest dominated by red oak with white oak as a canopy associate. White pine is occasionally present, but conifers comprise only a small proportion (<20%) of the canopy. Sugar maple and beech may be present in minor amounts. Shrubs occur as well-spaced patches; typical species include striped maple, ironwood, and maple-leaved viburnum. The forest floor is characterized by low heath shrubs, such as lowbush blueberry; common herbs include woodland sedge, bracken fern, whorled loosestrife, and Canada mayflower. Bryoids are very sparse. Sites of this type are on well-drained gentle slopes (up to 20%) below 600' elevation. The soil is generally well-drained, stony, sandy loam, fairly acidic (pH 4.8-5.0), and 20-50 cm deep. These forests are usually on somewhat sheltered sites.

Diagnostics

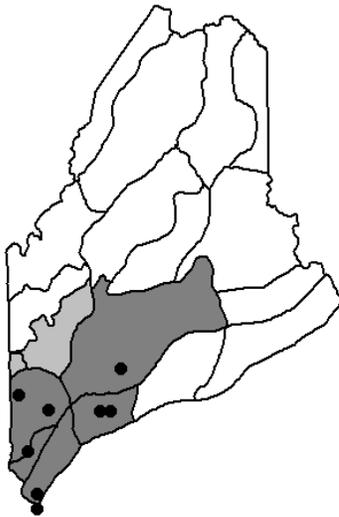
Forests dominated by a mixture of red oak and white oak, without a strong white pine or hickory component.

Similar Types

Oak - Hickory Forests (limited to extreme southern Maine) are similar but feature hickories in the canopy. Oak - Pine Forests lack white oak and may have white pine co-dominant with red oak. Red Oak - Northern Hardwoods - White Pine Forests lack white oak and have a larger component of beech or sugar maple.

Associated Rare Plants

Bitternut hickory
Chestnut oak
Flowering dogwood
Scarlet oak
White wood aster



Distribution: Restricted primarily to the southern and central regions, characteristic of the Eastern Broadleaf Forest Province.

Landscape Pattern: Large Patch, generally 100 acres or

Characteristic Species**Canopy:**

Sugar maple (F)
White oak (F)
Red oak (F,C)

Herb:

Wild sarsaparilla (F)
Wintergreen (F)
Rough-leaved ricegrass (F)
Wild-oats (F)
Woodland sedge (C)

FDU3

State Rarity Rank: S3

White Oak - Red Oak Forest

White Oak - Red Oak Forest

Conservation, Wildlife and Management Considerations

The few mature sites of White Oak - Red Oak Forest known to remain in Maine are all on land that was once cleared. The known sites are subject to fragmentation by timber harvesting, clearing for agriculture, and residential development, uses that have reduced this naturally rare type even further. Community dynamics are not well known, but there are some indications that red oak regenerates more strongly than white oak at some sites and may replace it over time. Most occurrences of this type are on private lands.

This type offers habitat for a variety of birds, including scarlet tanager and ovenbird. Mature occurrences of this community type offer excellent potential sites for cavity dwellers such as the southern flying squirrel. The state rare red-winged sallow uses red oak as one of its host plants and may be found in this community.

Examples on Conservation Lands

Mt Agamenticus

Muddy River Wildlife Management Area

Sebago Lake State Park

Alonzo Garcelon Wildlife Management Area

York Co.

Sagadahoc Co.

Cumberland Co.

Kennebec Co.

Cross-reference to Other Classifications**New Hampshire**

Mesic Appalachian oak - sugar maple - beech - hemlock forest

S2S3

National Vegetation Classification

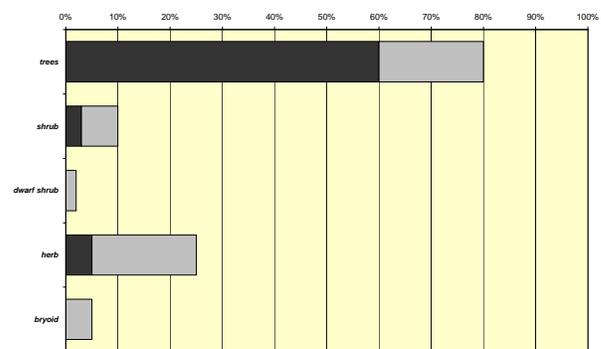
CEGL006336 Quercus (alba, rubra, velutina) / Cornus florida / Viburnum acerifolium Forest

G?

SAF Type

52 White oak - black oak - northern red oak

ME < SAF

Vegetation Structure (total cover by stratum)***Literature References***

Stern 1979a

Bromley 1935

FMU1

State Rarity Rank: S4

Oak - Pine Forest

Oak - Pine Forest

Community Description

This type is a closed-canopy forest (>75% closure) in which red oak or a mixture of oak and white pine (rarely red spruce) dominate. Red maple (up to 30% RD) and paper birch (up to 15% RD) can be common in younger stands. Striped maple is a common subcanopy associate; several other shrubs may be occasionally important. The herb layer is usually somewhat sparse (<30% cover), and features bracken fern, lowbush blueberry, and various herbaceous species; dwarf shrubs contribute 0-15% cover. The herb layer often includes forest species such as wild-oats and Indian cucumber-root that are seldom found in more open Oak - Pine Woodlands. Bryoids are sparse and are almost exclusively mosses rather than liverworts or lichens.

Sites occur on lower to mid-slopes, occasionally upper slopes on low hills. Slopes are typically 10-25% and aspect varies. Sites are characterized by well-drained mineral soils, somewhat shallow (10-50 cm to obstruction), usually sandy loams or loamy sands, acidic (pH ~5.0).

Diagnostics

These are more-or-less closed-canopy forests with dominance of red oak or red oak - white pine mixture (occasionally, red spruce replaces white pine); there is an absence or at least low cover of northern hardwood species and other oaks.

Similar Types

Oak - Pine Woodlands are similar and sometimes contiguous with this type. Their canopy is more open and the dwarf shrub layer much more well developed (usually >15% cover of dwarf shrubs). Red Oak - Northern Hardwoods - White Pine Forests occur on more mesic sites and feature at least 10% RD of other tolerant hardwoods (beech, sugar maple, white ash, or ironwood). White Oak - Red Oak Forests contain white oak in the canopy.

Associated Rare Plants

American chestnut
Mountain laurel
Variable sedge
Wild indigo

Characteristic Species**Canopy:**

Red maple	(F,C)
Paper birch	(F)
Red spruce	(F)
White pine	(F,C)
Red oak	(F,C)
American beech	(C)
Balsam fir	(C)

Sapling/Shrub:

Beaked hazelnut	(C)
Black huckleberry	(C)
Witch-hazel	(C)

Dwarf Shrub:

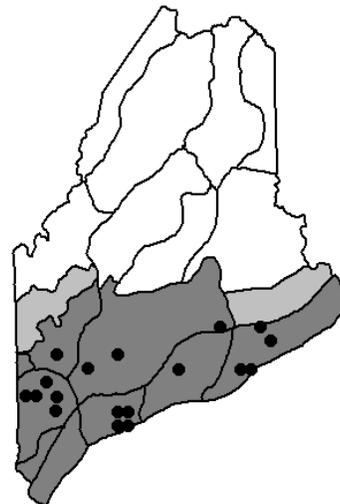
Lowbush blueberry	(F,C)
Black huckleberry	(C)

Herb:

Canada mayflower	(F)
Bracken fern	(F,C)
Starflower	(F)
Big-leaved aster	(C)

Bryoid:

Large hair-cap moss	(F)
<i>Dicranum</i> moss	(F)



Distribution: Extending southward and southwestward from southern and central Maine; characteristic of the Eastern Broadleaf Forest Province.

Landscape Pattern: Large Patch; possibly formerly a matrix type in southern Maine and lower New

FMU1

State Rarity Rank: S4

Oak - Pine Forest

Oak - Pine Forest

Conservation, Wildlife and Management Considerations

Most, if not all, Oak - Pine Forests in Maine are on land that was once cleared or pastured. The known sites are subject to fragmentation by timber harvesting, clearing for agriculture, and residential development. Fire or other soil disturbance may be important in maintaining this type.

The community provides nesting habitat for a large number of passerine bird species like the wood thrush, scarlet tanager, ovenbird, and pine warbler. Mature stands with a high proportion of oaks offer excellent potential sites for cavity nesters. The state rare red-winged sallow uses red oak as one of its host plants and may be found in this community. Historical butterfly species like the Persius duskywing and the frosted elfin were known from oak-pine forests and woodlands in southern Maine where their host plants, wild indigo and wild lupine, were formerly present. Similarly, this community type historically included chestnut as a canopy constituent and may include the chestnut clearwing moth, which uses chestnut as a host plant.

Examples on Conservation Lands

Bald Mountain, Little Concord Pond Public Lands
Sebago Lake State Park

Oxford Co.
Cumberland Co.

Cross-reference to Other Classifications**New Hampshire**

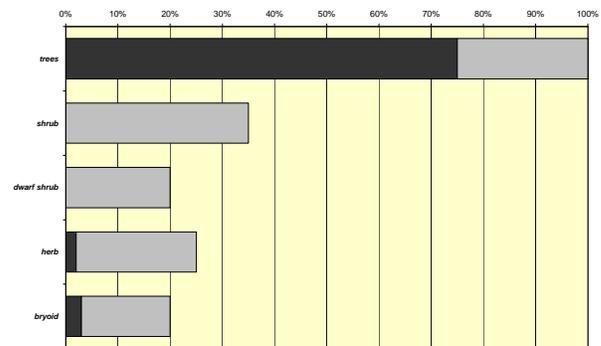
Dry red oak - white pine / heath / bracken fern forest S3S4
Pitch-red-white pine - red oak / heath forest/woodland S1

National Vegetation Classification

CEGL006293 Pinus strobus - Quercus (rubra, velutina) - Fagus grandifolia Forest G5
CEGL006506 Quercus rubra - Acer rubrum - Betula spp. - Pinus strobus Forest G?

SAF Type

20 White pine - northern red oak - red maple ME < SAF

Vegetation Structure (total cover by stratum)***Literature References***

Fahey and Reiners 1981
Russell 1983
Singleton et al. 2000

FMU2

State Rarity Rank: S4

Red Oak - Northern Hardwoods - White Pine Forest

Oak - Northern Hardwoods Forest

Community Description

This is an upland forest type with red oak and northern hardwoods in the canopy. Some stands are almost entirely deciduous (typically oak - beech), while others are mixed with white pine, red spruce, or (especially along the coast) northern white cedar. Red oak comprises 45-85% RD; beech is less than half that of red oak. Large red oak trees are prominent. Red maple is frequent. The shrub/sapling layer is usually sparse (< 25%) but occasionally up to 50% cover. The herb layer is likewise spotty (typically <10% cover, sometimes 20-50% cover), with very few dwarf shrubs aside from lowbush blueberry, and with typical forest herbs and tree regeneration (red maple, red oak, white pine, beech) more typical. Few bryoids are found on the leaf-litter covered forest floor.

Sites occur on gently to somewhat steeply sloping (15 - 35%) mid- and lower hills, occasionally upper slopes, but usually not highly exposed sites. Known sites are at low elevations (<1200') on moderately well-drained mineral soils, often rocky but not extremely shallow (typically 25-50 cm) and loamy, with a pH 5.0 - 5.4.

Diagnostics

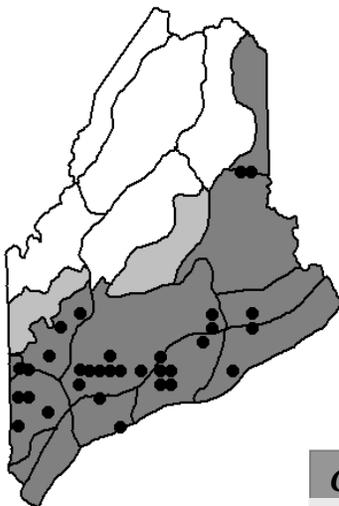
These are closed-canopy forests in which red oak and at least one northern hardwood species (beech, sugar maple, or, infrequently, yellow birch) dominate the canopy. Maple-leaved viburnum is an indicator shrub.

Similar Types

Oak - Pine Forests, the most similar type, generally lack sugar maple, white ash, and ironwood. Beech - Birch - Maple Forests have only minor amounts of red oak (<10% RD if even present), and generally are strongly deciduous (>75%) rather than mixed. Spruce - Northern Hardwoods Forests lack red oak.

Associated Rare Plants

- American chestnut
- Back's sedge
- Mountain laurel
- Nantucket shadbush
- Ram's-head lady's-slipper
- Veiny hawkweed
- White wood aster



Distribution: Primarily the Laurentian Mixed Forest Province (except for the far northern portion) and southern portion of the New England - Adirondack Province, extending eastward and westward from Maine.

Landscape Pattern: Large Patch; possibly formerly a matrix type in central Maine.

Characteristic Species**Canopy:**

- Striped maple (F)
- Red maple (F)
- Sugar maple (F)
- Paper birch (F)
- American beech (F)
- Red oak (F,C)
- Northern white cedar (C)

Sapling/Shrub:

- Striped maple (F)
- Maple-leaved viburnum (F)

Herb:

- Wild sarsaparilla (F)
- Canada mayflower (F)
- Bracken fern (F)
- Starflower (F)
- Wild-oats (F)

FMU2

State Rarity Rank: S4

Red Oak - Northern Hardwoods - White Pine Forest

Oak - Northern Hardwoods Forest

Conservation, Wildlife and Management Considerations

Most sites in Maine are on lands with a long settlement history, and have apparently been timbered, pastured, or burned in the 1700s-1800s. Several sites occur on public lands but are not necessarily designated as areas to be set aside from timber harvest. Small and isolated protected stands (on the order of 25 acres or less) would probably not be viable in the long run; larger stands, or naturally small stands protected within a managed forest matrix, could be.

This community type provides nesting habitat for a large number of passerine bird species, such as black-throated blue warbler, black-throated green warbler, scarlet tanager, and ovenbird. Mature stands offer excellent potential sites for cavity nesters. The state rare red-winged swallow uses red oak as one of its host plants and may be found in this community. The globally uncommon early hairstreak butterfly uses beech as its larval host plant.

Examples on Conservation Lands

Lombard Pond Hill, White Mountain National Forest	Oxford Co.
Albany Mountain, White Mountain National Forest	Oxford Co.
Sebago Lake State Park	Cumberland Co.
Patte Hill, White Mountain National Forest	Oxford Co.
Mt Megunticook, Camden Hills State Park	Knox Co.
Center Hill, Mount Blue State Park	Franklin Co.
Alonzo Garcelon Wildlife Management Area	Kennebec Co.

Cross-reference to Other Classifications**New Hampshire**

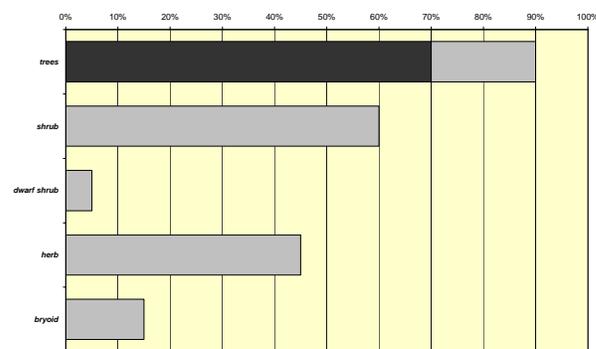
Hemlock - beech - oak - pine forest	S5
Semi-rich Apalachian oak-sugar maple forest	S2S3

National Vegetation Classification

CEGL006173	Quercus rubra - Acer saccharum - Fagus grandifolia / Viburnum acerifolium Forest	G?
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SAF Type

55	Northern red oak	?
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Vegetation Structure (total cover by stratum)***Literature References***

FMU3

State Rarity Rank: S4

Spruce - Northern Hardwoods Forest

Spruce - Northern Hardwoods Forest

Community Description

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

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

Diagnostics

Sites are distinguished by a mixture of red spruce and northern hardwoods (most often yellow birch, but may be sugar maple or beech) in the canopy; conifer and deciduous components exceed 25% RD each.

Similar Types

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

Associated Rare Plants

Giant rattlesnake-plantain

Characteristic Species**Canopy:**

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

Sapling/Shrub:

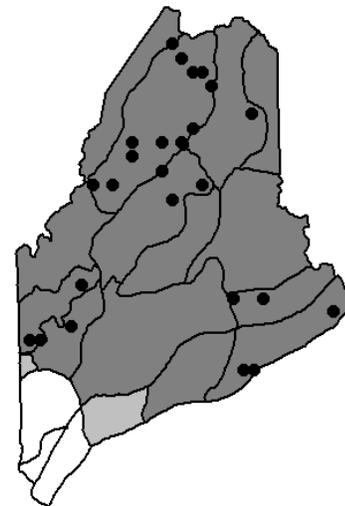
Balsam fir	(F,C)
Striped maple	(F,C)
Red spruce	(F,C)
American beech	(C)
Mountain maple	(C)
Red maple	(C)
Hobblebush	(C)

Herb:

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

Bryoid:

Pincushion moss	(F)
Flat-tufted feather-moss	(F)
Three-lobed bazzania	(F)
<i>Dicranum</i> moss	(F)



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

Landscape Pattern: Matrix

FMU3

State Rarity Rank: S4

Spruce - Northern Hardwoods Forest

Spruce - Northern Hardwoods Forest

Conservation, Wildlife and Management Considerations

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

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

Examples on Conservation Lands

Cranberry Brook, Moosehorn National Wildlife Refuge
 Chamberlain Lake Public Lands
 Big Reed Pond Preserve
 Nesuntabunt Mountain, Nahmakanta Public Lands
 Mahoosuc Notch, Mahoosuc Public Lands
 Western Mountain, Acadia National Park
 Black Mountain, Mahoosuc Public Lands

Washington Co.
 Piscataquis Co.
 Piscataquis Co.
 Piscataquis Co.
 Oxford Co.
 Hancock Co.
 Oxford Co.

Cross-reference to Other Classifications**New Hampshire**

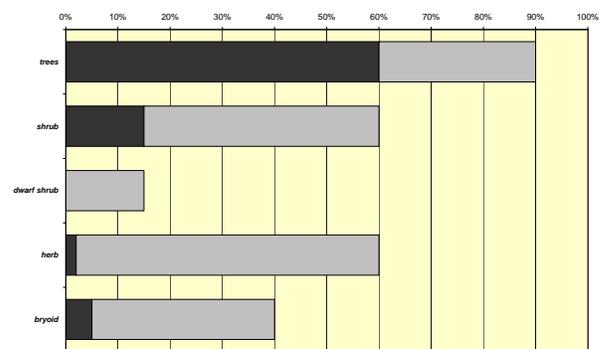
Hemlock - spruce - northern hardwoods forest S3S4
 Northern hardwood - spruce - fir forest S4

National Vegetation Classification

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

SAF Type

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

Vegetation Structure (total cover by stratum)***Literature References***

Chokkalingham 1998
 Cogbill 1985
 Oosting and Reed 1944
 Lorimer 1977

WCU1

State Rarity Rank: S4

Red Spruce - Mixed Conifer Woodland

Spruce - Pine Woodland

Community Description

This type is a mixed-canopy woodland (25-70% closure) in which red spruce and/or white pine is always present and associated species vary. (White spruce may rarely replace red spruce at coastal sites.) Red spruce or white pine is strongly dominant at some sites (RD >65%); at others, the canopy is mixed, with no one tree species strongly dominant (all with <40% RD). The shrub layer is typically very sparse (and variable in composition) and the herb layer is mostly 15-50% cover. Heath shrubs are the dominant feature of the herb layer; herb species rarely exceed 8%. The bryoid layer is sparse at some sites (<25%) and well developed at others (35-70%). Fruticose lichens typically make up half or more of the bryoid cover.

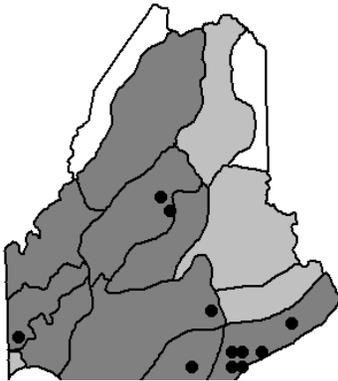
Sites occur on mid to upper slopes (usually 10-20% slope) and low summits at elevations up to 2000'; aspect varies. Soils are thin (<25 cm), consisting of coarse mineral soil or poorly decomposed duff, and form patches over the bedrock substrate. The very well drained soils are acidic (pH 4.6-5.2) and nutrient-poor. Some sites show evidence of past fire, but many do not.

Diagnostics

Sites are woodlands on bedrock with conifer cover exceeding deciduous; red spruce (or occasionally white pine or white spruce) >40% RD, or mix of red spruce or white pine with other conifers, with none > 40% RD.

Similar Types

Other upland coniferous woodlands may include red spruce but will have other tree species (northern white cedar, pitch pine, red pine, jack pine, or black spruce) in greater abundance. Oak - Pine Woodlands may have considerable red spruce (an oak - spruce mix), but have more deciduous than coniferous tree cover. Moving downslope, or into areas of greater soil development, these woodlands can grade into spruce or pine forests, but those have more continuous canopy and less shrub and herb cover.



Distribution: New England - Adirondack Province and Laurentian Mixed Forest Province, extending eastward, westward, and northward from Maine.

Landscape Pattern: Small Patch

Characteristic Species**Canopy:**

Balsam fir	(F,C)
Red spruce	(F,C)
White pine	(F,C)
Black spruce	(C)
Northern white cedar	(C)
Paper birch	(C)
White spruce	(C)

Dwarf Shrub:

Black huckleberry	(F,C)
Sheep laurel	(F,C)
Lowbush blueberry	(F,C)

Herb:

Bracken fern	(F)
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Sapling/Shrub:

Shadbush	(F)
Bayberry	(C)
Wild-raisin	(C)

Bryoid:

<i>Dicranum</i> moss	(F)
Reindeer lichen	(F,C)
Red-stemmed moss	(F)

WCU1

State Rarity Rank: S4

Red Spruce - Mixed Conifer Woodland

Spruce - Pine Woodland

Conservation, Wildlife and Management Considerations

Most sites have little pressure from development or timbering; the main impacts are from recreational use. Communications towers could have an impact on some of these woodlands on mid-elevation summits. Several sites are in public or private conservation ownership.

Birds that may nest in this habitat include the sharp-shinned hawk, gray jay, yellow-bellied flycatcher, boreal chickadee, blackburnian warbler, red crossbill, and northern parula.

Examples on Conservation Lands

Potaywadjo Ridge, Appalachian Trail

Reid State Park

Petit Manan Point, Petit Manan National Wildlife Refuge

Holbrook Island Sanctuary State Park

Mahoosuc Mountain, Mahoosuc Public Lands

Nahmakanta Public Lands

Mansell Mountain, Acadia National Park

Piscataquis Co.

Sagadahoc Co.

Washington Co.

Hancock Co.

Oxford Co.

Piscataquis Co.

Hancock Co.

Cross-reference to Other Classifications

New Hampshire

Red spruce / heath / cinquefoil rocky ridge

S3S4

National Vegetation Classification

CEGL006053 Picea rubens / Vaccinium
angustifolium - Sibbaldiopsis
tridentata Woodland

G3G5

SAF Type

32

Red spruce

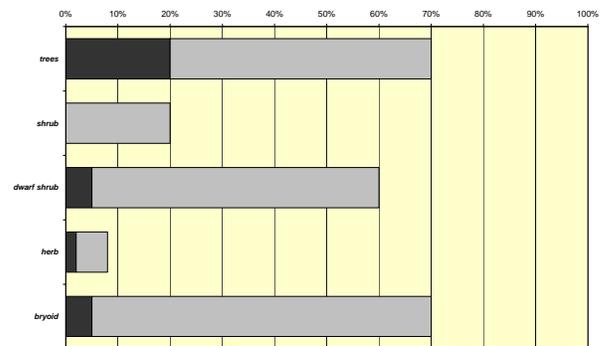
ME > SAF

21

Eastern white pine

?

Vegetation Structure (total cover by stratum)



Literature References

WCU2

State Rarity Rank: S4

Spruce Talus Woodland

Spruce Rocky Woodland

Community Description

These partial canopy woodlands (usually less than 50%) support red spruce, mixed with lesser amounts of other conifers, birches, red oak, or beech. Vegetation tends to be very patchy due to the substrate. Beneath the scattered trees and smaller, sapling-sized trees, heath shrubs or herbs are found in pockets (15-45% cover overall). Typical species include lowbush blueberry, common polypody, rusty cliff fern, and crinkled hairgrass. Bryoids may include typical forest species in areas where the tree canopy is fairly well developed; in more open areas, rock-tripe lichens and patches of reindeer lichens are characteristic.

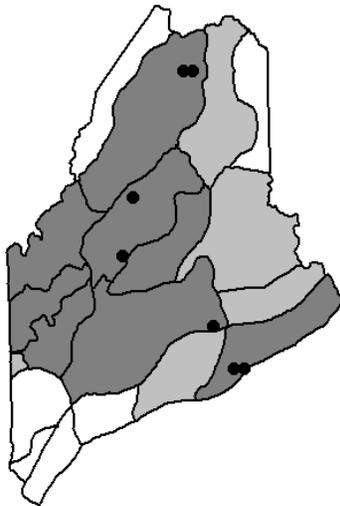
Sites occur on talus slopes, with vegetation developing in patches among the rocks. Sites are usually steep (>20% slope) and have very limited soil; sites are typically on acidic rocks such as granite.

Diagnostics

These are open-canopy woodlands in which red spruce is dominant (>50% RD) on steep talus slopes.

Similar Types

Red Spruce - Mixed Conifer Woodlands have similar canopies but occur on bedrock, not talus and have more heaths, and fewer ferns and rock tripe lichens. Other talus woodlands (Birch - Oak Talus Woodlands and Ironwood - Oak - Ash Woodlands) are dominated by deciduous trees, not conifers.



Distribution: New England - Adirondack Province and Laurentian Mixed Forest Province, extending westward (and probably eastward and northward) from Maine.

Landscape Pattern: Small Patch

Characteristic Species**Canopy:**

Red spruce (F,C)
Paper birch (F)

Sapling/Shrub:

Red spruce (F)
Red raspberry (C)
Mountain holly (C)

Dwarf Shrub:

Black huckleberry (F)
Lowbush blueberry (F,C)
Sheep laurel (C)

Herb:

Common hairgrass (F)
Rock polypody (F)

Bryoid:

Fringed Ptilidium liverwort (F)
Rock-tripe lichen (F)
Tufted reindeer-lichen (F,C)
Woodland reindeer-lichen (F)
Dicranum moss (F)

WCU3

State Rarity Rank: S2

White Cedar Woodland

White Cedar Woodland

Community Description

This type is a partial- to nearly closed-canopy upland woodland (50-85% closure) in which northern white cedar is the dominant tree. Cedar may make up almost the entire canopy, or may be mixed with lesser amounts of white pine, balsam fir, or green ash. Lower layers all tend to be sparse (< 25% cover each), with only scattered plants. Species composition varies according to the site's moisture regime. Where seeps maintain somewhat mesic conditions, one finds plants like bush-honeysuckle and meadowsweet, while under more xeric conditions mountain holly and black huckleberry are representative. The sparse bryoid layer contains mostly bryophytes, rather than lichens.

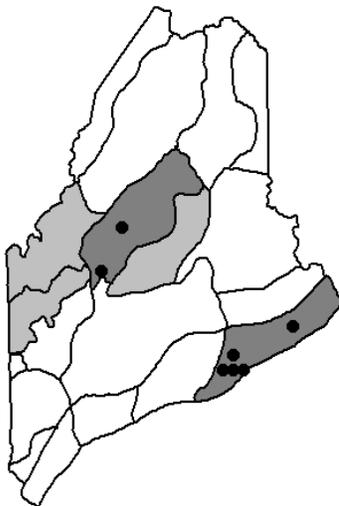
Sites occur on rocky hillslopes with 10-50% slope. The substrate is bedrock, talus, or coarse glacial till, with a thin (< 15 cm) layer of sandy soil or poorly decomposed organic duff developing in pockets or over portions of the rock. Sites with seepage moisture tend to have deeper sandy soils, but soil depth is <30 cm. Known sites are either on acidic substrates near the coast or on somewhat calcareous rocks inland.

Diagnostics

This type is a partial canopy woodland dominated by northern white cedar (>40%); heath shrubs are not prominent in herb layer (<20%).

Similar Types

Some Red Spruce - Mixed Conifer Woodlands may be co-dominated by northern white cedar but will also have a heath shrub layer. Other northern white cedar dominated community types are wetlands or seepage forests on deeper mineral or organic soils.



Distribution: Laurentian Mixed Forest and New England - Adirondack Provinces, known from east-coastal and north-central Maine; distribution elsewhere not well documented.

Landscape Pattern: Small Patch

Characteristic Species**Canopy:**

Paper birch (F)
Northern white cedar (F,C)
Balsam fir (C)

Dwarf Shrub:

Lowbush blueberry (F)

Herb:

Starflower (F)

Sapling/Shrub:

Balsam fir (C)

Bryoid:

Dicranum moss (F)

WCU3

State Rarity Rank: S2

White Cedar Woodland

White Cedar Woodland

Conservation, Wildlife and Management Considerations

Little is known about the distribution and landscape setting of these woodlands. Documented sites are almost all within Acadia National Park and are currently not threatened by recreational use.

Examples of this community type that occur on bedrock or talus may provide cool, moist crevices that offer suitable habitat for the long-tailed shrew.

Examples on Conservation Lands

Bubble Pond, Acadia National Park	Hancock Co.
Pemetic Mountain, Acadia National Park	Hancock Co.

Cross-reference to Other Classifications

New Hampshire

Northern white cedar forest/woodland S1S3

National Vegetation Classification

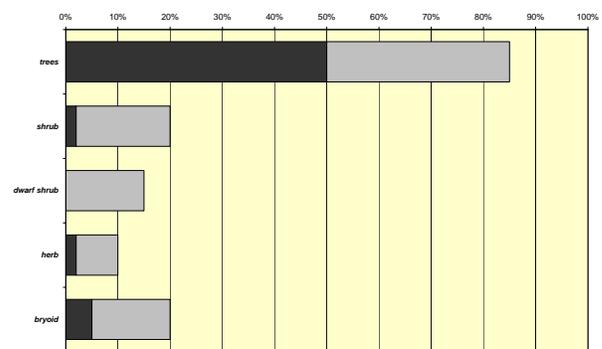
CEGL006508 Thuja occidentalis - Fraxinus pennsylvanica / Acer pensylvanicum Woodland G?

CEGL006411 Thuja occidentalis / Gaylussacia baccata - Vaccinium angustifolium Woodland G?

SAF Type

37 Northern White-cedar ME < SAF

Vegetation Structure (total cover by stratum)



Literature References

WCU4

State Rarity Rank: S3

Black Spruce Woodland

Black Spruce Woodland

Community Description

These are open-canopy woodlands in which black spruce is strongly dominant (typically >60% RD) but is sometimes mixed with red spruce, pitch pine or white pine. Trees are stunted and canopy closure is <50%; occasionally a site will have a more closed canopy (~85%). The shrub layer often has smaller black spruce, and a scattering of shrubs, both evergreen and deciduous. The herb layer is usually extensive (>50% cover) and strongly dominated by ericaceous shrubs. Herbs comprise <5% of the herb layer cover; bracken fern and bunchberry are typical. The bryoid layer is fairly well developed (>15% cover) and may be prominent, with abundant reindeer lichens. Peat mosses may be present in low pockets but are not abundant.

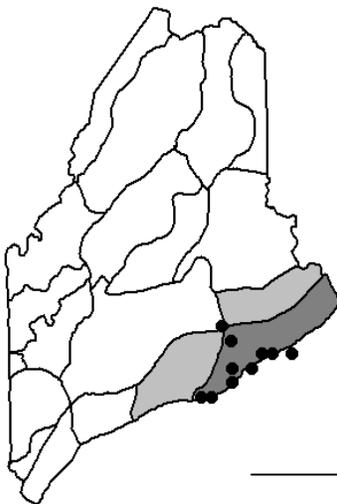
Sites are upland or transitional wetland-upland, on flat or slightly sloping ground. Substrate is bedrock with only a thin patchy layer (<12 cm) of sandy soil or poorly decomposed organic duff. At some sites, the sandy substrate is up to 30 cm, over till. Soils are acidic (pH ~5.0) and well drained; moisture may accumulate in pockets of the substrate. Sites occur on cool and moist microclimates, mostly at the immediate coast and inland at up to ~1000'.

Diagnostics

Black spruce is strongly dominant (> 65% RD), with canopy closure 25-60%; the dwarf shrub component of the herb layer is well developed and dominated by heaths.

Similar Types

Spruce - Heath Forests have a more continuous canopy and generally occur on mineral soil rather than on bedrock. Spruce - Larch Wooded Bogs can have very similar species composition but grow on saturated Sphagnum, as part of a peatland. Labrador Tea Talus Dwarf-shrublands can have similar species but have < 25% tree cover.



Distribution: Mostly east-coastal Maine, in the Laurentian Mixed Forest Province; extending eastward.

Landscape Pattern: Small Patch

Characteristic Species**Canopy:**

Black spruce (F,C)
Pitch pine (C)

Sapling/Shrub:

Black spruce (F,C)
Black huckleberry (C)
Gray birch (C)
Wild-raisin (C)

Dwarf Shrub:

Black huckleberry (F,C)
Sheep laurel (F,C)
Lowbush blueberry (F,C)

Bryoid:

Reindeer lichen (F)
Dicranum moss (F)

WCU4

State Rarity Rank: S3

Black Spruce Woodland

Black Spruce Woodland

Conservation, Wildlife and Management Considerations

Sites appear to receive little human impact other than some light recreational use.

A variety of conifer-nesting birds may use this habitat, including blackpoll warbler, bay-breasted warbler, and black-backed woodpecker.

Cross-reference to Other Classifications**New Hampshire**

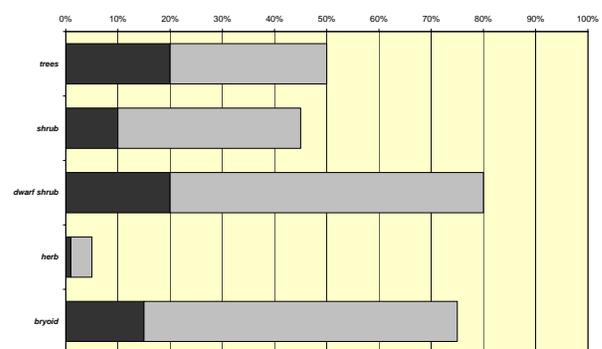
N/A

National Vegetation Classification

CEGL006292 Picea mariana / Kalmia angustifolia Woodland G4?

SAF Type

12 Black spruce - dwarf shrub 1:1

Vegetation Structure (total cover by stratum)***Literature References***

Clayden and Bouchard 1983

WCU5

State Rarity Rank: S3

Red Pine Woodland

Red Pine Woodland

Community Description

These open canopy woodlands (40-75% closure) are dominated by red pine (usually >60% RD). Associated canopy species vary among sites and include white pine, red spruce, or paper birch. The shrub layer includes scattered red spruce, red maple, paper birch or gray birch. The herb layer varies in extent, but usually features heath shrubs and scattered forbs or bracken fern; graminoids virtually absent. Bryoids are patchy, and usually consist of types associated with somewhat xeric conditions like mosses or reindeer lichens.

Sites occupy low ridges or upper slopes, flat to moderately sloping. Most sites are inland. The substrate is usually thin soil or organic duff (<20 cm) over bedrock, but occasionally may be deeper sandy soil. Evidence of past fire is often found.

Diagnostics

Sites are distinguished by open canopy (< 65%) woodlands, usually on bedrock; with red pine > 40% RD and oaks and northern hardwoods lacking; the herb layer is dominated by dwarf shrubs and few graminoids.

Similar Types

Red Pine - White Pine Forests have more complete canopy (>75%) and usually lack a well-developed dwarf shrub layer. Oak - Pine Woodlands may occasionally have red pine as the dominant pine species, but will have red oak or northern hardwood species present, and usually have a more extensive graminoid cover, particularly of woodland sedge and allies.

Associated Rare Plants

Canada mountain-ricegrass
Swarthy sedge

Characteristic Species

Canopy:

Red maple	(F)
Paper birch	(F)
Red spruce	(F)
Red pine	(F,C)
White pine	(F)

Sapling/Shrub:

Red maple	(F)
Paper birch	(F,C)
Mountain holly	(F)
Black chokeberry	(F)
Red spruce	(F)
White pine	(F)
Gray birch	(C)

Dwarf Shrub:

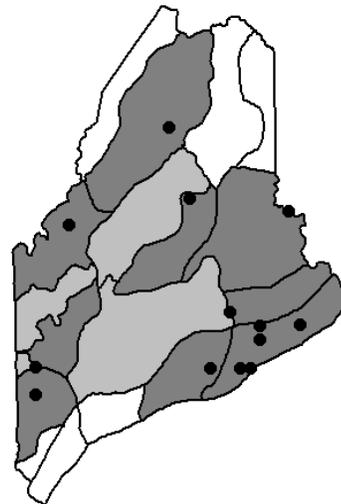
Black huckleberry	(F)
Sheep laurel	(F,C)
Lowbush blueberry	(F,C)

Herb:

Bunchberry	(F)
Wintergreen	(F)
Canada mayflower	(F)
Bracken fern	(F)

Bryoid:

Grey reindeer-lichen	(F)
Grimmia rock-moss	(F)



Distribution: New England - Adirondack Province and Laurentian Mixed Forest Province, extending westward, northward, and presumably eastward from Maine.

Landscape Pattern: Small Patch

WCU5

State Rarity Rank: S3

Red Pine Woodland

Red Pine Woodland

Conservation, Wildlife and Management Considerations

These occur as small patches, usually on upper slopes or hilltops; maintaining representative examples is best accomplished by retaining adjacent forest cover as buffer. Most sites have fire evidence, and fire may be required for regeneration or persistence of this type.

Common nighthawks and whip-poor-wills may nest in open patches within red pine woodlands. This community type may include rare moths that utilize hard pines as larval host plants such as the oblique zale, pine sphinx, and pine pinion.

Examples on Conservation Lands

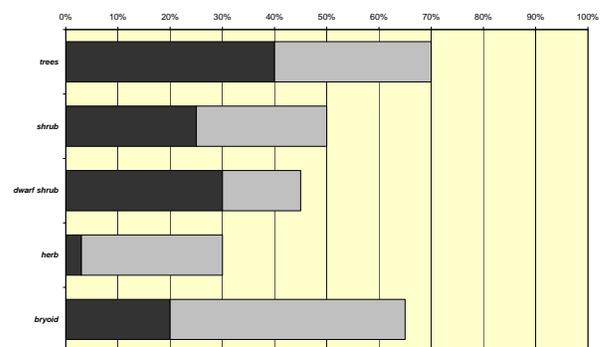
Moose River	Somerset Co.
Albany Notch, White Mountain National Forest	Oxford Co.
Tunk Lake Area, Donnell Pond Public Lands	Hancock Co.
Norumbega Mountain, Acadia National Park	Hancock Co.

Cross-reference to Other Classifications**New Hampshire**

Red pine forest/woodland S2

National Vegetation ClassificationCEGL006010 Pinus resinosa / Gaylussacia baccata -
Vaccinium angustifolium Woodland G3G5**SAF Type**

15 Red pine ME < SAF

Vegetation Structure (total cover by stratum)***Literature References***

WCU6

State Rarity Rank: S3

Jack Pine Woodland

Jack Pine Woodland

Community Description

These are open-canopy woodlands (<50% closure) in which the dominant tree is always jack pine (>40% RD, usually >65% RD). Red spruce, black spruce, or white pine (usually only one) are common associates. The canopy trees are generally stunted. Below the canopy, smaller jack pines are common, with scattered shrubs. The extensive herb layer is mostly heath shrubs that may form a thick tangle in canopy openings. At some maritime sites, black crowberry or mountain cranberry reflect the coastal influence. Herbs are very sparse. The bryoid layer varies from extensive to quite sparse, and is dominated by reindeer lichens.

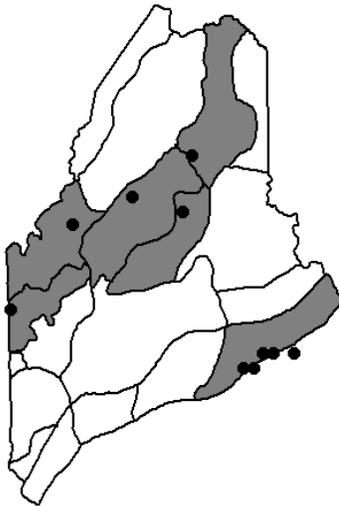
Sites are dry and occur in cooler climate regions, on gentle slopes with very well drained flats, or on low ridges, usually at <900' elevation. The substrate is a thin layer (<20 cm) of sandy soil or poorly decomposed organic duff over bedrock; some occurrences grow on deeper sands. Substrates are acidic (pH ~5.0) and nutrient poor. Most sites contain evidence of past fire, which in most cases is required to open the serotinous cones.

Diagnostics

Jack pine is dominant; canopy is generally less than 60% cover.

Similar Types

Black Spruce Woodlands are floristically and structurally similar with the exception of the dominant canopy species. Both types tend to occur in extremely nutrient-poor and often coastal environments. Pitch Pine Woodlands occur in somewhat more temperate settings and are dominated by pitch pine. Jack Pine Forests have a closed canopy and much lower cover of heath shrubs and are known from only one area of western Maine.



Distribution: Immediate coastline of eastern Maine and lakeshores of north-central Maine (Laurentian Mixed Forest Province and New England - Adirondack Province), extending north, east, and west into Canada.

Landscape Pattern: Small Patch; usually less than 40 acres, occasionally 100-200 acres.

Characteristic Species**Canopy:**

Red spruce (F,C)
Jack pine (F,C)
Black spruce (C)

Sapling/Shrub:

Jack pine (F)
Black chokeberry (F)
Mountain holly (F,C)
Black spruce (C)

Dwarf Shrub:

Black huckleberry (F,C)
Sheep laurel (F,C)
Lowbush blueberry (F)
Mountain cranberry (F)

Herb:

Bunchberry (F)
Starflower (F)

Bryoid:

Reindeer lichen (F,C)

WCU6

State Rarity Rank: S3

Jack Pine Woodland

Jack Pine Woodland

Conservation, Wildlife and Management Considerations

The coastal occurrences of this woodland type appear to be self-maintaining and more or less stable in their extent. Perpetuation of the inland sites is probably dependent upon occasional fire. Natural fires in these woodlands may increase the ability of jack pine to maintain its dominance over potentially invasive or fire-sensitive tree species. Open jack pine woodlands have little marketable timber; however, the closed-canopy variant known from western Maine has been heavily harvested. Several sites are on public lands or private conservation lands.

Jack pine woodlands may be inhabited by rare moths such as the Western pine elfin, which uses jack pine as a larval host plant in the Midwest and more often black spruce in the east.

Examples on Conservation Lands

Lobster Lake Public Lands
Great Wass Island Preserve
Bois Bubert Island, Petit Manan National Wildlife Refuge
Petit Manan National Wildlife Refuge
Schoodic Point, Acadia National Park
Cadillac Mountain, Acadia National Park
Lake Umbagog National Wildlife Refuge

Piscataquis Co.
Washington Co.
Washington Co.
Washington Co.
Hancock Co.
Hancock Co.
Oxford Co.

Cross-reference to Other Classifications**New Hampshire**

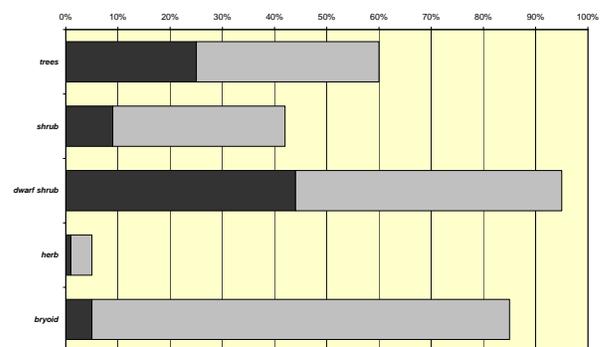
Jack pine rocky ridge woodland S1

National Vegetation Classification

CEGL006041 Pinus banksiana / Kalmia angustifolia - Vaccinium spp. Woodland G3G5

SAF Type

1 Jack pine - sheep laurel ME > SAF

Vegetation Structure (total cover by stratum)***Literature References***

Heinselman 1981
Thompson 1980
Baldwin 1979
Critical Areas Program 1983
Clayden and Bouchard 1983

WCU7

State Rarity Rank: S3

Pitch Pine Woodland

Pitch Pine Woodland

Community Description

These very open to semi-open woodlands (25% - 65% canopy, occasionally to 75%) are dominated by pitch pine (>55% RD, usually >80% RD), often with a much smaller component of red oak, red or white pine, or black or red spruce. The well-spaced pines allow a substantial amount of light to reach the understory. The sapling/shrub layer is usually <40% cover, with smaller pitch pines, mountain holly or black huckleberry. The herb layer is well developed (>30% cover) and strongly dominated by dwarf shrubs, mostly ericaceous. At some sites, broom-crowberry is a prominent species. Herbs contribute <10% cover, and the composition varies. The bryoid layer may be 0-50% cover (rarely more) and is typically dominated by reindeer lichens.

Typical sites are ledges or rock outcrops in coastal areas. They may be flat to gently sloping, at elevations up to 1000'. Soils are usually very thin, consisting of a coarse mineral fraction or a layer of poorly decomposed duff over bedrock, with a pH of 4.6 - 5.4. Many sites have evidence of past fire.

Diagnostics

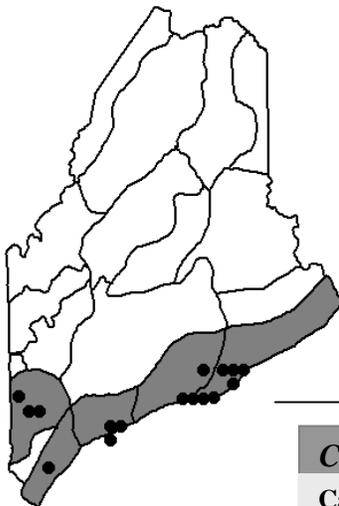
These pitch pine-dominated woodlands (25 to 65% canopy cover) grow on bedrock with very little soil.

Similar Types

Pitch Pine - Scrub Oak Barrens, Pitch Pine - Heath Barrens, and Pitch Pine Dune Woodlands differ in that they develop on sandy outwash or dunes, rather than on thin soil over bedrock. Pitch Pine Bogs are wetlands, with wetland plants, including peat mosses.

Associated Rare Plants

Mountain sandwort
Smooth sandwort



Distribution: Coastal Maine, east to Mount Desert Island; extending southward along the Atlantic coastal plain and Appalachian foothills.

Landscape Pattern: Small Patch; size range variable from a few acres to nearly 100 acres.

Characteristic Species**Canopy:**

Pitch pine (F,C)
Black spruce (C)
Red oak (C)
Red pine (C)
White pine (C)

Dwarf Shrub:

Black huckleberry (F,C)
Sheep laurel (F,C)
Lowbush blueberry (F,C)
Broom-crowberry (C)
Rhodora (C)

Sapling/Shrub:

Pitch pine (F,C)
Black huckleberry (C)
Gray birch (C)
Mountain holly (C)
Red spruce (C)

Herb:

Bracken fern (F)

Bryoid:

Reindeer lichen (F)

WCU7

State Rarity Rank: S3

Pitch Pine Woodland

Pitch Pine Woodland

Conservation, Wildlife and Management Considerations

This community appears to be relatively stable in Maine, with little habitat conversion. Fire has apparently played a role in maintaining this woodland type by preventing the invasion of fire-sensitive hardwood trees and shrubs. The suppression of fire may result in the conversion of these woodlands to a different type. Many sites receive recreational use. In a few locations that use is heavy enough to have degraded the community, but most foot-traffic recreational use is compatible. Communications towers could impact some sites on mid-elevation summits.

Birds such as the pine warbler and prairie warbler may prefer this open habitat. This community type may include rare moths that utilize hard pines as larval host plants such as the oblique zale and the pine sphinx, which use pitch pine as a host plant. The pine-devil moth, a historical species for Maine, probably also inhabited this community type, where its larvae fed on pitch pine.

Examples on Conservation Lands

Duck Harbor Hill, Acadia National Park	Knox Co.
Dorr Mountain, Acadia National Park	Hancock Co.
Popham Beach State Park	Sagadahoc Co.
Middle Pond State Park	Oxford Co.
Champlain Mountain, Acadia National Park	Hancock Co.
Bald Head Preserve	Sagadahoc Co.
Reid State Park	Sagadahoc Co.

Cross-reference to Other Classifications**New Hampshire**

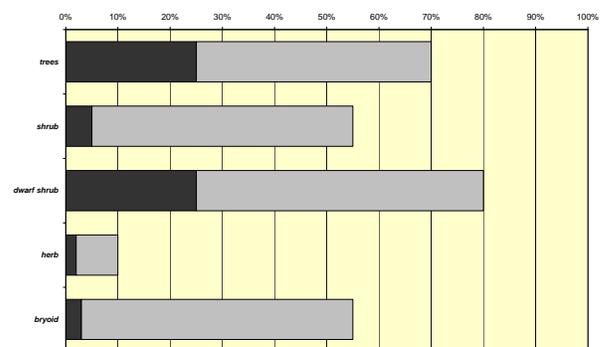
Appalachian oak - pine rocky ridge woodland/barren S3

National Vegetation Classification

CEGL006116	Pinus rigida / Photinia melanocarpa / Deschampsia flexuosa - Schizachyrium scoparium Woodland	G?
CEGL006154	Pinus rigida / Corema conradii Woodland	G2

SAF Type

45 Pitch pine ME < SAF

Vegetation Structure (total cover by stratum)***Literature References***

McIntosh 1959

WCU8

State Rarity Rank: S1

Pitch Pine - Scrub Oak Barren

Pitch Pine - Scrub Oak Barren

Community Description

This woodland type ranges from very open to nearly closed canopy (25%-75% closure) in which pitch pine is dominant (>50% RD). Red maple is frequent but rarely abundant in the canopy. In openings among the trees, a dense shrub/sapling layer of scrub oak is typical. Gray birch may be a prominent feature of the shrub layer, and shrubs are locally dense. A low layer of heath shrubs dominated by lowbush or velvet-leaf blueberry is usually present. Bracken fern and woodland sedge are characteristic herbs. Bryoids are virtually absent. Pitch pine-scrub oak barrens vegetation is typically very patchy, with some areas clearly pitch pine dominated and others areas extensive thickets of scrub oak. Non-forested openings with blueberry and lichens may occur within the barrens.

Sites occur on nutrient-poor soils of glacial outwash plains or moraines south of 44 degrees N latitude. Topography is flat to undulating. The xeric to dry-mesic, sandy soils are acidic (pH usually <5.0) and have little organic matter. Fire is an important factor in maintaining this community, and most sites have a history of periodic fires.

Diagnostics

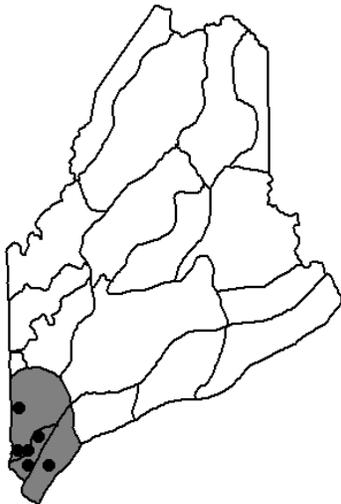
These are pitch pine-dominated, partially forested areas which develop on sands or glacial outwash deposits, not on stabilized coastal dunes. Scrub oak is common and locally dominant in the shrub layer.

Similar Types

Pitch Pine Woodlands can be floristically similar but occur on bedrock, not on deep sandy soils. Pitch Pine Dune Woodlands occur on stabilized sand dunes along the coast. They also lack a well-developed heath shrub layer. Pitch Pine - Heath Barrens share many species but lack the scrub oak layer (scrub oak may be present but only at low cover). Pitch Pine Bogs are wetlands, with at least a shallow peat substrate.

Associated Rare Plants

Branching needle-grass
 Butterfly weed
 Fern-leaved false foxglove
 Ground-fir
 Northern blazing star
 Veiny hawkweed
 Wild chess
 Wild indigo
 Wild lupine



Distribution: Primarily southern Maine (Eastern Broadleaf Forest Province). Extends southward and southwestward from the state along the Atlantic coastal plain.

Landscape Pattern: Large Patch

Characteristic Species**Canopy:**

Gray birch (F)
 Pitch pine (F,C)
 Red maple (C)

Sapling/Shrub:

Pitch pine (F)
 Scrub oak (F,C)
 Sweetfern (F)
 Gray birch (F)
 Shadbush (F)
 Wild-raisin (F)

Dwarf Shrub:

Sheep laurel (F)
 Lowbush blueberry (F,C)
 Velvet-leaf blueberry (F)

Herb:

Woodland sedge (F)
 Mayflower (F)
 Wintergreen (F,C)
 Canada mayflower (F)
 Sharp-pointed ricegrass (F)
 Bracken fern (F,C)
 Starflower (F)

Bryoid:

Large hair-cap moss (F)

WCU8

State Rarity Rank: S1

Pitch Pine - Scrub Oak Barren

Pitch Pine - Scrub Oak Barren

Conservation, Wildlife and Management Considerations

This community type is dependent upon periodic fires to eliminate competing tree species and prevent succession to an oak-pine forest. Because of fire suppression in the last century, this community type has become very rare. Relatively large areas are required to maintain this dynamic community and its associated rare animal species. Most of the large sites in the state have been fragmented by permanent conversion to residential areas or to sand and gravel pits.

Birds such as the whip-poor-will, eastern towhee, pine warbler and prairie warbler may prefer this open habitat. This community type includes a rich array of rare Lepidopteran species. Many use pitch pine as their larval host plant including the pine sphinx, pine pinion, and oblique zale. Other species including the inland barrens buck moth, Edward's hairstreak, pine barrens zale, pine barrens itame and sleepy dusky wing use scrub oak as a larval host plant. A number of historical species believed to have inhabited formerly large tracts of this community include the pine-devil moth, graceful clearwing, Persius dusky wing, and frosted elfin. Several less-well studied insect orders such as Heteroptera and Hymenoptera also include suites of apparent pitch pine scrub oak specialists

Examples on Conservation Lands

Killick Pond Wildlife Management Area	York Co.
Waterboro Barrens Preserve	York Co.
Vern Walker Wildlife Management Area	York Co.
Brownfield Bog Wildlife Management Area	Oxford Co.
Kennebunk Plains Preserve	York Co.

Cross-reference to Other Classifications**New Hampshire**

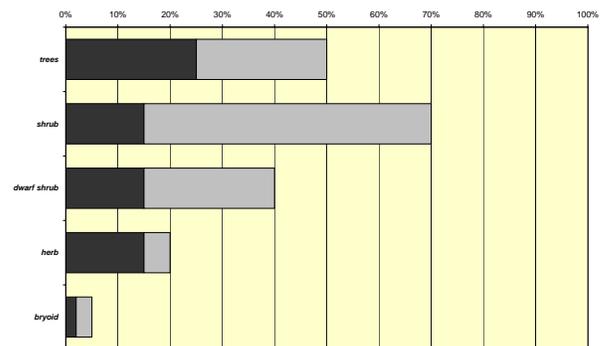
Pitch pine - Appalachian oak / heath forest	S1
Pitch pine/scrub oak forest/woodland	S1S2

National Vegetation Classification

CEGL003883	Quercus ilicifolia Shrubland [Placeholder]	G?
CEGL006203	Pinus rigida / Quercus ilicifolia / Piptatherum pungens Woodland	G2

SAF Type

43	Bear oak	1:1
45	Pitch pine	ME < SAF

Vegetation Structure (total cover by stratum)***Literature References***

- Wheeler 1991
- Harris 1991
- Gawler and Jessee 1997
- Buell and Cantlon 1950
- Widoff 1987
- Bromley 1935

WCU9

State Rarity Rank: S1

Pitch Pine - Heath Barren

Pitch Pine - Heath Barren

Community Description

This is an open-canopy type in which pitch pine dominates the tree layer, with an understory of dwarf shrubs and herbs, and without an extensive tall shrub layer. Canopy cover is usually <50%, and openings with blueberry and lichens may occur within the barrens. Scrub oak may be present but at only low cover. Sites typically have an herb layer of lowbush blueberry and woodland sedge, with scattered bracken fern and forbs. Sharp-pointed ricegrass is characteristic, although it is rarely abundant. The lack of a shrub layer gives these barrens a park-like appearance. Occasionally these may occur as almost closed-canopy forests, but the pitch pines with the heath understory and little scrub oak retain the character of the type.

Sites occur on well-drained to very well-drained sandy soils on outwash plains. Soils have little organic matter and are acidic. Topography is flat or very gently sloping. Sites generally have a history of periodic fire.

Diagnostics

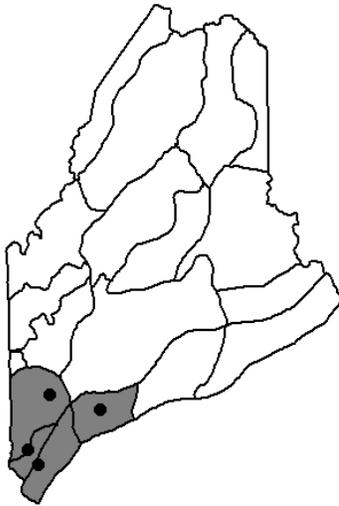
These are pitch pine-dominated, partially forested areas which develop on sands or glacial outwash deposits, not on stabilized coastal dunes. Scrub oak is lacking or sparse.

Similar Types

Pitch - Pine Dune Woodlands are also pitch pine dominated, but they occur on stabilized sand dunes along the coast. They also lack a well-developed heath shrub layer. Pitch Pine - Scrub Oak Barrens are similar, but have areas dominated by scrub oak, or at least have scrub oak as a common component in the shrub layer.

Associated Rare Plants

Branching needle-grass
Fern-leaved false foxglove
Unicorn root
Wild chess



Distribution: Southern Maine (Eastern Broadleaf Forest Province), with a few sites in central Maine. Extends southward and southwestward from the state.

Landscape Pattern: Large Patch

Characteristic class

Canopy: Pitch pine	(F,C)	Dwarf Shrub: Lowbush blueberry	(F,C)
Sapling/Shrub: Sweetfern	(F)	Herb: Whorled loosestrife	(F)
Scrub oak	(F)	Woodland sedge	(F,C)
		Sharp-pointed ricegrass	(F)

WCU9

State Rarity Rank: S1

Pitch Pine - Heath Barren

Pitch Pine - Heath Barren

Conservation, Wildlife and Management Considerations

This community type is dependent upon periodic fires to eliminate competing tree species and prevent succession to an oak-pine forest. Because of a history of fire suppression, this forest type has become very rare. Most of the sites in the state have been fragmented by permanent conversion to residential areas or sand and gravel mines.

Birds such as the eastern towhee, whip-poor-will, pine warbler and prairie warbler may prefer this open habitat. This community type may include rare moths that utilize hard pines as larval host plants such as the pine pinion, oblique zale, and pine sphinx, which use pitch pine as a host plant. The pine-devil moth, a historical species for Maine, probably also inhabited this community type, where its larvae fed on pitch pine

Examples on Conservation Lands

Jugtown Plains Cumberland Co.

Cross-reference to Other Classifications**New Hampshire**

Pitch pine-Appalachian oak-heath forest S1

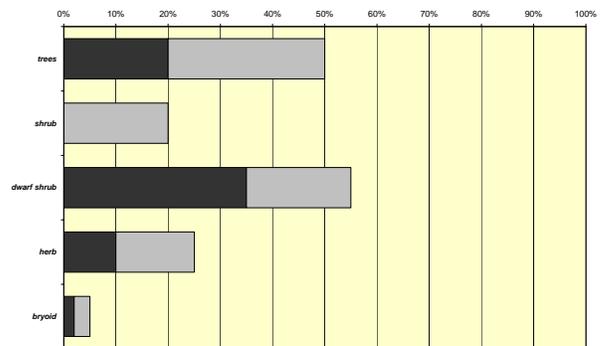
Pitch-red-white pine-red oak/heath forest/woodland S1

National Vegetation Classification

CEGL005046 Pinus rigida / Vaccinium spp. - Gaylussacia baccata Woodland G3G5

SAF Type

45 Pitch pine ME < SAF

Vegetation Structure (total cover by stratum)***Literature References***

Bromley 1935

WCU10

State Rarity Rank: S1

Pitch Pine Dune Woodland

Pitch Pine Dune Woodland

Community Description

These partial-canopy woodlands (typically ~35% closure) support stunted pitch pine trees on sand dunes, where the density of the pines and the composition of the understory vary within and between sites. Bayberry, wild raisin, and/or alder form a patchy shrub layer. The herb layer is typically well developed (>35%), often with extensive patches of grasses or sedges. These are frequently disturbed forests on more dynamic dunes and may have patches of lichens and beach heather beneath the spotty canopy. Older examples on more stable dunes can be nearly closed canopy forests in which pitch pine is mixed with other species such as red maple, red oak, and paper birch, with less understory vegetation.

Sites occur on open coastal dunes. The sandy substrate of this community is very dry, acidic, and nutrient-poor, resulting in stunted tree growth. Only limited herbaceous species are able to tolerate the oceanside conditions.

Diagnostics

These woodlands are distinguished by stunted pitch pine growing on stabilized dunes along the immediate coast.

Similar Types

Pitch Pine - Scrub Oak Barrens and Pitch Pine - Heath Barrens are also partially forested with pitch pine, but occur more inland and have a well-developed shrub layer of scrub oak and/or ericaceous shrubs. Pitch Pine Woodlands occur on a bedrock substrate.

Associated Rare Plants

Beach plum
Seabeach sedge



Distribution: South-coastal Maine (Eastern Broadleaf Forest Province), extending south along the Atlantic coastal plain.

Landscape Pattern: Small Patch; typically less than 50 acres.

Characteristic Species**Canopy:**

Pitch pine (F,C)

Sapling/Shrub:

Bayberry (F)
Wild-raisin (F)
Speckled alder (C)

Dwarf Shrub:

Lowbush blueberry (F)
Beach heather (C)
Golden heather (C)
Sheep laurel (C)

Herb:

Wild sarsaparilla (F)
Woodland sedge (F)
Common hairgrass (F,C)
Canada mayflower (F)
Indian pipe (F)
Starflower (F,C)

Bryoid:

Reindeer lichen (F,C)

WCU10

State Rarity Rank: S1

Pitch Pine Dune Woodland

Pitch Pine Dune Woodland

Conservation, Wildlife and Management Considerations

This community appears to have been reduced in extent due to extensive beachfront development. The remaining sites are ecologically intact, and while dynamic, are moderately well buffered from human impacts. They may, however, be vulnerable to ATV traffic or intensive recreational use. Most known sites are on public land or private conservation land.

Birds such as the pine warbler and prairie warbler may prefer this open habitat. This community type may include rare moths that utilize hard pines as larval host plants such as the pine pinion, oblique zale, and pine sphinx, which use pitch pine as a host plant. The pine-devil moth, a historical species for Maine, probably also inhabited this community type, where its larvae fed on pitch pine.

Examples on Conservation Lands

Seawall Beach, Morse Mountain Preserve	Sagadahoc Co.
Crescent Beach State Park	Cumberland Co.
Popham Beach State Park	Sagadahoc Co.

Cross-reference to Other Classifications**New Hampshire**

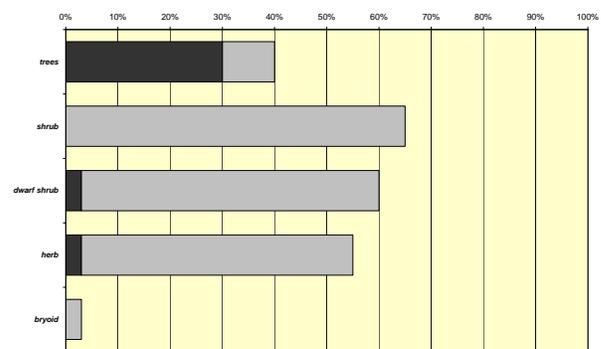
Maritime dune forest/woodland S1

National Vegetation Classification

CEGL006117	Pinus rigida / Hudsonia tomentosa Woodland	G2
CEGL006143	Hudsonia tomentosa - Arctostaphylos uva-ursi Dwarf-shrubland	G2

SAF Type

45 Pitch pine ME < SAF

Vegetation Structure (total cover by stratum)***Literature References***

Henault 1995
 Nelson and Fink 1980
 Dunlop and Crow 1985

WCU11

State Rarity Rank: S2

Spruce - Heath Barren

Black Spruce Barren

Community Description

Black spruce, sometimes mixed with red spruce (and hybrids), forms a variable canopy over heath shrubs, mosses, and lichens. Canopy closure is usually 25-60%, occasionally greater. Associates include balsam fir, larch, and white spruce. The shrub/sapling layer is usually well developed (>25%) and may be very dense; mountain holly and wild-raisin are characteristic shrubs. Dwarf shrubs, herbs, and regenerating trees cover the ground layer, with heath shrubs prominent. The bryoid cover is close to 100%; mosses dominate many areas, but in drier sites reindeer lichens may be abundant. Openings with blueberry and lichens may occur within the barrens.

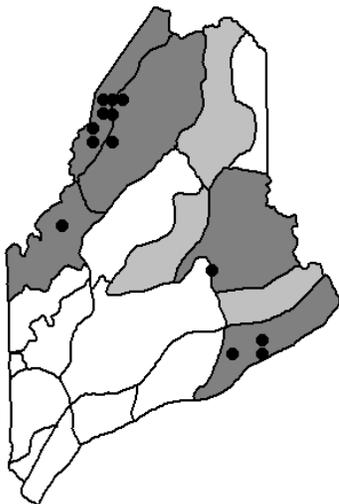
Sites occur on flat to rolling terrain in cold lowlands (usually <1200' elevation) characteristic of nutrient-poor or highly acidic sites (pH of 5.0 - 6.0). The sandy to clayey coarse soils over till can vary (even within the same site) from well drained to very poorly drained, reflecting the microtopography. Wet areas may have an organic layer of up to 25 cm over the mineral soil. Slopes are typically flat (<10%). Sites often contain evidence of fire.

Diagnostics

A somewhat open spruce canopy, usually including black spruce, occurs with prominent shrub and herb layers (typically > 25% each). Heath shrubs may form dense thickets. Sites are underlain by mineral soil sometimes overlain by a thin organic layer.

Similar Types

Spruce - Fir - Broom-moss Forests and Maritime Spruce - Fir Forests have far lower shrub and herb cover and generally lack black spruce. Black Spruce Woodlands and Red Spruce - Mixed Conifer Woodlands share many species with this type, but are on bedrock rather than soil. Spruce - Fir - Cinnamon Fern Forests have more closed canopies with red spruce dominant and lack the abundant heath shrubs. Spruce - Larch Wooded Bogs are on deeper peat deposits.



Distribution: Eastern and far northern Maine, extending into Canada; part of the New England - Adirondack Province..

Landscape Pattern: Large Patch

Conservation, Wildlife and Management Considerations

The extent of this type in Maine has not been well documented, nor has its site and successional relationships. It appears mostly in areas that have burned within the last century or so and that also have a cool microclimate. Several known sites are in conservation ownership.

Birds that may nest in this habitat include the Lincoln's sparrow, fox sparrow, palm warbler, and blackpoll warbler.

WCU11

State Rarity Rank: S2

Spruce - Heath Barren

Black Spruce Barren

Characteristic Species**Canopy:**

Balsam fir	(F)
Red maple	(F)
Red spruce	(F,C)
White pine	(F)
Black spruce	(F,C)
Big-toothed aspen	(C)

Sapling/Shrub:

Balsam fir	(F,C)
Mountain holly	(F)
Red spruce	(F,C)
Gray birch	(C)
Mountain ash	(C)
White pine	(C)

Dwarf Shrub:

Sheep laurel	(F,C)
Lowbush blueberry	(F,C)
Rhodora	(F,C)
Labrador tea	(C)

Herb:

Goldthread	(F)
Bunchberry	(F)
Canada mayflower	(F)
Bracken fern	(F)
Starflower	(F)
Wild sarsaparilla	(C)
Balsam fir	(C)

Bryoid:

Reindeer lichen	(F)
Large hair-cap moss	(F)
Wavy broom-moss	(F)
<i>Sphagnum</i> mosses	(C)

Examples on Conservation Lands

Nicotous Public Lands	Hancock Co.
St. John River Preserve	Aroostook Co.

Cross-reference to Other Classifications**New Hampshire**

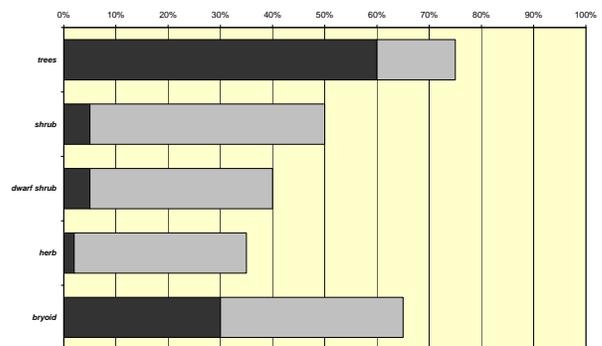
Montane black spruce - red spruce forest	S1
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National Vegetation Classification

<i>Picea mariana</i> - <i>Picea rubens</i> / <i>Rhododendron canadense</i> / <i>Cladina</i> ssp. Woodland	G?
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SAF Type

12	Black spruce - feather moss	ME > SAF
12	Black spruce - dwarf shrub	ME > SAF

Vegetation Structure (total cover by stratum)**Literature References**

Famous 1998

WDU1

State Rarity Rank: S5

Aspen - Birch Woodland/Forest Complex

Early Successional Forest

Community Description

This complex of post-fire associations of aspen, birch, and other species can occur as open-canopy woodlands, as closed forest, or, in very exposed areas, as stunted, dense shrublands. Paper birch, big-toothed aspen, quaking aspen, and red maple are the most common trees; other trees may be common at some sites. The shrub layer, usually <50% cover except in the shrubland variant, is variable; shadbush (at low cover) and gray birch (locally abundant) are the most consistent species. The herb layer cover is higher under more open canopies, where more light reaches the ground. Many sites have patches of lowbush blueberry or black huckleberry; bracken fern is the most characteristic herbaceous species. The bryoid layer is sparse.

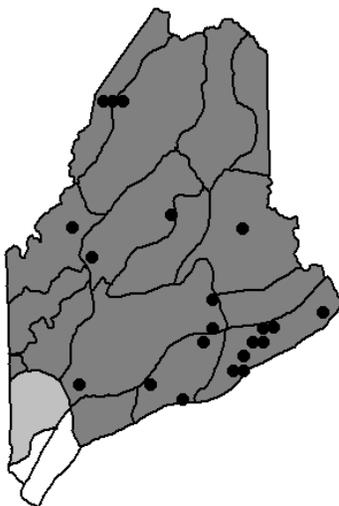
Occurring in various settings, nearly all sites are post-fire and typically on nutrient-poor soils. The mineral soils are usually <25 cm deep, and some stands occur on thin glacial till or bare granite. Documented examples all have well-drained to excessively drained soils with a pH of 5.0-5.4. The shrubland form occurs on exposed low-elevation summits (900-1200') and is currently documented only from Acadia National Park, but it probably occurs elsewhere as well.

Diagnostics

The canopy is dominated by early successional deciduous trees (poplars, birches, red maple). Conifers comprise <25% RD; red oak may be present but is not dominant (<45% RD). Lowbush blueberry and bracken fern are usually present below. Sites are on thin mineral soil over till or bedrock.

Similar Types

Other deciduous forest/woodland types have greater amounts of red oak (Oak - Birch Talus Woodland) or have northern hardwood species dominant (Beech - Birch - Maple Forest). Some Oak - Pine Woodlands can be strongly deciduous and can resemble this type, but red oak cover exceeds that of birches, aspen and red maple combined.



Distribution: Statewide, less common in southern Maine. Extends eastward, westward, and northward from Maine.

Landscape Pattern: Large Patch, or temporary matrix in successional areas.

WDU1

State Rarity Rank: S5

Aspen - Birch Woodland/Forest Complex

Early Successional Forest

Characteristic Species**Canopy:**

Red maple	(F,C)
Paper birch	(F,C)
Blue birch	(C)
Quaking aspen	(C)
Red oak	(C)
Red spruce	(C)
Yellow birch	(C)
Big-toothed aspen	(C)

Sapling/Shrub:

Striped maple	(C)
Balsam fir	(C)
Red maple	(C)
Wild-raisin	(C)
Winterberry	(C)
Gray birch	(C)

Dwarf Shrub:

Black huckleberry	(C)
Lowbush blueberry	(F,C)

Herb:

Canada mayflower	(F)
Bracken fern	(F,C)
Sheep fescue	(C)

Bryoid:

Reindeer lichen	(F)
<i>Dicranum</i> moss	(F)
Large hair-cap moss	(F)

Conservation, Wildlife and Management Considerations

Aspen - birch stands originating after heavy cutting are ubiquitous in Maine. Only those that originated after fire or other natural disturbance are considered as natural community examples of this type. Natural succession dictates that the aspen-birch dominance will not be long-lived, and these stands develop into various types of coniferous, deciduous, or mixed forest. Conservation efforts should not attempt to maintain the aspen- birch dominance, but rather to let natural succession proceed. Good examples are known from public lands and private conservation lands.

Ruffed grouse commonly use young stands with dense sapling cover and little herbaceous cover. Snags remaining after wildfire in northern or eastern occurrences of this community type provide foraging strata for three-toed woodpeckers and perches for olive-sided flycatchers.

Examples on Conservation Lands

Deadwater Brook, Appalachian Trail
Acadia National Park
Black Mountain, Donnell Pond Public Lands

Piscataquis Co.
Hancock Co.
Hancock Co.

Cross-reference to Other Classifications**New Hampshire**

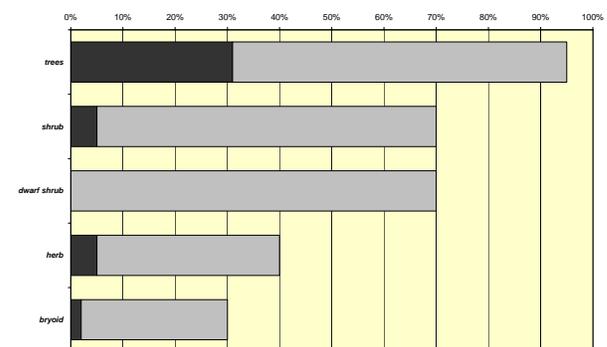
N/A

National Vegetation Classification

CEGL006303 Populus (tremuloides, grandidentata) - G5
Betula (populifolia, papyrifera)
Woodland

SAF Type

16	Aspen	ME > SAF
17	Pin cherry	ME > SAF
18	Paper birch	?
19	Gray birch - red maple	ME > SAF

Vegetation Structure (total cover by stratum)

WDU2

State Rarity Rank: S1

Chestnut Oak Woodland

Chestnut Oak Woodland

Community Description

This partial canopy woodland type is dominated by chestnut oak growing in association with other oak species, white pine, and rarely shagbark hickory. The sapling layer typically includes small oaks as well as various shrub species. Beneath the trees, a mixture of low heath shrubs and herbs covers much of the ground surface, with some bare rock patches. Bracken fern and lowbush blueberry are most common; in some locations, herbs typical of somewhat richer woodlands can be found, such as columbine and early saxifrage. Bryoids are virtually absent.

These woodlands occupy dry ridges and south-facing slopes on thin, excessively well-drained and stony soils; known sites are in extreme southern Maine only, on granite-syenite bedrock.

Diagnostics

These woodlands (25 to 65% canopy cover) are dominated by chestnut oak.

Similar Types

Oak - Hickory Forests (Provisional) may contain chestnut oak, but have a closed canopy and are dominated by trees other than chestnut oak.

Associated Rare Plants

Chestnut oak
Flowering dogwood



Distribution: Characteristic of the Eastern Broadleaf Forest Province, extending southward and southwestward from Maine and only barely reaching into the state.

Landscape Pattern: Large Patch

Characteristic Species**Canopy:**

Red maple (F)
White pine (F)
Black cherry (F)
White oak (F)
Chestnut oak (F,C)
Red oak (F)

Sapling/Shrub:

Shadbush (F)
Black huckleberry (F)
Witch-hazel (F)
Meadowsweet (F)
Maple-leaved viburnum (F)

Dwarf Shrub:

Lowbush blueberry (F,C)
Velvet-leaf blueberry (F)

Herb:

Woodland sedge (F)
Common hairgrass (F)
Wintergreen (F)
Partridgeberry (F)
Rough-leaved ricegrass (F)
Bracken fern (F,C)
Wild-oats (F)

Bryoid:

Sphagnum mosses (F)
Pincushion moss (F)
Polytrichum moss (F)

WDU2

State Rarity Rank: S1

Chestnut Oak Woodland

Chestnut Oak Woodland

Conservation, Wildlife and Management Considerations

The single documented site in Maine is in public ownership, with attention given to conserving this rare type. Fire appears to have played a role in maintaining this woodland type by preventing the invasion of fire-sensitive hardwood trees and shrubs. The suppression of fire could therefore result in the conversion of these woodlands to a different type. Chestnut oak does not seem to regenerate under a closed canopy.

Mature occurrences of this type offer excellent potential sites for cavity dwellers such as the southern flying squirrel.

Examples on Conservation Lands

Mt Agamenticus York Co.

Cross-reference to Other Classifications**New Hampshire**

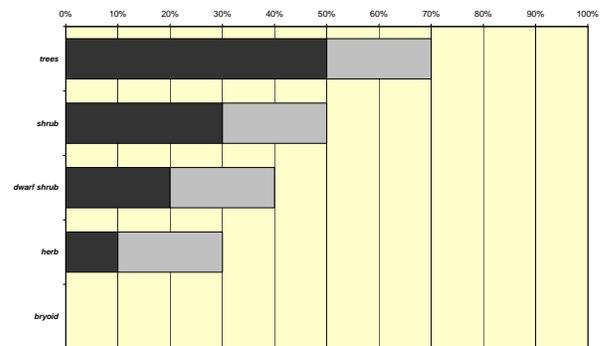
Appalachian oak - pine rocky ridge woodland/barren S3

National Vegetation Classification

CEGL006282 Quercus prinus - Quercus (rubra, velutina) / Gaylussacia baccata Forest G3G5

SAF Type

51	White pine - chestnut oak	ME > SAF
44	Chestnut oak	ME > SAF

Vegetation Structure (total cover by stratum)***Literature References***

Eastman 1976

WDU3

State Rarity Rank: S3

Birch - Oak Talus Woodland

Birch - Oak Rocky Woodland

Community Description

These community types are partial-canopy deciduous woodlands or patches of woodland among open talus areas. Overall canopy closure may be <25% when the open areas are included. Paper birch, red oak, and/or yellow birch are dominant. In some areas, blue birch may be common. Sugar maple, if present, is not abundant. Marginal wood-fern and poison-ivy are characteristic of the herb layer, which is best developed in open patches. Vegetation is generally very patchy, developing in pockets among the rocks.

Sites typically occur on dry, acidic talus substrates with various aspects. Documented elevations are from nearly sea level to about 1500'. More information would be useful.

Diagnostics

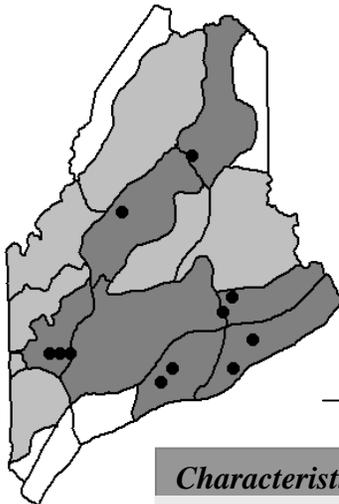
Sites occur on talus substrate; conifers are < 25% RD, ironwood is absent and birches are common.

Similar Types

Ironwood - Oak - Ash Woodlands are similar. They may have a high cover of red oak, but also include ironwood and sometimes sugar maple. Birches are less common, and the herbaceous flora includes rich site indicators that are absent from this type. Other community types dominated by red oak occur on thin soil over bedrock or on deeper soils. Oak - Pine Woodlands, the most similar, typically include bracken fern and lowbush blueberry, which are rarely (or only sparsely) found in talus woodlands.

Associated Rare Plants

Purple clematis



Distribution: Not well documented. Extends westward from Maine, and possibly in other directions.

Landscape Pattern: Small Patch

Characteristic Species**Canopy:**

Striped maple	(F)
Red maple	(F)
Yellow birch	(F,C)
Blue birch	(C)
Paper birch	(F,C)
Big-toothed aspen	(F)
Red oak	(C)

Sapling/Shrub:

Yellow birch	(F,C)
Striped maple	(F,C)
Mountain maple	(C)

Dwarf Shrub:

Lowbush blueberry	(F)
Poison-ivy	(F)

Herb:

Wild sarsaparilla	(F)
Big-leaved aster	(F)
Two-edged sedge	(F)
Common hairgrass	(F)
Marginal woodfern	(F)

Bryoid:

Large hair-cap moss	(F)
<i>Dicranum</i> moss	(F)
Pincushion moss	(F)

WDU3

State Rarity Rank: S3

Birch - Oak Talus Woodland

Birch - Oak Rocky Woodland

Conservation, Wildlife and Management Considerations

Talus woodlands receive little human use because of their inaccessibility and low timber value; however, areas at the base of talus slopes that receive water and nutrients from above sometimes have enough large trees to make logging economical. Conservation of these sites should include the range of talus forest cover, from the base of the slope on up, with a buffer of adjacent forest cover.

South-facing occurrences of this type in the southern part of the state may have provided historical habitat for the timber rattlesnake, which is believed to have been extirpated from Maine.

Examples on Conservation Lands

Acadia National Park	Hancock Co.
Horse Mountain, Baxter State Park	Penobscot Co.
Little Kineo Mountain Public Lands	Piscataquis Co.
Caribou Mountain, Donnell Pond Public Lands	Hancock Co.

Cross-reference to Other Classifications**New Hampshire**

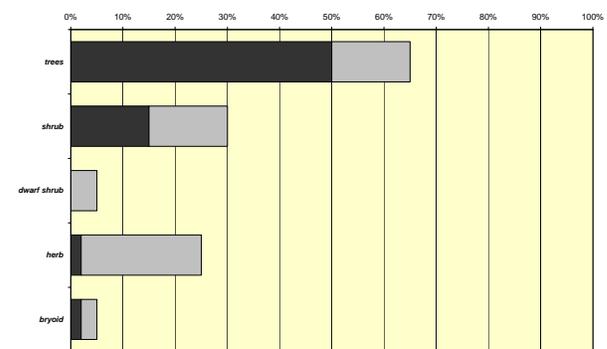
Red oak - black birch / marginal woodfern talus forest/woodland	S3S4
Temperate lichen talus barren	S1S2?

National Vegetation Classification

CEGL006320	Quercus rubra - Betula alleghaniensis / Polypodium virginianum Woodland	G3G5
CEGL006534	Lichen spp. Nonvascular Vegetation	G?

SAF Type

18	Paper birch	ME < SAF
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Vegetation Structure (total cover by stratum)***Literature References***

Singleton et al. 2000

WDU4

State Rarity Rank: S3

Ironwood - Oak - Ash Woodland

Oak - Ash Woodland

Community Description

These partial-canopy deciduous woodlands are dominated by red oak and ironwood (the latter often as subcanopy). Basswood is an indicator species. Sugar maple may be co-dominant at some sites. The herb layer features species typical of somewhat enriched sites, such as Venus' looking-glass, herb Robert, round-lobed hepatica, plantain-leaved pussytoes, wild-licorice, and pale corydalis, among an often dense cover of graminoids. Marginal woodfern is characteristic of the herb layer. Vegetation may be patchy, developing in pockets among the rocks, or more continuous along upper slopes and ridges.

Sites occur on upper hillslopes and ridges or on talus slopes, with some southerly exposure. Soils are thin and very well drained. The exposure and thin soils create dry conditions. These woodlands usually develop over bedrock that is not strongly acidic.

Diagnostics

Sites occupy dryish hillslopes. Ironwood is well represented and may be codominant with red oak. Sugar maple and/or basswood are present if not abundant. Some rich site indicators are present in herb layer.

Similar Types

Birch - Oak Talus Woodlands are similar, but have far less ironwood, ash, and sugar maple, generally lack basswood, and have less extensive graminoid cover. Intermediates can be difficult to classify.

Associated Rare Plants

Blunt-lobed woodsia
 Bottlebrush grass
 Douglas' knotweed
 Dry land sedge
 Early crowfoot
 Ebony spleenwort
 Fern-leaved false foxglove
 Hairy wood brome-grass
 Missouri rockcress
 Summer grape

Characteristic Species**Canopy:**

Sugar maple (F,C)
 Ironwood (F,C)
 Red oak (F,C)

Sapling/Shrub:

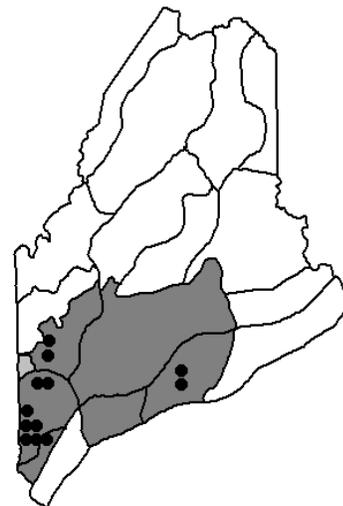
Beaked hazelnut (F)
 Ironwood (F,C)

Herb:

Marginal woodfern (F)
 Fibrous-rooted sedge (F)
 Woodland sedge (F,C)
 Round-lobed hepatica (F)
 Columbine (F)
 Rough-leaved ricegrass (F)
 False spikenard (F)

Bryoid:

Orthotrichum moss (F)
 Large hair-cap moss (F)
 Pincushion moss (F)
Dicranum moss (F)



Distribution: Eastern Broadleaf Forest Province, extending southwestward from Maine.

Landscape Pattern: Small Patch

WMU1

State Rarity Rank: S4

Oak - Pine Woodland

Oak - Pine Woodland

Community Description

These woodlands support a partial canopy (20-70%) dominated by red oak, or red oak with white pine or red spruce (rarely with red pine). The trees are widely spaced and often stunted, with an open understory. Gray birch is a common small tree. The herb layer is well developed (>25% cover), with one-third to nearly all of the herb layer consisting of dwarf shrubs. Lowbush blueberry is the most abundant dwarf shrub; sheep laurel is also common. Herbs form 1-20% cover among the dwarf shrubs. The bryoid layer is patchy, sparse, and variable in composition. While this is categorized as a "mixed" type, individual examples may be either mixed (>25% conifer and >25% deciduous) or deciduous (<25% conifer); they are otherwise very similar.

Sites occupy upper hillsides and low ridgelines, with slopes up to 30% and elevations up to 1500'. Aspect varies. The substrate is typically thin sandy to loamy soil (< 25 cm) over bedrock or coarse till, occasionally with a layer of poorly decomposed duff over the mineral horizons. Soils are acidic, pH 5.0-5.2. Many sites have evidence of recent fire.

Diagnostics

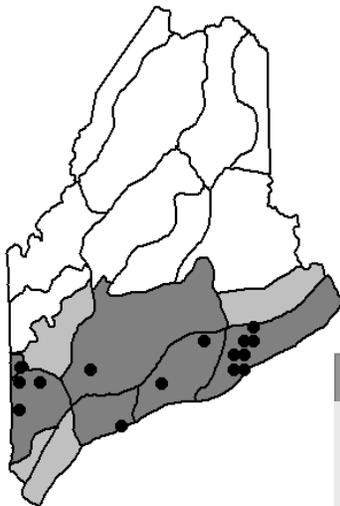
Canopy is less than 65% and red oak is dominant. Trees are short and spreading, or pines are dominant with > 25% RD of red oak, beech, sugar maple, or ash. The herb layer exceeds 20%, with lowbush blueberry, sheep laurel, or sweetfern prominent; graminoids are often abundant.

Associated Rare Plants

New Jersey tea
Scarlet oak

Similar Types

Oak - Pine Forests are similar and may be contiguous with this type. They are distinguished by their higher canopy cover (>75%), taller and straighter trees, and more sparse herb layer (generally <30%) with little cover of heath shrubs.



Distribution: Eastern Broadleaf Forest Province and southern portions of the New England - Adirondack Province and Laurentian Mixed Forest Province, extending southward and westward from Maine.

Landscape Pattern: Small Patch

Characteristic Species**Canopy:**

Red maple	(F,C)
Red spruce	(F,C)
Red oak	(F,C)
White pine	(F,C)
Red pine	(C)
Shadbush	(C)

Sapling/Shrub:

Shadbush	(F)
Pin cherry	(C)
Scrub oak	(C)
Black huckleberry	(C)
Highbush blueberry	(C)

Dwarf Shrub:

Sheep laurel	(F,C)
Lowbush blueberry	(F,C)

Herb:

Wintergreen	(F)
Canada mayflower	(F)
Bracken fern	(F,C)
Starflower	(F)
Sheep fescue	(C)

Bryoid:

Large hair-cap moss	(F)
<i>Dicranum</i> moss	(F)
Reindeer lichen	(F)

WMU1

State Rarity Rank: S4

Oak - Pine Woodland

Oak - Pine Woodland

Conservation, Wildlife and Management Considerations

This community appears to be relatively stable in Maine, with little habitat conversion. Fire has apparently played a role at some sites by preventing the invasion of fire-sensitive hardwood trees and shrubs. Many sites receive recreational use. In a few locations that use is heavy enough to have degraded the community, but most recreational foot-traffic is compatible. Communications towers could impact some sites on mid-elevation summits.

This community type hosts several rare Lepidopteran species that feed on oaks. Occurrences with an abundance of scrub oak may include the inland barrens buck moth, Edward's hairstreak, and sleepy dusky wing, all of which use scrub oak as a larval host plant. Other rare species considered to be associated with oak-pine woodlands include red-winged sallow, barrens chaetagnalea, barrens xylotype, similar underwing and oblique zale.

Examples on Conservation Lands

Styles Mountain, White Mountain National Forest	Oxford Co.
Round Mountain, Donnell Pond Public Lands	Hancock Co.
Spring River Mountain, Donnell Pond Public Lands	Hancock Co.
Blueberry Mountain, White Mountain National Forest	Oxford Co.
Isaiah Mountain, White Mountain National Forest	Oxford Co.
Shillalah Pond, Donnell Pond Public Lands	Hancock Co.

Cross-reference to Other Classifications**New Hampshire**

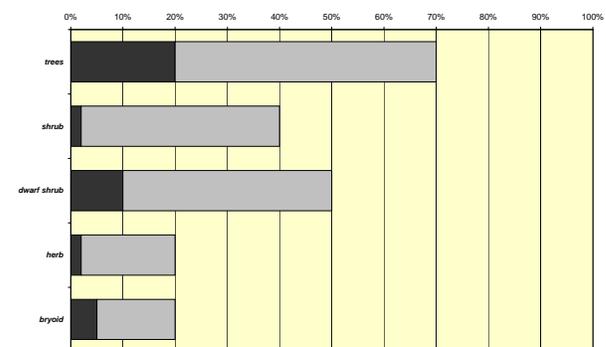
Red oak - pine / heath rocky ridge woodland S2S3

National Vegetation Classification

CEGL005101	(<i>Pinus strobus</i> , <i>Quercus rubra</i>) / Danthonia spicata Acid Bedrock Wooded Herbaceous Vegetation	G3G4
CEGL006134	<i>Quercus rubra</i> - (<i>Quercus prinus</i>) / <i>Vaccinium</i> spp. / <i>Deschampsia</i> <i>flexuosa</i> Woodland	G3G5

SAF Type

20 White pine - northern red oak - red maple ME < SAF

Vegetation Structure (total cover by stratum)***Literature References***

FCS1

State Rarity Rank: S4

Spruce - Fir - Cinnamon Fern Forest

Spruce - Fir Wet Flat

Community Description

This type is a wetland or poorly-drained forest in which red or black spruce is dominant (40 - 85% RD, rarely they are co-dominant). In southern Maine, red maple is frequent and may be sub-dominant (up to 45% RD). Fir may be present, but rarely >15% RD. The shrub layer varies from sparse to well developed, often >25%, with mountain holly and wild-raisin almost always present, other shrub species variable. The herb layer is extensive (> 30%), with cinnamon fern and three-seeded sedge typical. At sites near the coast, skunk cabbage may be prominent. Dwarf heath shrubs may be abundant at extreme northern Maine sites. The carpet-like bryoid layer (>50% cover) is dominated by peat mosses, with patches of three-lobed bazzania or red-stemmed moss on the hummocks.

Sites usually occur along drainages where soil remains saturated throughout the growing season and may be temporarily flooded in the springtime. The substrate is acidic mineral soil, with or without an organic layer (< 30 cm) on top. Mostly on flats or on gentle slopes along stream channels. Sites occasionally occur on steep-sided stream drainages in outwash deposits; these need better documentation to see if they are correctly placed in this type.

Diagnostics

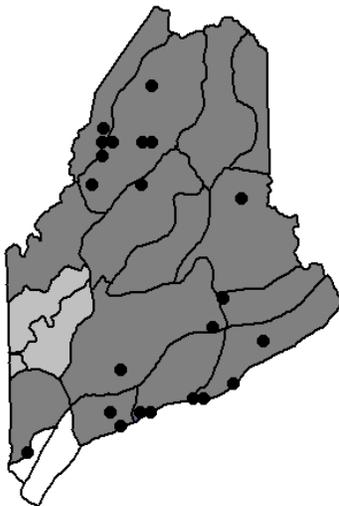
Sites occur on saturated mineral soils. Closed canopies have spruce >40% RD, or are rarely more open in which case red maple <25% RD. Wetland plants occur in the herb layer, usually including cinnamon fern and three-seeded sedge.

Associated Rare Plants

Showy lady's-slipper

Similar Types

Other spruce - fir types occur on upland soils. Red Maple - Sensitive Fern Swamps can be similar but will have more red maple and less spruce and fir. Spruce - Larch Wooded Bogs can have similar species composition (especially where black spruce is dominant) but occur on peat deposits (>30 cm) rather than on mineral soils.



Distribution: Statewide, more common and extensive northward. Characteristic of the Laurentian Mixed Forest Province and New England - Adirondack Province.

Landscape Pattern: Large Patch

Conservation, Wildlife and Management Considerations

Most known occurrences of this community type in Maine have been harvested for timber in the past. Timbering generally does not result in permanent conversion of this type, although more than a century may be required for recovery from heavy cutting. Market pressure for timber may lead to a decrease in the quality of the existing, unprotected sites. Some high-quality examples on public and private conservation lands are known, but not necessarily set aside from future harvesting.

This community type may be used as nesting habitat by a number of coniferous forest specialist bird species, including the yellow-bellied flycatcher, sharp-shinned hawk, black-backed woodpecker, pine grosbeak, green heron, black-throated green warbler, blackburnian warbler, common yellowthroat, wilson's warbler, spruce grouse, blackpoll warbler, and the uncommon rusty blackbird.

FCS1

State Rarity Rank: S4

Spruce - Fir - Cinnamon Fern Forest

Spruce - Fir Wet Flat

Characteristic Species**Canopy:**

Black spruce	(F,C)
Red spruce	(F,C)
Larch	(C)
Northern white cedar	(C)
White pine	(C)

Sapling/Shrub:

Mountain holly	(F,C)
Wild-raisin	(F)
Black huckleberry	(C)
Red maple	(F)
Highbush blueberry	(C)
Alder	(C)
Balsam fir	(F)

Dwarf Shrub:

Sheep laurel	(F,C)
Lowbush blueberry	(F,C)
Rhodora	(C)
Leatherleaf	(C)

Herb:

Goldthread	(F)
Bunchberry	(F)
Three-seeded sedge	(F,C)
Cinnamon fern	(F,C)
Starflower	(F)
Dwarf raspberry	(C)
Skunk cabbage	(C)
Black spruce	(C)

Bryoid:

Three-lobed bazzania	(F)
Reindeer lichen	(F)
Red-stemmed moss	(C)
<i>Sphagnum</i> mosses	(F,C)

Examples on Conservation Lands

Round Pond Public Lands	Aroostook Co.
Chamberlain Lake Public Lands	Piscataquis Co.

Cross-reference to Other Classifications**New Hampshire**

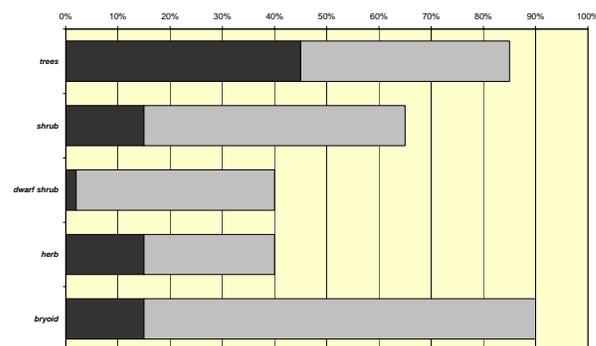
Red spruce/cinnamon fern-three seeded sedge/Sphagnum swamp S3

National Vegetation Classification

CEGL006361	Picea mariana - Picea rubens / Pleurozium schreberi Forest	G?
CEGL006311	Picea rubens - Abies balsamea / Sphagnum magellanicum Forest	G?
CEGL006312	Picea rubens - Abies balsamea / Gaultheria hispidula / Sphagnum spp. Forest	G?

SAF Type

33 Red spruce - balsam fir 1:1

Vegetation Structure (total cover by stratum)**Literature References**

Oosting and Reed 1944

FCS2

State Rarity Rank: S3

Northern White Cedar Swamp

Northern White Cedar Swamp

Community Description

This type is moderately to densely forested, often with little light penetrating. Northern white cedar is dominant (40-95% RD), often forming a fairly uniform stand, but may be interspersed with various amounts of red maple (up to 25% RD), black spruce (up to 40% RD), or, less frequently, yellow birch or balsam fir. The ground is a lush mosaic of vegetated hummocks interspersed with moist hollows. The herb layer is well developed (> 30% cover), with herbs more abundant than dwarf shrubs. Small cedar trees and an array of boreal herbs grow on the fallen logs and hummocks, including yellow lady's-slipper and several rare species. Sphagnum and other mosses blanket the hummocks, hollows, and fallen logs.

This community typically occupies poorly drained basins along stream flowages or the perimeter of small ponds. They often occupy most of the basin, rather than being a part of a larger open peatland. Substrate is usually shallow peat (< 50 cm) over mineral soil; some sites are on deep peat accumulations. The characteristically alkaline conditions in this community type provide suitable habitat for a number of rare plant species.

Diagnostics

Sites are basin wetland with >60% tree canopy cover and northern white cedar as the dominant tree. Heath shrubs are sparse (usually <15% cover). *Sphagnum* mosses are the dominant bryophytes. The substrate is organic (peat or muck).

Similar Types

Northern White Cedar Seepage Forests are underlain by mineral soils, sometimes with a thin peat layer, and tend to occur on slopes. They also have different mosses: feather-mosses (especially mountain-fern moss) and three-lobed bazzania will generally exceed peat mosses (*Sphagnum*) in total cover. Northern White Cedar Woodland Fens are partially forested peatlands with a patchy canopy of northern white cedar and a substantial cover of heath or other dwarf shrubs (usually >15% cover); open peatland vegetation types will usually occur with this type as part of the peatland.

Characteristic Species

Canopy:

Black spruce	(F)
Northern white cedar	(F,C)
Red spruce	(C)
White pine	(C)

Sapling/Shrub:

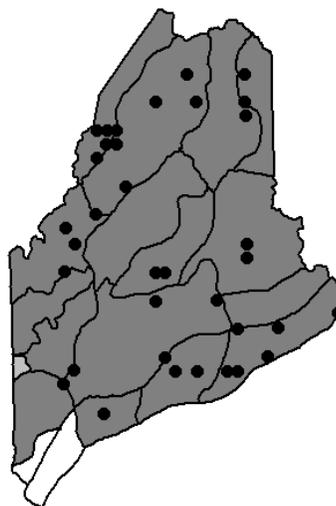
Black spruce	(C)
Highbush blueberry	(C)
Red spruce	(C)
Winterberry	(C)
Northern white cedar	(C)

Herb:

Three-seeded sedge	(F,C)
Creeping snowberry	(F)
Starflower	(F)
Red spruce	(C)
Balsam fir	(C)
Northern white cedar	(C)

Bryoid:

Mountain fern moss	(F)
<i>Sphagnum girgensohnii</i>	(F,C)
Three-lobed bazzania	(F)
Red-stemmed moss	(F)



Distribution: Throughout the New England - Adirondack Province and Laurentian Mixed Forest Province, but most extensive in northern Maine. Extends in all directions from the state.

Landscape Pattern: Large Patch, although in more southerly locations in the state, swamps are often small, < 50 acres.

FCS2

State Rarity Rank: S4

Northern White Cedar Swamp

Northern White Cedar Swamp

Conservation, Wildlife and Management Considerations

Most examples of northern white cedar swamps have been logged at least once in the past for the valuable cedar timber. Cedar swamps in northern Maine can be very extensive, running into hundreds of acres, and therefore more problematic to maintain examples not subject to human disturbance. In southern Maine, they are often less than 50 acres. The overall extent of this community type appears stable: there has been little permanent conversion to other land uses or forest types.

This community type may be used as nesting habitat by a number of coniferous forest specialist bird species, including black-backed woodpecker, palm warbler, yellow-bellied flycatcher, gray jay, boreal chickadee, Swainson's thrush, and northern waterthrush. Northern white cedar swamps that have a large number of dead trees provide ideal habitat for the rare three-toed woodpecker.

Associated Rare Plants

Bog bedstraw
Hoary willow
Lapland buttercup
Livid sedge
Northern bog sedge
Sheathed sedge
Showy lady's-slipper
Small round-leaved orchid
Sparse-flowered sedge
White adder's-mouth

Examples on Conservation Lands

Gott Brook, Dwinal Flowage Wildlife Management Area
Salmon Brook Lake Bog Public Lands
Magoon Pond Public Lands
Muddy River Wildlife Management Area
Great Heath Public Lands
Petit Manan Point, Petit Manan National Wildlife Refuge
Deboullie Ponds Public Lands

Penobscot Co.
Aroostook Co.
Penobscot Co.
Sagadahoc Co.
Washington Co.
Washington Co.
Aroostook Co.

Cross-reference to Other Classifications

New Hampshire

Northern white cedar-balsam fir seepage swamp S2

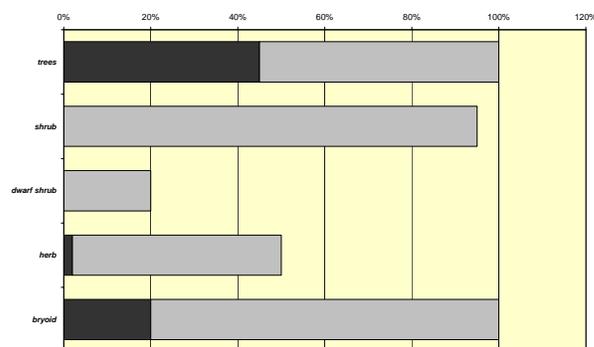
National Vegetation Classification

CEGL006007 Thuja occidentalis / Hylocomium splendens Forest G?

SAF Type

37 Northern white-cedar ME < SAF

Vegetation Structure (total cover by stratum)



Literature References

Sorensen et al. 1998a
Singleton et al. 2000

FCS3

State Rarity Rank: S3

Cedar - Spruce Seepage Forest

Evergreen Seepage Forest

Community Description

Northern white cedar and other trees form a moderate to dense canopy cover (70-95%), allowing only patchy light to penetrate to the forest floor. Northern white cedar is the dominant tree (60-100% RD); red spruce may be co-dominant or even dominant on some sites. Balsam fir, red maple or yellow birch may be present but not dominant. Black spruce occurs only rarely in this type. Shrubs and dwarf shrubs are sparse; the herb layer may be extensive, typically >50%. Most of the herb layer species are not woody, and feature plants of northern affinities such as bunchberry, twinflower, or creeping snowberry. The forest floor is characterized by a rich growth of mosses; generally, feather-mosses and liverworts are more abundant than peat mosses.

The substrate is mineral soil or shallow peat over mineral soil, generally saturated with cold groundwater. Water may emerge to form rivulets or small spring-fed brooks, or it may remain under the thick layer of mosses. These forests are typically found on gentle, saturated slopes with groundwater seepage, often at the base of slopes near drainage outlets.

Diagnostics

These closed canopy (>70%) forests are dominated by northern white cedar on mineral soil (may have a thin organic layer on top, but not deep peat). The bryophyte layer is dominated by feather-mosses and leafy liverworts rather than by peat mosses. Groundwater seeps may be visible.

Similar Types

This type is most similar to Northern White Cedar Swamps, which occur in saturated basins on organic rather than mineral soils with extensive cover of peat mosses. Northern White Cedar Woodland Fens are partially forested peatlands with a patchy canopy of cedar and a substantial cover of heath or other dwarf shrubs (usually >15% cover), on moderate to deep peat soils. Cedar - Spruce Seepage Forests with a substantial amount of red spruce could grade into Spruce - Fir - Cinnamon Fern Forests, which usually occur on flats.

Associated Rare Plants

Giant rattlesnake-plantain
Pink pyrola
Sheathed sedge
Showy lady's-slipper
Small yellow water crowfoot
Squashberry
Swamp fly honeysuckle

Characteristic Species

Canopy:

Balsam fir	(F)
Northern white cedar	(F,C)
Red spruce	(C)

Sapling/Shrub:

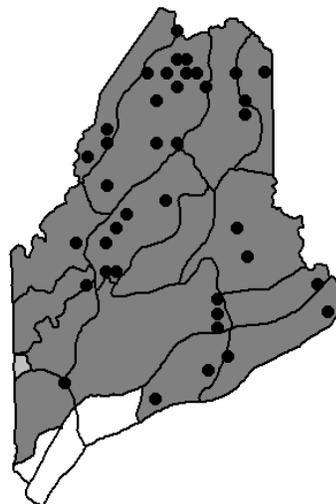
Fly honeysuckle	(F)
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Herb:

Goldthread	(F)
Bunchberry	(F)
Three-seeded sedge	(F)
Dewdrop	(F)
Creeping snowberry	(F)
Twinflower	(F)
Northern wood-sorrel	(F)
Oak fern	(F)

Bryoid:

<i>Sphagnum</i> mosses	(F)
Three-lobed bazzania	(F)
Mountain fern moss	(F)



Distribution: Primarily northern in distribution, extending westward and into Canada.

Landscape Pattern: Large Patch. Sites tend to be large (hundreds of acres) in northern Maine, and small at the southern periphery.

FCS3

State Rarity Rank: S3

Cedar - Spruce Seepage Forest

Evergreen Seepage Forest

Conservation, Wildlife and Management Considerations

Most known occurrences of this community type in Maine have been harvested for timber in the past. Timbering generally does not result in permanent conversion of this type, although more than a century may be required for recovery from heavy cutting. Market pressure for cedar timber may lead to a decrease in the quality of the existing, non-protected sites. Some high-quality examples on public and private conservation lands are known, but not necessarily set aside from future harvesting.

This community type may be used as nesting habitat by a number of coniferous forest specialist bird species, including black-backed woodpecker, palm warbler, yellow-bellied flycatcher, gray jay, boreal chickadee, Swainson's thrush, and northern waterthrush. Dead trees provide ideal habitat for the rare three-toed woodpecker. Cool, well-oxygenated forested seeps provide habitat for the northern spring salamander. The globally rare Nemourid stonefly, *Ostrocerca prolongata*, is restricted to seeps and springs and may be found in this community type.

Examples on Conservation Lands

Pollywog Gorge, Nahmakanta Public Lands	Piscataquis Co.
Chamberlain Lake Public Lands	Piscataquis Co.
Big Reed Pond Preserve	Piscataquis Co.
Deboullie Ponds Public Lands	Aroostook Co.
North Branch Inlet, Squa Pan Public Lands	Aroostook Co.
Sunkhaze Meadows National Wildlife Refuge	Penobscot Co.
Salmon Brook Lake Bog Public Lands	Aroostook Co.

Cross-reference to Other Classifications**New Hampshire**

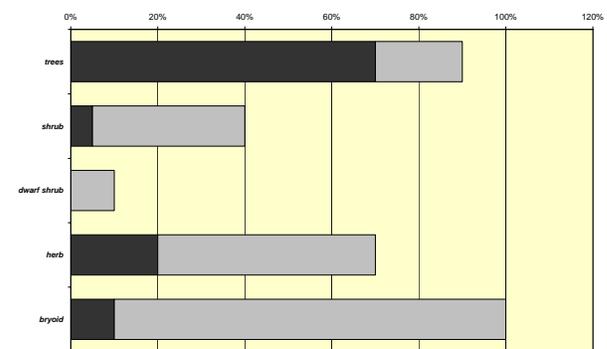
Seasonally saturated northern white cedar seepage forest S2

National Vegetation Classification

CEGL006175 Thuja occidentalis / Equisetum spp. Forest G?

SAF Type

37 Northern white-cedar ME < SAF

Vegetation Structure (total cover by stratum)***Literature References***

Sorensen et al. 1998a
Cogbill 1985

FCS4

State Rarity Rank: S2

Atlantic White Cedar Swamp

Atlantic White Cedar Swamp

Community Description

These densely forested communities allow little direct light to the forest floor. The canopy is usually a uniform cover of Atlantic white cedar (60-95% RD) with occasional black spruce and red maple; in some sites, red maple may be co-dominant. The ground is a mosaic of moss-covered hummocks and hollows. Where light penetrates the canopy, shrubs such as highbush blueberry, black huckleberry, mountain holly, or winterberry may be prominent. The herb layer features dense patches of tree regeneration in some openings. Herbaceous species are typically more abundant than dwarf heath shrubs.

Atlantic white cedar swamps are underlain by shallow peat over mineral soil, or, less commonly, by mineral soil with little organic matter. They are flat, found in poorly drained depressions where standing water is present at least part of the year. All are at less than 300' elevation.

Diagnostics

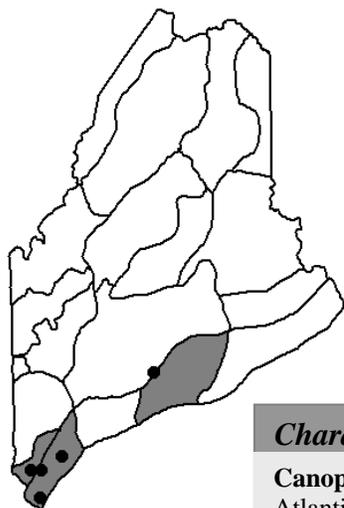
These wetlands have greater than 60% tree canopy cover. Atlantic white cedar is dominant or at least common. Evergreen shrubs are often present.

Similar Types

Northern White Cedar Swamps may be compositionally similar except for the dominant species. Other similar types lack Atlantic white cedar, except for Atlantic White Cedar Bogs, where the trees are stunted, the canopy is well under 60%, and the peat moss substrate is deep (> 50 cm).

Associated Rare Plants

Atlantic white cedar
Smooth winterberry



Distribution: Along the entire Atlantic coastal plain north to central Maine. They have been greatly reduced in extent and are one of the rarest forest types in the eastern US.

Landscape Pattern: Large Patch, though many sites in Maine are small.

Characteristic Species**Canopy:**

Atlantic white cedar (F,C)
Black spruce (F,C)
Red maple (C)

Sapling/Shrub:

Mountain holly (F,C)
Atlantic white cedar (C)

Dwarf Shrub:

Sheep laurel (F)
Labrador tea (F)

Herb:

Wild sarsaparilla (F,C)
Goldthread (F,C)
Three-seeded sedge (F)
Creeping snowberry (F)
Canada mayflower (F)
Cinnamon fern (F,C)
Pitcher plant (F)
Starflower (F)

Bryoid:

Sphagnum mosses (F,C)
Three-lobed bazzania (F)
Dicranum moss (F)
Reindeer lichen (F)

FCS4

State Rarity Rank: S2

Atlantic White Cedar Swamp

Atlantic White Cedar Swamp

Conservation, Wildlife and Management Considerations

Atlantic white cedar is valuable as timber and most occurrences of this community type occur in rapidly growing southern Maine it vulnerable. All of Maine's stands have been harvested in the past; some are now mature. Their perpetuation appears to be partially dependent on disturbance events such as blowdowns, fire, or beaver flooding. In the absence of such events, cedar may be replaced by more shade-tolerant species such as red maple and hemlock. The quality of Atlantic white cedar swamps may also be impaired by filling, water quality degradation, water level changes, and timber harvesting.

These forested wetlands provide habitat for a variety of conifer nesting birds. One of Maine's rarest animals, the Hessel's Hairstreak butterfly, is restricted to this type.

Examples on Conservation Lands

Massabesic Experimental Forest	York Co.
Appleton Bog Preserve	Knox Co.
Mt Agamenticus	York Co.

Cross-reference to Other Classifications**New Hampshire**

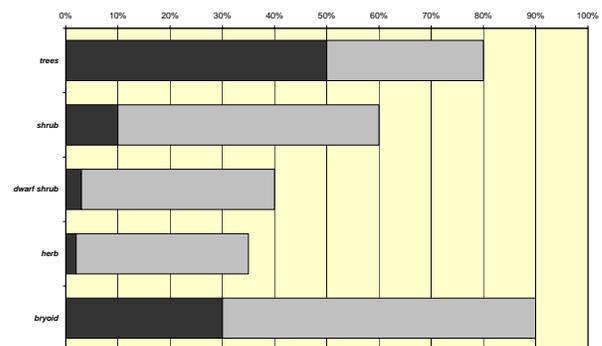
Atlantic white cedar-yellow birch/sweet pepperbush swamp	S2
Boreal Atlantic white cedar swamp	S1
Seasonally flooded Atlantic white cedar swamp	S2

National Vegetation Classification

CEGL006207	Chamaecyparis thyoides - Acer rubrum Lower New England / Northern Piedmont Forest	G3G5
CEGL006189	Chamaecyparis thyoides / Ilex verticillata Forest	G3
CEGL006363	Chamaecyparis thyoides - Picea rubens / Gaylussacia baccata / Gaultheria hispidula Forest	G3?

SAF Type

97	Atlantic white-cedar	ME < SAF
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Vegetation Structure (total cover by stratum)***Literature References***

- Laderman 1989
- Motzkin 1991
- Sperduto and Ritter 1994

FDF1

State Rarity Rank: S3

Silver Maple Floodplain Forest

Silver Maple Floodplain Forest

Community Description

These forests possess an almost-complete canopy dominated by silver maple (>60% RD). Associates include red maple and American elm (up to 30% RD) or, in central Maine, bur oak (up to 25% RD). Widely spaced trees, many with multiple trunks, give a park-like feeling. The understory is open and shrubs are sparse. Musclewood may be present and is a good indicator. The lush carpet of herbs changes from spring ephemerals like trout lilies and bloodroot to dense fern cover in summer. Bryoid cover is minor. Some forests have a berm adjacent to the river channel where black willow is common and herbaceous species composition is different from the lower-elevation interior.

Sites occur on plains flanking low-gradient rivers, within the reach of seasonal floods, at elevation <700'. Soils are fine sand or silt, usually with good drainage capacity; the water table fluctuates. Relatively high nutrient levels result from sediment deposition of annual floods; pH is 5.0 - 6.2.

Diagnostics

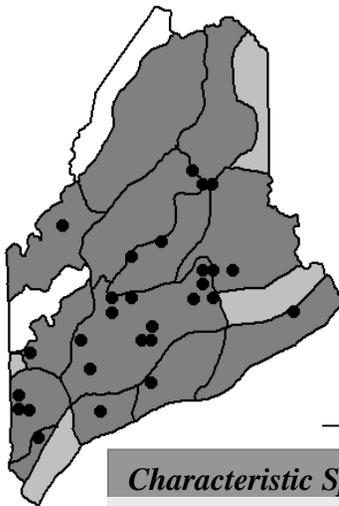
Sites occur in a floodplain setting with mineral soil. Silver maple is the dominant tree. There is a dense herb layer with sensitive fern and, locally, ostrich fern. Spring ephemerals are frequent.

Associated Rare Plants

Long-beaked sedge
Swamp white oak
Wild garlic
Wild leek

Similar Types

Hardwood River Terrace Forests may be adjacent to this type on the higher floodplain; they have a much smaller proportion of silver maple in the canopy. Instead, the canopy is dominated by sugar maple, red oak, or green ash, and herb diversity is higher. Red Maple - Sensitive Fern Swamps lack the dominance of silver maple, and have surface water or saturated soil throughout the growing season. Hardwood Seepage Forests occur along small drainages, usually sloping, rather than in extensive floodplains.



Distribution: Long and narrow floodplains along the shores or islands of large rivers and streams throughout Maine, New England, and New Brunswick.

Landscape Pattern: Large Patch (remaining sites mostly 20-200 acres, up to 1000 acres)

Characteristic Species

Canopy:		Sapling/Shrub:		Dwarf Shrub:	
Silver maple	(F,C)	Arrowwood	(C)	Swamp dewberry	(C)
Basswood	(C)	Buttonbush	(C)		
Black cherry	(C)	Common blackberry	(C)	Herb:	
Bur oak	(C)	Musclewood	(C)	Jack-in-the-pulpit	(F)
Green ash	(C)	Nannyberry	(C)	Sensitive fern	(F,C)
Red oak	(C)	Winterberry holly	(C)	Tall meadow-rue	(F)
Sugar maple	(C)	Gray birch	(C)	Ostrich fern	(F,C)
Yellow birch	(C)	Meadowsweet	(F,C)	Cinnamon fern	(C)
American elm	(F)			Royal fern	(C)
Black ash	(F)			Wood-nettle	(C)
				Bluejoint	(F)
				Green ash	(F)

FDF1

State Rarity Rank: S3

Silver Maple Floodplain Forest

Silver Maple Floodplain Forest

Conservation, Wildlife and Management Considerations

With little market for silver maple, until recently, these forests were often left alone. The market for hardwood pulp, however, is a potential threat to this forest type. Exotic plant species, which may displace those native to our area, also represent a threat to the integrity of these forests and have degraded some Maine examples. Several of the known examples are formally protected from conversion.

The northern waterthrush, barred owl, belted kingfisher, bank swallow, and green heron are associates of this community type. In the southern part of the state, the Louisiana waterthrush and yellow-throated vireo are likely associates if the canopy is closed or nearly so. Wood turtles overwinter in river channels and forage in floodplain forests. The silver-haired bat often roosts in riparian habitats in trees with loose bark. Rare turtles like wood, spotted, and Blanding's turtles may feed on amphibian egg masses present in isolated pools within such forests.

Examples on Conservation Lands

West Branch Piscataquis River, Appalachian Trail	Piscataquis Co.
The Oxbow, East Branch Penobscot River	Penobscot Co.
Saco River Preserve	York Co.
Wassataquoik Public Lands	Penobscot Co.
Little Ossipee River Public Lands	York Co.
Indian And Fowl Meadow Islands Preserve	Somerset Co.
Brownfield Bog Wildlife Management Area	Oxford Co.
Trout Brook, Baxter State Park	Piscataquis Co.
Sunkhaze Meadows National Wildlife Refuge	Penobscot Co.

Cross-reference to Other Classifications**New Hampshire**

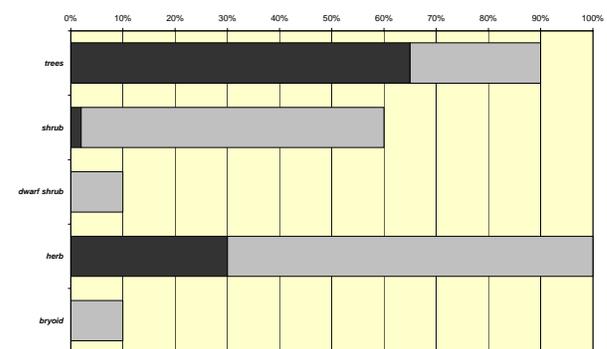
Silver maple/wood nettle-ostrich fern floodplain forest	S2
Silver maple/false nettle-wood reed-sedge floodplain forest	S2

National Vegetation Classification

CEGL006176 Acer saccharinum / Onoclea sensibilis - Boehmeria cylindrica Forest	G?
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SAF Type

39	Black ash - American elm - red maple	ME < SAF
62	Silver maple - American elm	ME > SAF

Vegetation Structure (total cover by stratum)***Literature References***

- Frye and Quinn 1979
- Hoffman 1995
- Holland and Burk 1984
- Metzler and Damman 1985
- Sorensen et al. 1998b
- Singleton et al. 2000

fdf2

State Rarity Rank: S2

Hardwood River Terrace Forest

Upper Floodplain Hardwood Forest

Community Description

An almost-complete canopy is dominated by sugar maple, red oak, or yellow birch, with ash often common and basswood and butternut occasional. The understory is open and shrubs are sparse. The lush carpet of herbs changes from spring ephemerals like trout lily and bloodroot to variable cover of mixed graminoids and forbs in summer. Some sites are rich in rare herbs; others lack richness indicators. Bryoid cover is minor. A poorly documented variant, seen in smaller drainages, is dominated by basswood, red maple, and black cherry; it is tracked provisionally as a Basswood - Ash - Red Maple Floodplain Forest.

Sites occur on slightly elevated terraces flanking low-gradient rivers at elevations <700'. Flooding is occasional, sometimes less frequent than yearly. These forests have lower frequency and duration of flooding than silver maple floodplain forests. Most known examples are along larger rivers. Soils are fine sand or silt, usually with good drainage capacity and relatively high nutrient levels; pH is 5.0 - 6.2.

Diagnostics

Sites occupy floodplain or river terrace settings with mineral soil. The canopy is dominated by red oak or yellow birch. Silver maple may be present. A dense herb layer includes species not typical of wetlands (e.g. starflower, zig-zag goldenrod, big-leaved aster, silvery spleenwort). Sensitive fern is often present but not dominant. Spring ephemerals are often abundant.

Similar Types

Silver Maple Floodplain Forests are often adjacent to these forests, occurring between them and the channel, and are dominated by silver maple. Red Maple - Sensitive Fern Swamps have red maple dominant, and have soils that are flooded or saturated throughout the growing season. Beech - Birch - Maple Forests, Maple - Basswood - Ash Forests, and Red Oak - Northern Hardwoods - White Pine Forests can be similar in canopy composition, but are not in the floodplain or terraces of a river. Hardwood Seepage Forests occur along small stream drainages, usually sloping with steeper gradients.

Associated Rare Plants

Bottlebrush grass
Honewort
Long-beaked sedge
Pubescent sedge
Wild garlic
Wild ginger
Wild leek

Characteristic Species

Canopy:

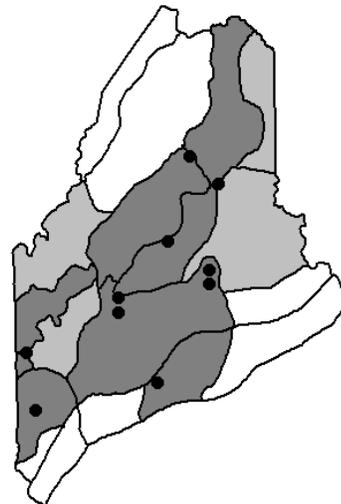
Black cherry	(C)
Green ash	(C)
Red oak	(C)
Sugar maple	(F,C)
Yellow birch	(C)
Basswood	(C)

Sapling/Shrub:

Musclewood	(C)
Nannyberry	(C)
American elm	(F)
Choke cherry	(F)
White ash	(F)

Herb:

Bloodroot	(F)
Blue cohosh	(F)
Jack-in-the-pulpit	(F)
Tall meadow-rue	(F)
Ostrich fern	(F,C)
Sensitive fern	(F)
Lady fern	(F,C)
Silvery spleenwort	(C)



Distribution: Long and narrow floodplains along the shores or islands of large rivers and streams throughout Maine, New England, and New Brunswick.

Landscape Pattern: Large Patch (remaining sites mostly 20 -200 acres, up to 1000 acres).

FDF2

State Rarity Rank: S2

Hardwood River Terrace Forest

Upper Floodplain Hardwood Forest

Conservation, Wildlife and Management Considerations

Virtually all of these forests have been harvested, and most have been converted to agriculture. Exotic plant species, which may displace those native to our area, represent a threat to the integrity of these forests and have degraded at least some Maine examples.

The northern waterthrush, barred owl, belted kingfisher, bank swallow, scarlet tanager, and green heron are associates of this community type. Wood turtles overwinter in river channels and forage in floodplain forests. The silver-haired bat often roosts in riparian habitats in trees with loose bark. Rare turtles like wood, spotted, and Blanding's turtles may feed on amphibian egg masses present in isolated pools within such forests. Fairy shrimp may also occur in isolated vernal pools.

Examples on Conservation Lands

West Branch Piscataquis River, Appalachian Trail	Piscataquis Co.
Trout Brook, Baxter State Park	Piscataquis Co.
Brownfield Bog Wildlife Management Area	Oxford Co.
Indian And Fowl Meadow Islands Preserve	Somerset Co.
Wassataquoik Public Lands	Penobscot Co.

Cross-reference to Other Classifications**New Hampshire**

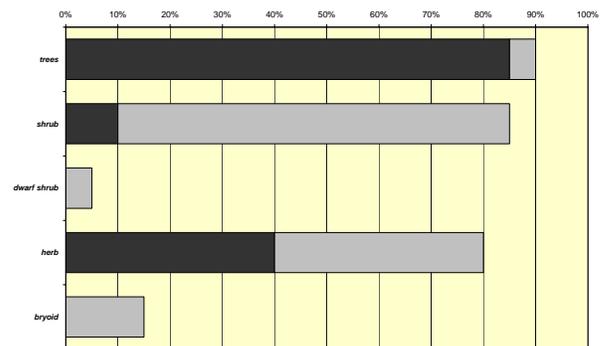
Sugar maple/ironwood/short husk floodplain forest	S1
Sugar maple-silver maple-white ash floodplain forest	S1S2

National Vegetation Classification

CEGL006114	Acer saccharum - Fraxinus spp. - Tilia americana / Matteuccia struthiopteris - Ageratina altissima Forest	G?
CEGL006504	Acer saccharinum / Ostrya virginiana / Brachyelytrum erectum Floodplain Forest [Provisional]	G?

SAF Type

27	Sugar maple	ME > SAF
55	Northern red oak	~
26	Sugar maple - basswood	1:1

Vegetation Structure (total cover by stratum)***Literature References***

FDF3

State Rarity Rank: S1

Balsam - Poplar Floodplain Forest

Balsam - Poplar Floodplain Forest

Community Description

These partly open to closed canopy forests are dominated by balsam poplar (>50% RD). This association includes a wide range of early seral, wetland, and floodplain species. These typically include American elm, black or green ash, ostrich fern, lady fern, sensitive fern, blue-joint grass, red-osier dogwood, Virgin's bower, speckled alder, dwarf raspberry, broad leaved goldenrod, inflated sedge, and wood nettle.

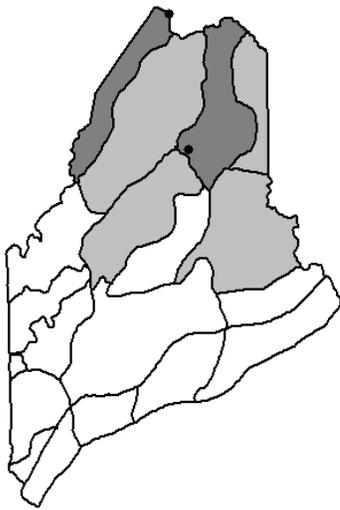
Sites occur on seasonally inundated floodplains or slightly elevated terraces flanking low-gradient rivers in central and northern Maine. Sites are often embedded within a matrix of open oxbows and shrub thickets. These forests have lower frequency and duration of flooding than silver maple floodplain forests. Soils are alluvial fine sand or silt, usually with good drainage capacity.

Diagnostics

Sites occupy a floodplain or river terrace setting with mineral soil. Balsam poplar is dominant or co-dominant; black or green ash and American elm may be present. The dense herb layer includes ferns, blue-joint grass, sedges, and shrubs such as red-osier dogwood and speckled alder.

Similar Types

Silver Maple Floodplain Forests and Hardwood River Terrace forests lack balsam poplar as a dominant or co-dominant.



Distribution: Narrow floodplains along the shores or islands of medium and smaller rivers in northern Maine, Quebec, and the Maritime Provinces.

Landscape Pattern: Small Patch

Characteristic Species**Canopy:**

Balsam poplar	(F,C)
Black ash	(F)
American elm	(F)
Balsam fir	(F)

Dwarf Shrub:

Dwarf raspberry	(F)
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Herb:

Ostrich fern	(F,C)
Sensitive fern	(F)
Blue-joint grass	(F)
Royal fern	(F)
Wood nettle	(F)

SDU2

State Rarity Rank: S2

Balsam - Poplar Floodplain Forest

Balsam - Poplar Floodplain Forest

Conservation, Wildlife and Management Considerations

Many of these forests have been harvested or altered by agricultural conversion. Exotic plant species, which may displace those native to our area, represent a threat to the integrity of these forests. The biggest threat may be hydrologic alteration.

Little data is available on wildlife use of this specific community type, but it is suspected that it would support many of those species associated with Hardwood River Terrace forests in central and northern Maine.

Cross-reference to Other Classifications**New Hampshire**

N/A

National Vegetation Classification

CEGL006432 Populus balsamifera – Fraxinus
nigra/Matteucia struthiopteris
Forest [Provisional]

SAF Type

39	Black ash – American elm – red maple	ME < SAF
16	Aspen	ME < SAF

Vegetation Structure (total cover by stratum)

Data not available.

FMF1

State Rarity Rank: S3

Hardwood Seepage Forest

Hardwood Seepage Forest

Community Description

These closed-canopy to partial-canopy forests support a mixture of mostly deciduous overstory trees. Yellow birch and/or green, black, or white ash are usually prominent species (35%-85% RD each, sometimes lower). Hemlock or, less often, red spruce may create a mixed canopy (>25% conifer), with locally dense conifers. Sugar maple, red maple, beech, and red oak are occasional. The understory is usually open, with few shrubs and patches of tree regeneration. The herb layer is typically patchy, and reflects the underlying seepage gradients. Skunk cabbage, jewel weed, sensitive fern, and cinnamon fern occur in the wettest areas, and species less restricted by soil moisture occur elsewhere. Rich-site species such as maidenhair fern may be present at some sites. Bryoids are sparse.

Sites occur on slight slopes (<15%) and adjacent bottoms where an impervious soil layer (~30 cm deep), such as marine clay or packed till, forces seepage water near the surface. Soils are loamy, or grading to silty in flats, with moderately acidic to neutral pH (5.2-7.0). Known sites are near the coast or at lower elevations inland (<500'). Soils place this as a wetland type, but some sites may grade from wetland to upland as one moves upslope.

Diagnostics

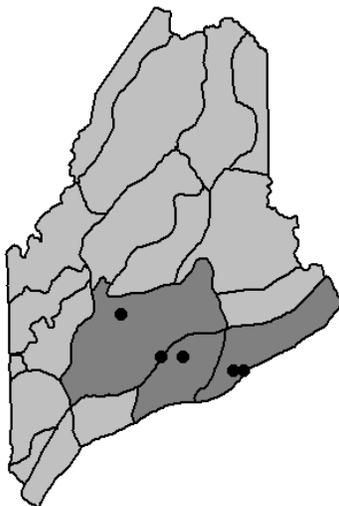
Ash and/or yellow birch are common in the canopy (red oak is prominent at some sites). Red maple may be present but is not dominant. Wetland species are common in the herb layer. Soils are saturated and often temporarily flooded.

Associated Rare Plants

Spicebush
Swamp saxifrage

Similar Types

Hemlock - Hardwood Pocket Swamps feature hemlock and/or red maple as dominants, and have ericads or winterberry in the shrub layer. Some Maple - Basswood - Ash Forests may have areas of wet soils, but have very different herb layer composition. Spruce - Fir - Cinnamon Fern Forests and Red Maple - Sensitive Fern Swamps can occur in similar settings, but have different canopy composition.



Distribution: Not well documented.

Landscape Pattern: Small Patch

Characteristic Species**Canopy:**

Sugar maple (F)
Yellow birch (F,C)
American beech (F)
Green ash (F,C)
Red spruce (F)
Red oak (F)
Eastern hemlock (C)

Herb:

Jack-in-the-pulpit (F)
Goldthread (F)
Spinulose wood fern (F)
Sensitive fern (F)
New York fern (F)
Common speedwell (F)
Bluejoint (C)
Cinnamon fern (C)

Sapling/Shrub:

American beech (F)
Red spruce (F,C)

Bryoid:

Dicranum moss (F)
Sphagnum mosses (C)

FMF1

State Rarity Rank: S3

Hardwood Seepage Forest

Hardwood Seepage Forest

Conservation, Wildlife and Management Considerations

Known sites are on land with a long settlement history, and were presumably cleared or at least harvested in the 1800s. Because these tend to occur as small forest patches, their conservation depends in part on maintaining some surrounding forest cover (both upslope and downslope) as a buffer. Most known sites are in small private ownerships.

Birds using a variety of hardwood types may use these communities. Cool, well-oxygenated forested seeps provide habitat for the northern spring salamander. The globally rare Nemourid stonefly, *Ostrocerca prolongata*, is restricted to seeps and springs and may be found here. Occurrences of this community type in southern Maine may host the spicebush swallowtail butterfly, whose larvae feed only on spicebush and sassafras.

Examples on Conservation Lands

Sears Island Penobscot Co.

Cross-reference to Other Classifications**New Hampshire**

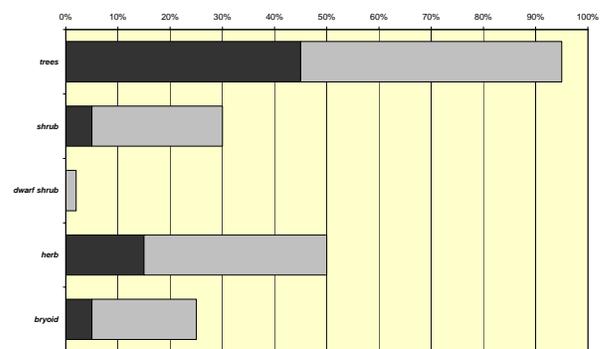
Northern hardwood-black ash-conifer seepage swamp S2
 Seasonally saturated red maple swamp S3S4

National Vegetation Classification

CEGL006380 *Tsuga canadensis* - *Acer rubrum* - *Betula alleghaniensis* / *Osmunda cinnamomea* forest

SAF Type

24 Hemlock - yellow birch ?

Vegetation Structure (total cover by stratum)***Literature References***

FMS1

State Rarity Rank: S2

Hemlock - Hardwood Pocket Swamp

Pocket Swamp

Community Description

These forested wetlands can be deciduous or mixed and occur as small depressions within an upland landscape. Red maple almost always dominates the canopy and occurs with hemlock and/or black gum. Black gum is an uncommon tree in Maine and is a good indicator of this community. Shrubs may be locally dense and include highbush blueberry and winterberry. The herb layer is variable in extent, and often features large clumps of ferns. Several plants that are rare in Maine are associated with these wetlands.

Sites occur in small isolated basins, sometimes perched on the sides of gentle hills, with a seasonal high water table. The soil may dry out during the summer, or pools of water may remain among the forested hummocks. Often these basins have no surface outlet, or they may drain only at high water. Soils are acidic, usually with a thin peat layer over mineral soil, occasionally with deeper peat. These wetlands may occur as small patches (typically < 3 acres) in otherwise well-drained, forested uplands.

Diagnostics

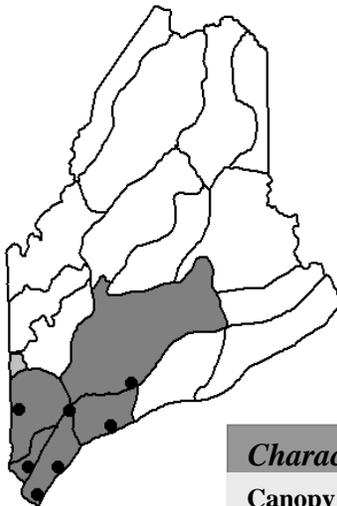
Hemlock and/or red maple are dominant; black gum is usually present; wetland soils occur in isolated drainages, not along a stream or large drainage flat.

Similar Types

Red Maple - Sensitive Fern Swamps occur along streams or lake basins and are more strongly dominated by red maple. Hardwood Seepage Forests have less red maple, more ash and yellow birch.

Associated Rare Plants

Mountain laurel
Smooth winterberry
Spicebush



Distribution: Limited to the southern and midcoast regions of the state, primarily in the Eastern Broadleaf Forest Province, and extending southward and southwestward from Maine.

Landscape Pattern: Small Patch; known sites are 2 - 30 acres.

Characteristic Species**Canopy:**

Red maple (F)
Black gum (F)
Eastern hemlock (F)
Yellow birch (F)

Sapling/Shrub:

Yellow birch (F)
Winterberry (F)
Highbush blueberry (F)
Mountain holly (F)
Maleberry (F)
Wild-raisin (F)

Dwarf Shrub:

Lowbush blueberry (F)

Herb:

Three-seeded sedge (C)
Bluejoint (F)
Goldthread (F)
Long sedge (F)
Northern water-horehound (F)
Cinnamon fern (F,C)
Royal fern (F,C)
Marsh fern (F)

FMS1

State Rarity Rank: S2

Hemlock - Hardwood Pocket Swamp

Pocket Swamp

Conservation, Wildlife and Management Considerations

Timber harvesting lowers the natural community values of these small and often isolated wetlands. Because these tend to occur as small forest patches, their conservation depends in part on maintaining some surrounding forest cover as a buffer. They should be buffered from direct impacts, such as physical disturbance to the soil, and indirect impacts, such as water quality degradation. Some contain vernal pools, which are known to be important habitat for frogs, salamanders, and some of Maine's rare turtles. Only a few examples are known on public lands or private conservation lands.

Some occurrences of this community type host vernal pools, which are important breeding habitat for a variety of amphibians including wood frogs, spotted salamanders, and blue-spotted salamanders. Rare turtles like Blanding's and spotted turtles may feed on amphibian egg masses present in such pools. If peaty hummocks are common, four-toed salamanders may breed in these wetlands. Occurrences of this community type in which spicebush is present may host the spicebush swallowtail butterfly, whose larvae feed only on spicebush and sassafras.

Examples on Conservation Lands

Mt Agamenticus	York Co.
Long - Short Pond, Ferry Beach State Park	York Co.
Brownfield Bog Wildlife Management Area	Oxford Co.
Coastal Maine Botanical Garden	Lincoln Co.

Cross-reference to Other Classifications**New Hampshire**

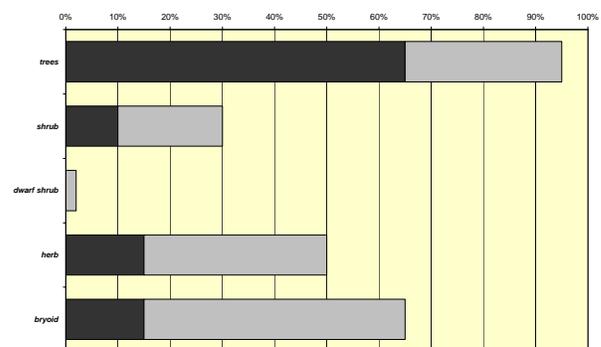
Black gum-red maple basin swamp	S1S2
Low hemlock/hardwood/cinnamon fern forest	S4?

National Vegetation Classification

CEGL006014	Acer rubrum - Nyssa sylvatica - Betula alleghaniensis / Sphagnum spp. Forest	G?
CEGL006226	Tsuga canadensis - Betula alleghaniensis / Ilex verticillata / Sphagnum spp. Forest	G5

SAF Type

39	Black ash - American elm - red maple	ME < SAF
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Vegetation Structure (total cover by stratum)***Literature References***

Vogelmann 1976

WCS1

State Rarity Rank: S4

Northern White Cedar Woodland Fen

Open Cedar Fen

Community Description

These open-canopy woodlands occur in a peatland setting with northern white cedar dominant (> 65% RD). Canopy closure is 20-60%. Black spruce, red maple, balsam fir, black ash, or larch may be mixed with the cedar (each <20% RD). The shrub layer may be locally dense with patches of trees and scattered shrubs of winterberry, alder, or mountain holly. The herb layer, usually with >50% cover, is variable in composition and may be predominantly ericaceous shrubs or herbs with a prominent component of graminoids. Shrubby cinquefoil, alpine cotton-grass, sticky false-asphodel, and grass-of-parnassus may be at higher pH sites. The bryoid layer is mostly peat mosses, but the presence of mountain fern moss is indicative of this type.

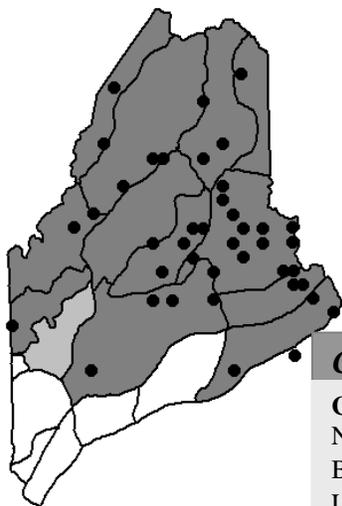
Sites generally occur as part of a peatland (peat > 30 cm deep) or occasionally along a peatland outlet stream where the peat substrate is shallower. Sites are in lowlands at elevations up to 1000' and typical of somewhat minerotrophic (fen) conditions, not raised bog conditions. pH ranges from quite acidic to circumneutral (4.6-7.2).

Diagnostics

Northern white cedar forms a partial canopy (< 65%) and is frequently dominant in the shrub layer. Dwarf shrub peatland indicator plants are present. Sites often occur adjacent to an open peatland.

Similar Types

Northern White Cedar Swamps and Cedar - Spruce Seepage Forests occur on mineral soils or on thin-to-moderate peat over mineral soil, and not as part of a peatland with forested and non-forested areas (Northern White Cedar Swamps may occasionally occur in that setting); they have very low cover of peatland dwarf shrubs. Red Maple Wooded Fens can be similar, but have far less northern white cedar (<25% RD) in the canopy. Gradations from cedar fens to Spruce - Larch Wooded Bogs also occur; Spruce - Larch Wooded Bogs also have little cedar (well under 50% RD).



Distribution: New England - Adirondack Province and Laurentian Mixed Forest Province, extending eastward, westward, and northward from Maine.

Landscape Pattern: Large Patch

Characteristic Species**Canopy:**

Northern white cedar	(F,C)
Black spruce	(C)
Larch	(C)

Sapling/Shrub:

Northern white cedar	(F,C)
Balsam fir	(C)
Black ash	(C)
Highbush blueberry	(C)
Red maple	(C)

Dwarf Shrub:

Sheep laurel	(F)
Labrador tea	(F)
Black huckleberry	(C)
Sweet gale	(C)
Leatherleaf	(C)

Herb:

Three-leaved false Solomon's seal	(F)
Bluejoint	(C)
Cinnamon fern	(C)
Creeping snowberry	(C)
Dwarf raspberry	(C)
Tussock sedge	(C)
Northern white cedar	(C)

Bryoid:

<i>Sphagnum</i> mosses	(F,C)
<i>Dicranum</i> moss	(F,C)
Mountain fern moss	(F)
Red-stemmed moss	(F)

WCS1

State Rarity Rank: S4

Northern White Cedar Woodland Fen

Open Cedar Fen

Conservation, Wildlife and Management Considerations

These fens occur as part of larger peatlands, and maintaining the hydrologic integrity (e.g. with upland buffers) of the entire wetland is key. The cedars generally remain small and are therefore less economically valuable than those occurring in other community types.

Conifer-preferring birds that may use this partly open type include black-backed woodpecker, palm warbler, common yellowthroat, Lincoln's sparrow, and Swainson's thrush. Cedar fens that have a large number of dead trees provide habitat for the rare three-toed woodpecker.

Examples on Conservation Lands

Mattagodus Wildlife Management Area
 Number Five Bog Public Lands
 Lake Umbagog National Wildlife Refuge

Penobscot Co.
 Somerset Co.
 Oxford Co.

Associated Rare Plants

Bog bedstraw
 Dioecious sedge
 Grass-of-parnassus
 Horned beak-rush
 Livid sedge
 Marsh valerian
 Showy lady's-slipper
 Sparse-flowered sedge
 Swamp birch
 Wiegand's sedge

Cross-reference to Other Classifications**New Hampshire**

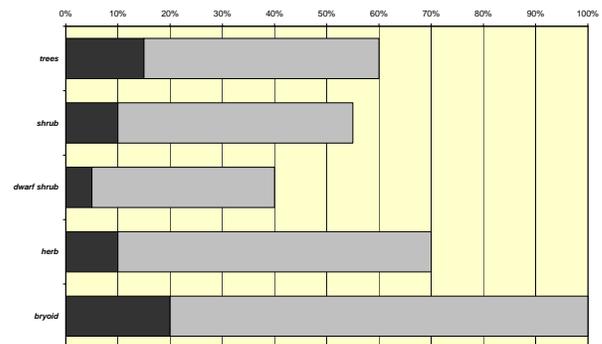
Northern white cedar circumneutral string S1?
 Boreal acidic northern white cedar swamp S1

National Vegetation Classification

CEGL006507 Thuja occidentalis - Abies balsamea / G?
 Alnus incana / Carex trisperma
 Woodland

SAF Type

37 Northern white-cedar ME < SAF

Vegetation Structure (total cover by stratum)***Literature References***

Anderson and Davis 1997
 Gawler 1998

WCS2

State Rarity Rank: S4

Spruce - Larch Wooded Bog

Black Spruce Bog

Community Description

This open-canopy peatland type is characterized by black spruce and/or larch trees over typical bog vegetation of ericad shrubs, graminoids, and peat mosses. Canopy closure is usually 20-50% and occasionally ranges up to 85%. Black spruce is usually dominant (>60% RD), but in some cases larch (or rarely, fir) may be more abundant. Red maple may be a component in somewhat more minerotrophic portions. The shrub layer, including small trees, is usually well developed (>30%). Dwarf shrubs, herbs, and tree regeneration cover the ground layer; the proportion of each varies from site to site. Labrador tea and three-seeded sedge are characteristic species. The bryoid layer is close to 100% cover and is dominated by peat mosses; sparse reindeer lichens may occur.

Sites occur in a peatland setting, usually <1200' elevation, characteristic of nutrient-poor or highly acidic peatlands (pH 4.2-5.2). These bogs may occur as part of fens, especially in kettleholes, and are standard constituents of raised (ombrotrophic) bogs.

Diagnostics

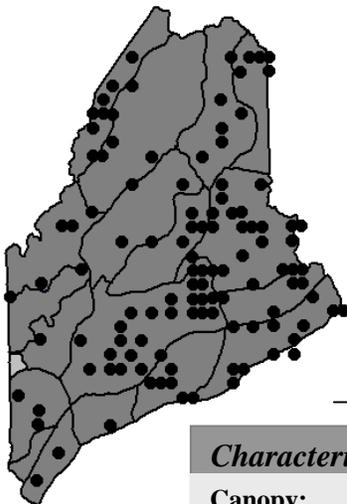
The canopy is at least 20%, black spruce and/or larch are strongly dominant; red maple is generally < 20% RD; ericad shrubs occur in the ground layer. Sites occur in a peatland setting (peat generally > 30 cm deep).

Associated Rare Plants

Northern comandra
Swamp birch
Wiegand's sedge

Similar Types

Sheep Laurel Dwarf Shrub Bogs and Leatherleaf Boggy Fens, with which this type is often adjacent on the ground, share many shrub and herb species, but are considerably more open (defined as having < 20% canopy). More minerotrophic sites tend to have wooded fens (Red Maple Wooded Fen, Northern White Cedar Woodland Fen), with black spruce at < 40% RD; intermediates occur.



Distribution: Statewide, especially in the New England - Adirondack Province and Laurentian Mixed Forest Province. Extending eastward, westward, and northward from Maine, and as more isolated occurrences southward.

Landscape Pattern: Large Patch

Characteristic Species

Canopy:		Dwarf Shrub:		Herb:	
Black spruce	(F,C)	Sheep laurel	(F)	Three-seeded sedge	(F,C)
Balsam fir	(C)	Labrador tea	(F,C)	Creeping snowberry	(F)
Gray birch	(C)	Black huckleberry	(C)	Balsam fir	(C)
Red spruce	(C)	Rhodora	(C)	Cinnamon fern	(C)
		Velvet-leaf blueberry	(C)	Skunk cabbage	(C)
				Black spruce	(C)
Sapling/Shrub:		Bryoid:			
Black spruce	(F,C)	Red-stemmed moss	(F)		
Mountain holly	(F,C)	Reindeer lichen	(F)		
Balsam fir	(C)	<i>Sphagnum</i> mosses	(F,C)		
Highbush blueberry	(C)	<i>Dicranum</i> moss	(F)		
Larch	(C)				
Rhodora	(C)				
Sheep laurel	(C)				

WCS2

State Rarity Rank: S4

Spruce - Larch Wooded Bog

Black Spruce Bog

Conservation, Wildlife and Management Considerations

These generally occur as part of larger peatlands. Maintaining the hydrologic integrity of the entire wetland with upland buffers is key. The trees mostly remain small and have limited economic use. Several known sites are in public ownership.

Bogs with scattered tall larch or snags provide suitable perching and foraging habitat for the olive-sided flycatcher. Similarly, the three-toed woodpecker inhabits bogs with large numbers of dead trees. Palm warblers common yellowthroats, and northern waterthrushes are specialists that breed primarily in this community type. The bog elfin butterfly populates bogs with black spruce, which it uses as a larval host plant. The western pine elfin, although it uses jack pine as its host plant in the Midwest, is associated with black spruce in Maine and may be found in occurrences of this community in northwestern Maine. Thaxter's pinion moth uses larch as one of its larval host plants and may be found here as well.

Examples on Conservation Lands

Camden Hills State Park	Knox Co.
The Klondike, Baxter State Park	Piscataquis Co.
Moose River	Somerset Co.
Salmon Brook Lake Bog Public Lands	Aroostook Co.
Gassabias Lake, Duck Lake Public Lands	Hancock Co.

Cross-reference to Other Classifications**New Hampshire**

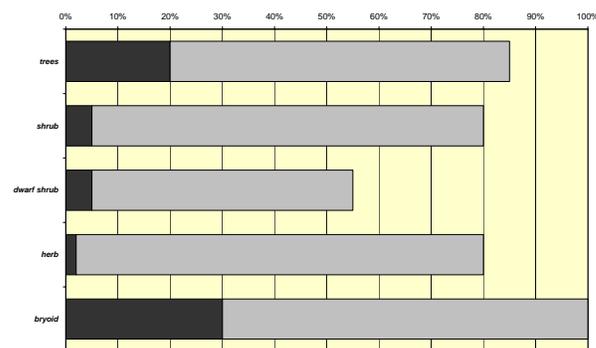
Black spruce-larch/heath/Sphagnum basin swamp S3

National Vegetation Classification

CEGL006082	Picea mariana / Rubus chamaemorus / Sphagnum spp. Woodland	G3G5
CEGL005271	Picea mariana - (Larix laricina) / Ledum groenlandicum / Sphagnum spp. Forest	G5
CEGL006098	Picea mariana / (Vaccinium corymbosum, Gaylussacia baccata) / Sphagnum sp. Woodland	G3G5
CEGL002485	Picea mariana / Ledum groenlandicum / Carex trisperma / Sphagnum spp. Forest	G5

SAF Type

12	Black spruce - sphagnum	ME > SAF
13	Black spruce - tamarack	ME > SAF
38	Tamarack	ME > SAF

Vegetation Structure (total cover by stratum)***Literature References***

Damman and French 1987
 Anderson and Davis 1997
 Gawler 1998
 Davis and Anderson 2001
 Sorenson 1986

WCS3

State Rarity Rank: S1

Atlantic White Cedar Bog

Atlantic White Cedar Bog

Community Description

These peatlands are dominated by dwarf ericaceous shrubs with a sparse tree layer of Atlantic white cedar. Sheep laurel, Labrador tea, dwarf huckleberry, and other heath shrubs can form an almost continuous carpet beneath the stunted cedars. Herbs are sparse. Abundant peat moss covers the ground and forms the substrate. Leatherleaf is a common shrub.

Sites occur in basin wetlands of the southwestern coast, usually in areas transitional between fen and bog. They generally maintain contact with the groundwater but lack indicators of minerotrophic conditions. Peat and water are highly acidic.

Diagnostics

These peatland possess abundant sphagnum and low ericaceous shrubs and are only sparsely forested by Atlantic white cedar.

Associated Rare Plants

Atlantic white cedar

Similar Types

Atlantic White Cedar Swamps occur on mineral soil or on thin peat (< 30 cm) over mineral soil and typically have higher canopy closure (>50%). Other sparsely forested bog or fen communities, e.g. Sheep Laurel Dwarf Shrub Bog and Leatherleaf Boggy Fen, can have similar composition in the dwarf shrub, herb, and bryophyte layers, but lack Atlantic white cedar.

Characteristic Species**Canopy:**

Atlantic white cedar	(F,C)
Black spruce	(F,C)
White pine	(F)

Sapling/Shrub:

Mountain holly	(F)
Black huckleberry	(F)
Atlantic white cedar	(F,C)

Dwarf Shrub:

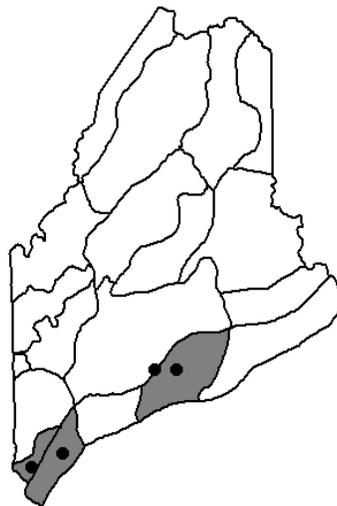
Sheep laurel	(F,C)
Labrador tea	(F,C)
Dwarf huckleberry	(C)
Leatherleaf	(C)
Large cranberry	(F)

Herb:

Tufted cotton-grass	(F)
Pitcher plant	(F)

Bryoid:

<i>Sphagnum</i> mosses	(F,C)
Reindeer lichen	(F)
<i>Dicranum</i> moss	(F)



Distribution: Eastern Broadleaf Forest Province, extending southward from Maine.

Landscape Pattern: Small Patch

WCS3

State Rarity Rank: S1

Atlantic White Cedar Bog

Atlantic White Cedar Bog

Conservation, Wildlife and Management Considerations

These bogs occur as part of larger peatlands, and maintaining the hydrologic integrity of the entire wetland with upland buffers is key. The cedars generally remain small, and therefore are of limited economic value. Most known sites in Maine are in conservation ownership.

Frequent birds associated with this community include common yellowthroat and northern waterthrush. These wetlands provide habitat for the rare Hessel's hairstreak butterfly, which feeds in its larval stage on Atlantic white cedar.

Examples on Conservation Lands

Saco Heath Preserve	York Co.
Knight Pond, St. Clair Preserve	Waldo Co.

Cross-reference to Other Classifications**New Hampshire**

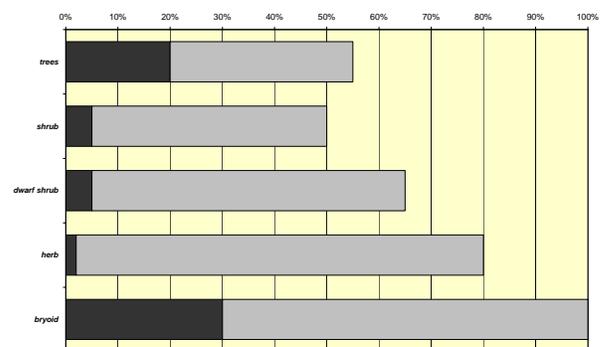
N/A

National Vegetation Classification

CEGL006321	Chamaecyparis thyoides / Chamaedaphne calyculata Woodland	G3G4
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SAF Type

97	Atlantic white-cedar	ME < SAF
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Vegetation Structure (total cover by stratum)***Literature References***

WCS4

State Rarity Rank: S2

Pitch Pine Bog

Pitch Pine Bog

Community Description

Pitch pine is the dominant tree in these sparsely forested peatlands. The shrub layer likewise indicates the more southerly affinities of this type, with maleberry and highbush blueberry common along with the standard bog shrubs of huckleberry and mountain holly. The herb layer may be dense evergreen heath shrubs, especially leatherleaf, or it may be more sparse. Peat mosses cover the ground and form the substrate.

Sites occur in shallow basins on the coastal plain; typical acidic bog conditions predominate. Peat may be shallow, over sandy mineral soil, or deep (>50 cm) as is typical of peatlands.

Diagnostics

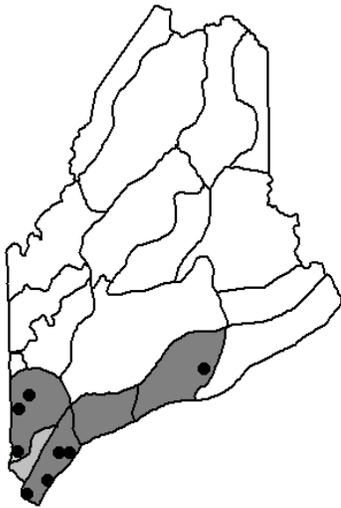
This is an organic-soil wetland with abundant peat and low ericaceous shrubs, sparsely forested by pitch pine.

Associated Rare Plants

Smooth winterberry

Similar Types

Several other peatland community types have very similar dwarf shrub, herb, and bryophyte composition, especially Spruce - Larch Wooded Bog, Sheep Laurel Dwarf Shrub Bog, and Leatherleaf Boggy Fen. The predominance of pitch pine in the tree layer makes this type unique in Maine.



Distribution: Along the north Atlantic coastal plain (Eastern Broadleaf Forest Province), north to southern and midcoast Maine.

Landscape Pattern: Small Patch; mostly 20-40 acres.

Characteristic Species**Canopy:**

Pitch pine (F)

Dwarf Shrub:

Sheep laurel (F)

Large cranberry (F)

Leatherleaf (C)

Sapling/Shrub:

Black huckleberry (F,C)

Maleberry (F)

Mountain holly (F)

Black chokeberry (F)

Highbush blueberry (F,C)

Speckled alder (F)

Herb:

Wild sarsaparilla (F)

Three-seeded sedge (F)

Cinnamon fern (F)

Bracken fern (F)

Starflower (F)

Bryoid:*Sphagnum girgensohnii* (F,C)

WCS4

State Rarity Rank: S2

Pitch Pine Bog

Pitch Pine Bog

Conservation, Wildlife and Management Considerations

Strong development pressures in southern Maine may threaten unprotected sites and degrade their landscape surroundings. Four sites in southern Maine are in public or private conservation ownership.

Birds associated with this community include wetland species such as the common yellowthroat and northern waterthrush.

Examples on Conservation Lands

Saco Heath Preserve

East Of Little River, Rachel Carson National Wildlife Refuge

Brownfield Bog Wildlife Management Area

Scarborough Marsh Wildlife Management Area

York Co.

York Co.

Oxford Co.

Cumberland Co.

Cross-reference to Other Classifications**New Hampshire**

N/A

National Vegetation Classification

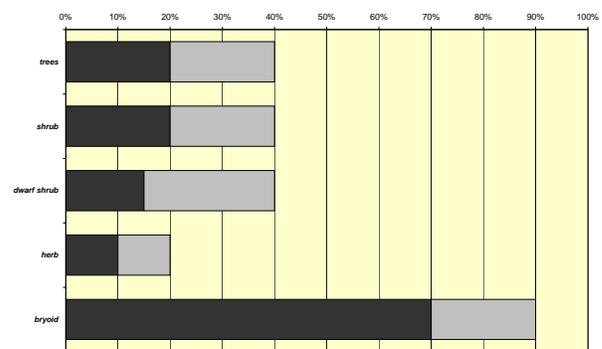
CEGL006194 Pinus rigida / Chamaedaphne calyculata / Sphagnum spp. Woodland

G3G5

SAF Type

45 Pitch pine

ME < SAF

Vegetation Structure (total cover by stratum)***Literature References***

Sperduto 1994

WDS1

State Rarity Rank: S4

Red Maple Wooded Fen

Red Maple Fen

Community Description

Red maple dominates the canopy of this partly forested peatland, or it may be co-dominant with larch or black spruce (red maple >50% RD). Canopy closure is usually <50%, sometimes to 65%. The shrub layer is locally dense, with small trees and thickets of winterberry, mountain holly, highbush blueberry, or maleberry. Sweetgale and heath shrubs that are typically dwarfed in bog settings grow taller (often >1 m) in this setting. Three-seeded sedge is characteristic in the herb layer; cinnamon fern and other wetland plants may be locally common. The bryoid layer is extensive (>60% cover) and dominated by peat mosses. A variant features larch as the dominant canopy tree, but vegetation is otherwise the same; more data needed.

Sites occupy low basins (up to 1000' elevation) and are typically a peripheral portion of a larger wetland. The saturated soils are organic and the peat layer may be deep (>50 cm). Substrate is less acidic than most true bogs, with pH typically in the 5.0-5.4 range.

Diagnostics

Sites occur in a peatland setting with red maple dominant in a partial canopy (< 65%, usually < 50%) or co-dominant with larch or black spruce. Heath shrubs and other characteristic peatland plants are present in shrub and herb layers; The substrate is dominated by sphagnum moss.

Associated Rare Plants

Atlantic white cedar
Bog bedstraw

Similar Types

Red Maple - Sensitive Fern Swamps can have similar overstory vegetation, but occur on mineral soils (perhaps with a thin peat layer) rather than on a peat substrate, and typically have taller trees with a more continuous canopy; they lack the ericaceous shrubs characteristic of this type. Northern White Cedar Woodland Fens are similar, but dominated by northern white cedar, sometimes mixed with red maple. Spruce - Larch Wooded Bogs occur in similar settings, but generally in more nutrient-poor conditions, and have spruce and/or larch much more abundant than red maple in the canopy.

Characteristic Species**Canopy:**

Red maple (F,C)
Black spruce (F,C)
Larch (C)

Sapling/Shrub:

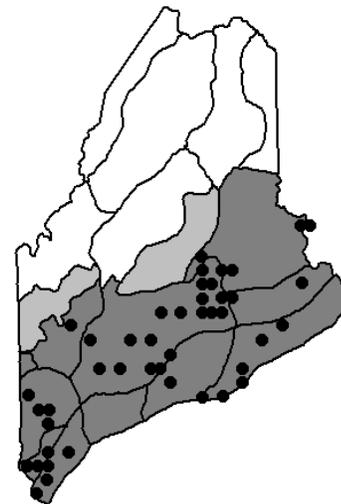
Winterberry (F,C)
Balsam fir (C)
Rhodora (C)
Sweetgale (C)
Wild-raisin (C)

Herb:

Three-seeded sedge (F,C)
Marsh fern (C)
Skunk cabbage (C)
Three-leaved false Solomon's seal (C)
Cinnamon fern (C)
Tussock sedge (C)
White beak-rush (C)
Goldthread (C)

Bryoid:

Dicranum moss (F)
Sphagnum mosses (F,C)



Distribution: Statewide, less abundant northward; extending westward and southward (and perhaps eastward) from Maine

Landscape Pattern: Large Patch

WDS1

State Rarity Rank: S4

Red Maple Wooded Fen

Red Maple Fen

Conservation, Wildlife and Management Considerations

These fens usually occur as part of larger peatlands, and maintaining the hydrologic integrity of the entire wetland with upland buffers is key. This type is widespread and apparently has few or no competing uses.

Birds associated with this community include wetland species such as the common yellowthroat and northern waterthrush. Thaxter's pinion moth uses larch and sweetgale as its larval host plants and may be found in this community.

Examples on Conservation Lands

The Heath, Massabesic Experimental Forest
 Appleton Bog Preserve
 Middle Pond State Park

York Co.
 Knox Co.
 Oxford Co.

Cross-reference to Other Classifications**New Hampshire**

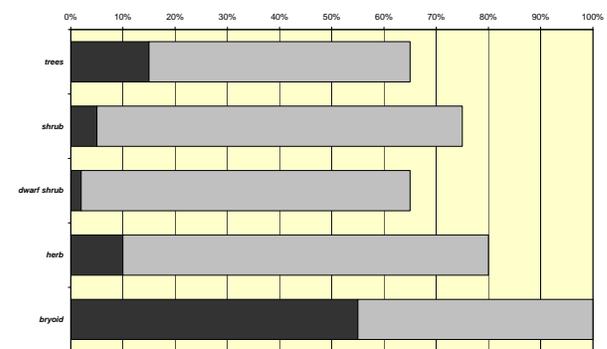
Red maple/Sphagnum saturated basin swamp S4

National Vegetation Classification

CEGL006395 Acer rubrum / Alnus incana - Ilex
 verticillata / Osmunda regalis G?
 Woodland

SAF Type

108 Red maple ME < SAF

Vegetation Structure (total cover by stratum)***Literature References***

Golet et al. 1993
 Anderson and Davis 1997
 Gawler 1998
 Davis and Anderson 2001

WDS2

State Rarity Rank: S4

Red Maple - Sensitive Fern Swamp

Red Maple Swamp

Community Description

Red maple dominates the somewhat open to nearly closed canopy (20-90% closure), sometimes with a relatively large component (up to 40% RD) of balsam fir, red spruce, or northern white cedar. Green ash and yellow birch are common, but rarely abundant, associates. The maples may be widely spaced with multiple trunks and arching crowns. The shrub layer is patchy: winterberry is common, various other shrubs may be locally abundant. The herb layer is well developed and dominated by herbs; dwarf shrubs make up less than 20% of the layer's cover. Bluejoint and sensitive fern are characteristic herbs. The bryoid layer is usually <35% cover; peat mosses are typical but do not form extensive, deep carpets as they do in peatlands.

Sites occupy mineral soils or well-decomposed organic material over mineral soil. Flats or gentle slopes in small basins, or on floodplains of streams to small rivers. Sites occasionally occur as narrow ribbons along steep-sided drainage channels in outwash plains. Soils are typically 30-60 cm deep, loamy to silty in texture, sometimes with well decomposed muck over the mineral fraction, pH 4.8-5.4.

Diagnostics

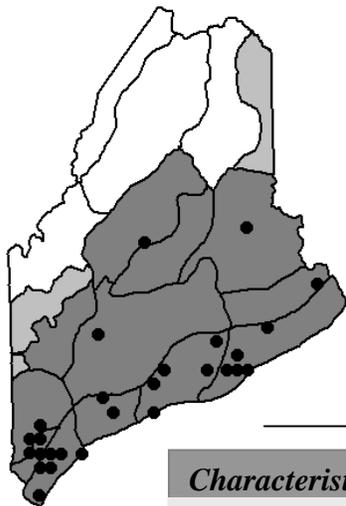
These are mineral-soil wetlands in which red maple dominates the canopy or is co-dominant with conifers other than black spruce or larch; the seasonally flooded soils usually remain saturated through the growing season.

Similar Types

Red Maple Wooded Fens are similar, but either occur in association with large peatlands or occupy small somewhat peaty basins; they do not occur on mineral soils. Some small Northern White Cedar Swamps and Spruce - Fir - Cinnamon Fern Forests, particularly along the coast, include a fair amount of red maple but have cedar or spruce/fir, respectively, as the most abundant canopy species. Silver Maple Floodplain Forests are dominated by silver maple and generally occur along larger rivers, but the two types can intergrade on some floodplains.

Associated Rare Plants

Eastern joe-pye weed
Smooth winterberry
Spicebush
Swamp saxifrage
Swamp white oak
Sweet pepper-bush
Wiegand's sedge



Distribution: Statewide, but most common in southern half of state. Extends southward and southwestward from Maine; eastward distribution unknown.

Landscape Pattern: Large Patch

Characteristic Species

Canopy:		Sapling/Shrub:		Herb:	
Red maple	(F,C)	Arrowwood	(C)	Lady fern	(F)
Balsam fir	(C)	Balsam fir	(C)	Bluejoint	(C)
Gray birch	(C)	Gray birch	(C)	Interrupted fern	(C)
Northern white cedar	(C)	Red spruce	(C)	Royal fern	(C)
Red spruce	(C)	Speckled alder	(C)	Sensitive fern	(C)
		Winterberry	(F,C)	Tuckerman's sedge	(C)
Bryoid:				Tussock sedge	(C)
<i>Sphagnum</i> mosses	(F,C)			Flat-topped white aster	(F)

WDS2

State Rarity Rank: S4

Red Maple - Sensitive Fern Swamp

Red Maple Swamp

Conservation, Wildlife and Management Considerations

Maintaining the hydrologic integrity of these stream drainages with upland buffers is key. These swamps typically have had few conflicting uses, although some have been recently harvested. ATV use has been observed at some sites.

Red maple swamps often provide habitat in which spotted turtles hibernate. If wet sphagnum hummocks are present, four-toed salamanders may breed in this community. Examples that occur on floodplains of streams and small rivers may contain wood turtles, which overwinter in the stream channel and forage in the floodplain. The silver-haired bat often roosts in riparian habitats in trees with loose bark. The northern waterthrush is a common associate of this community type. In the southern part of the state, the Louisiana waterthrush and yellow-throated vireo may be associates if the canopy is closed or nearly so.

Examples on Conservation Lands

Lake Onawa, Borestone Mountain Sanctuary	Piscataquis Co.
Mattagodus Wildlife Management Area	Penobscot Co.
Great Heath Public Lands	Washington Co.
Waterboro Barrens Preserve	York Co.
Kennebunk Plains Preserve	York Co.
Roberts Pond, Massabesic Experimental Forest	York Co.
Mt Agamenticus	York Co.
Steep Falls Wildlife Management Area	Cumberland Co.

Cross-reference to Other Classifications**New Hampshire**

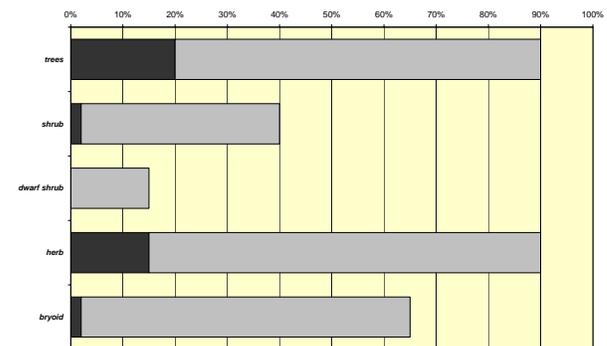
Red maple/lake sedge streamside/seepage swamp	S3
Red maple/sensitive fern-tussock sedge basin/seepage swamp	S2S3
Seasonally flooded red maple swamp	S4S5
Red maple floodplain forest	S2S3

National Vegetation Classification

CEGL006220	Acer rubrum – Fraxinus spp. / Nemopanthus mucronatus – Vaccinium corymbosum forest	G?
CEGL006119	Acer rubrum / Carex stricta - Onoclea sensibilis Woodland	G3G5
CEGL006198	Picea rubens - Acer rubrum / Nemopanthus mucronatus Forest	G?
CEGL006503	Acer rubrum – Carpinus caroliniana / Viburnum dentatum Floodplain Forest [Provisional]	G?

SAF Type

108	Red maple	ME < SAF
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Vegetation Structure (total cover by stratum)***Literature References***

Golet et al. 1993

SCU1

State Rarity Rank: S3

Spruce - Fir - Birch Krummholz

Spruce - Fir Krummholz

Community Description

Krummholz refers to the zone between treeline and more open alpine vegetation, where tree species are limited by the harsh conditions to a dense shrub growth-form. Black spruce, balsam fir, and heart-leaved paper birch form masses of stunted and wind-swept shrubs 1 - 2 m high. Mountain alder may be locally common, and mountain shadbush is occasional. Total shrub cover is often close to 100%, and these areas may be all but impenetrable. Boreal herbs, such as bluebead lily and Canada mayflower, grow with patches of mosses in small openings among the shrubs, but total herb cover is sparse. Bryoids may be extensive beneath the shrubs.

This type occupies upper mountain slopes above treeline, typically at elevations of 2700 - 3700'. The cool conditions, lingering snows, and frequent fog and clouds create a fairly moist microclimate, but the sites are very exposed to wind and storms.

Diagnostics

These are forests of the treeline zone in which dwarfed and matted trees form a dense shrub layer 0.5 - 1.5 m high; usually strongly coniferous.

Associated Rare Plants

Northern comandra

Similar Types

Subalpine Heath - Krummholz can grade into or form a patchwork with this community, but it features lower tree cover (< 25%) and more heath shrubs and open spaces. Fir - Heart-leaved Birch Subalpine Forest shares many overstory species and can grade into this community, but is distinguished by having more upright trees and a fairly well-developed herbaceous layer.

Characteristic Species**Sapling/Shrub:**

Balsam fir	(F,C)
Black spruce	(F,C)
Heart-leaved paper birch	(F,C)

Dwarf Shrub:

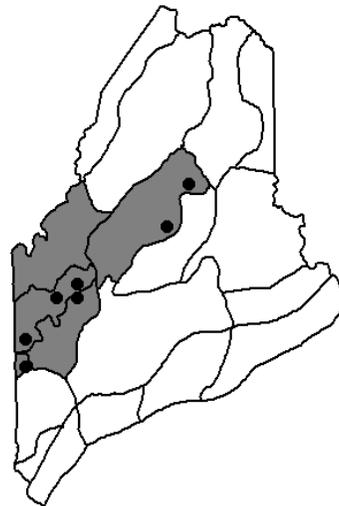
Alpine bilberry	(F,C)
Labrador tea	(F,C)

Herb:

Bunchberry	(F)
Canada mayflower	(F)
Stiff clubmoss	(F)
Creeping snowberry	(F)
Bluebead lily	(F)
Mountain cranberry	(F)
Black crowberry	(F)

Bryoid:

Fringed <i>Ptilidium</i> liverwort	(F)
Red-stemmed moss	(F)
Common broom-moss	(F)



Distribution: Upper-elevation ridges of Maine's western and central mountains (mostly in the New England - Adirondack Province), extending westward and southward along the Appalachians.

Landscape Pattern: Large Patch

SCU1

State Rarity Rank: S3

Spruce - Fir - Birch Krummholz

Spruce - Fir Krummholz

Conservation, Wildlife and Management Considerations

Krummholz is extensive on Maine's higher mountains, and most major occurrences are well protected within public lands or private conservation lands. The historic extent has been somewhat reduced by the development of ski areas, and proposals for wind generators could impact other minor sites. Because traversing this vegetation is so miserable, off-trail impacts from hikers are minimal, in contrast to other alpine/subalpine vegetation types.

This high-elevation dwarfed forest community type provides habitat for Bicknell's thrush, which only inhabits structurally complex forests above 2500 ft. Coniferous forest specialists like blackpoll warblers and spruce grouse are common associates in this community.

Examples on Conservation Lands

Bigelow Preserve Public Lands	Somerset Co.
Saddleback Mountain, Appalachian Trail	Franklin Co.
Mt. Abraham	Franklin Co.
Baldpate Mountain, Grafton Notch State Park	Oxford Co.
Goose Eye Mountain, Mahosuc Public Lands	Oxford Co.
Whitecap Mountain, Appalachian Trail	Piscataquis Co.
Mt. Katahdin, Baxter State Park	Piscataquis Co.
Haystack Mountain, White Mountain National Forest	Oxford Co.

Cross-reference to Other Classifications**New Hampshire**

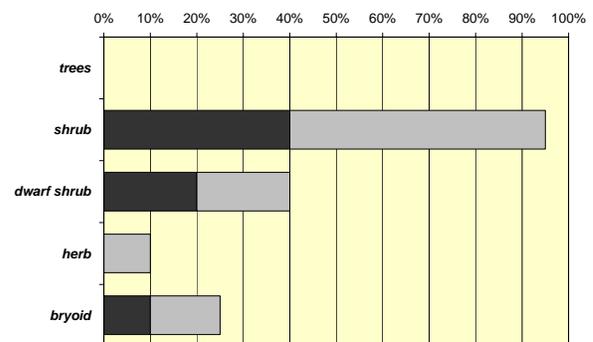
Black spruce and balsam fir krummholz S2S3

National Vegetation Classification

CEGL006038 Picea mariana - Abies balsamea / Sibbaldiopsis tridentata Shrubland G?

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

- Sperduto and Cogbill 1999
- Caljouw and Roeske 1981
- May and Davis 1978
- Cogbill and Hudson 1990

SDU1

State Rarity Rank: S4

Rose - Bayberry Maritime Shrubland

Rose Maritime Shrubland

Community Description

Medium-height shrubs (1-2 m) usually cover 30-60%, but may be dense thickets. Bayberry and roses are characteristic; raspberry and poison-ivy are frequent associates. On some islands, shrublands are dominated by raspberry or bush-honeysuckle, with little or no bayberry and rose. Wild-raisin and winterberry may occur in more protected or moist pockets. Lowbush blueberry and northern dewberry are occasional as dwarf shrubs. Herbs include salt-tolerant shore species, such as beach grass, beach-pea, sea-beach sandwort, sea-beach angelica, and seaside goldenrod. They grow in patches, sometimes extensive, among the shrubs. Bryoids are absent, except for small amounts of lichens in some areas.

These seaside bluffs and islands are exposed to onshore winds and salt spray; sometimes covering extensive areas on stabilized dunes or rocky islands. Except on dunes, soils are thin, usually less than 25 cm deep, and acidic (pH 4.8 - 5.5).

Diagnostics

This type is typified by a seaside setting and dominance of upland shrubs, particularly bayberry and roses; shrub cover (> about 1 m tall) > 20%.

Similar Types

Crowberry - Bayberry Headlands can share many species, but have dwarf shrub cover more abundant than taller shrub cover and lack poison-ivy. Other sandy beach community types can be adjacent to Rose - Bayberry Maritime Shrublands and share some species, but have different physiognomy: Pitch Pine Dune Woodlands have a tree canopy of >25%; Dune Grasslands are dominated by grasses, not shrubs, and Beach Strands are sparsely vegetated with herbs and no shrubs.

Associated Rare Plants

Beach plum
Seabeach sedge
Small saltmarsh aster
Tall goldenrod

Characteristic Species**Sapling/Shrub:**

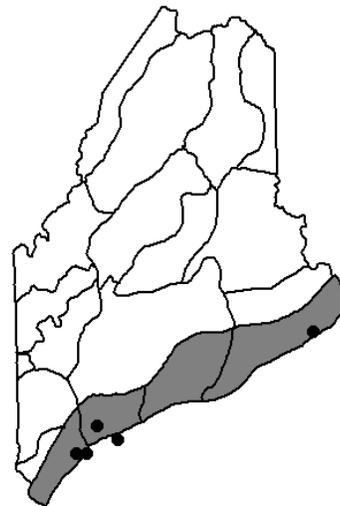
Bayberry	(F,C)
Virginia rose	(F,C)
Meadowsweet	(F,C)
Western poison-ivy	(C)
Winterberry holly	(C)
Red raspberry	(F,C)
Bush-honeysuckle	(C)
Rugosa rose	(F,C)

Dwarf Shrub:

Large cranberry	(C)
Lowbush blueberry	(C)

Herb:

Wire rush	(F)
Beach grass	(C)
Canada mayflower	(C)
Greene's rush	(C)
New York aster	(F)
Sea-beach angelica	(F)
Rough-stemmed goldenrod	(F)
Yarrow	(F)



Distribution: Along Maine's immediate coastline and islands (Laurentian Mixed Forest Province).

Landscape Pattern: Small Patch

SDU1

State Rarity Rank: S4

Rose - Bayberry Maritime Shrubland

Rose Maritime Shrubland

Conservation, Wildlife and Management Considerations

Most known sites have been used historically for grazing sheep. Evidence of fire is common in most. The extent to which this community has developed as an artifact of clearing and grazing is unknown and would be an interesting study (along with the successional dynamics). At least some small sites along the immediate coastline appear to have developed and be persisting through natural processes. Several occurrences are on public lands or private conservation lands.

Maritime shrubland communities, especially those that occur on uninhabited islands, may provide nesting habitat for some pelagic bird species, such as the Atlantic puffin, razorbill, and Leach's storm petrel. Coastal breeders such as the common eider, black duck, herring and great black-backed gulls, and common puffin may also use this habitat in appropriate settings.

Examples on Conservation Lands

Seawall Beach, Morse Mountain Preserve
 Popham Beach State Park
 North Libby Island Wildlife Management Area
 Stratton Island
 Little Duck Island

Sagadahoc Co.
 Sagadahoc Co.
 Washington Co.
 York Co.
 Hancock Co.

Cross-reference to Other Classifications**New Hampshire**

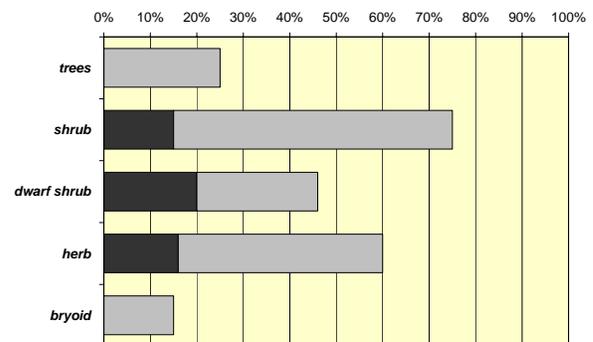
Coastal rocky headland S1
 Coastal interdunal marsh/swale S1

National Vegetation Classification

CEGL006295 Morella pensylvanica - Rosa rugosa Shrubland G4

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Rappaport and Wesley 1985
 Mulligan 1980
 Nelson and Fink 1980
 Dunlop and Crow 1985

SDU2**Mountain Alder - Bush-honeysuckle Subalpine Meadow**

State Rarity Rank: S2

Subalpine Meadow

Community Description

These shrub- and graminoid-dominated meadows occur near treeline. Dominants vary according to substrate moisture but often include mountain alder, bluejoint grass, and meadowsweet. In drier areas, bush-honeysuckle may be prominent. This vegetation is taller and more dense than typical alpine dwarf shrub vegetation. Openings around pondshores or other disturbed areas may support rare plants.

Sites occupy upper mountain slopes, flats, or basins near or above treeline. The slope and substrate moisture vary from almost flat to quite steep and dryish to seepy soil conditions.

Diagnostics

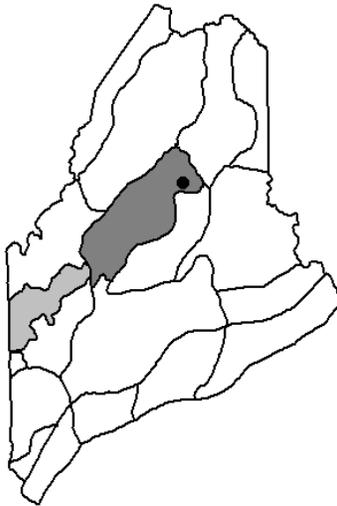
Sites are in an alpine setting with dense mountain alder, bluejoint grass, and/or bush-honeysuckle; dwarf shrubs are absent or minor.

Similar Types

This is not a well documented type, and its distribution and relationship to other alpine and subalpine vegetation types needs work.

Associated Rare Plants

Black sedge
Maine sedge
New England northern reed grass
Northern painted-cup
Russett sedge



Distribution: Upper-elevation ridges of Maine's western and central mountains (mostly in the New England - Adirondack Province).

Landscape Pattern: Small Patch

Characteristic Species**Sapling/Shrub:**

Mountain alder (F,C)
Bush-honeysuckle (F,C)
Meadowsweet (F)
Squashberry (F)

Dwarf Shrub:

Lowbush blueberry (F)

Herb:

Three-toothed cinquefoil (F)
Bluejoint (F,C)
Low rough aster (F)
Gall of the earth (F)
Large-leaved goldenrod (F)

Mountain Alder - Bush-honeysuckle Subalpine Meadow

Subalpine Meadow

Conservation, Wildlife and Management Considerations

Both known occurrences in Maine are on protected lands. Hiker impacts have been minimal. Understanding the importance of fire and other disturbances to initiating and maintaining the vegetation in this community type warrants study.

Examples on Conservation Lands

North Traveler, Baxter State Park Piscataquis Co.
Mt. Katahdin, Baxter State Park Piscataquis Co.

Cross-reference to Other Classifications

New Hampshire

N/A

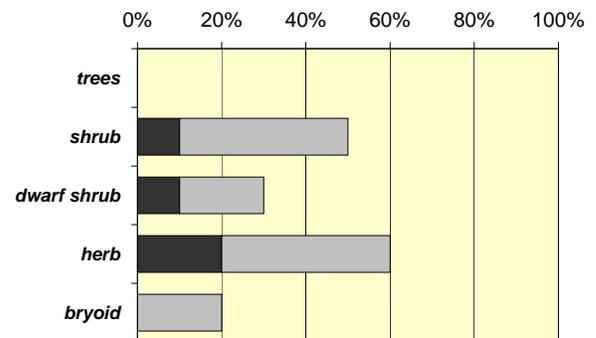
National Vegetation Classification

N/A

SAF Type

N/A

Vegetation Structure (total cover by stratum)



Literature References



DDU1

State Rarity Rank: S3

Crowberry - Bilberry Summit Bald

Mid-elevation Bald

Community Description

This patchy subalpine to alpine vegetation is dominated by low mats of crowberry (usually black crowberry) and alpine bilberry. Especially at lower elevations, fir, spruce, mountain holly, and/or heart-leaved birch occasionally grow 1-2 m high, but only at low cover (<25%). Total vegetation cover is usually 20-50% (excepting crustose lichens), with expanses of rock prominent among the vegetation. Crustose and foliose lichens are abundant on the exposed bedrock.

Sites are on very exposed bedrock summits or upper mountain slopes at moderate to high elevations (1800' and up). Typically sites occur on the most thin-soiled and well-drained sites.

Diagnostics

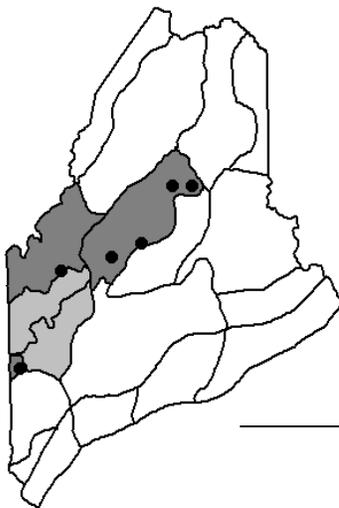
Sparse and patchy vegetation occurs near or on mountain summits, with crowberry, bilberry, and/or highland rush prominent, and without strictly alpine species such as Bigelow's sedge, diapensia, lapland rosebay, etc.

Similar Types

Subalpine Heath - Krummholz vegetation can occur at similar elevations, but is usually somewhat less exposed, with some tree cover (though stunted) and with typical lower-elevation heath shrubs such as Labrador tea, sheep laurel, black huckleberry or rhodora. Dwarf Heath - Graminoid Alpine Ridge occurs at higher elevations and features some strictly alpine species such as Bigelow's sedge, boreal bentgrass, diapensia, etc.

Associated Rare Plants

Alpine blueberry
Alpine sweet-grass
Dwarf rattlesnakeroot
Mountain sandwort
Silverling



Distribution: Mid-to upper-elevation ridges of Maine's western and central mountains (mostly in the New England - Adirondack Province), extending westward and southward along the Appalachians.

Landscape Pattern: Small Patch

Characteristic Species**Sapling/Shrub:**

Red spruce (C)

Dwarf Shrub:

Alpine bilberry (F,C)

Alpine blueberry (C)

Black crowberry (C)

Sheep laurel (C)

Herb:

Three-toothed cinquefoil (F,C)

DDU1

State Rarity Rank: S3

Crowberry - Bilberry Summit Bald

Mid-elevation Bald

Conservation, Wildlife and Management Considerations

Several occurrences of this type occur on public or private conservation land; however, hiker traffic can cause degradation even on these "protected" lands. As with all above-treeline vegetation in Maine, careful trail siting and efforts to minimize off-trail use are the important management considerations.

Birds of open habitats and grasslands, such as the Savannah sparrow, may use this habitat. The rare crowberry blue butterfly is restricted to coastal heaths in east-coastal Maine. It is typically found in peatlands, where it uses black crowberry as a larval host plant, but could occur in this community as well.

Examples on Conservation Lands

Borestone Mountain Sanctuary	Piscataquis Co.
Mount Coe, Baxter State Park	Piscataquis Co.
Moxie Bald Mountain, Appalachian Trail	Somerset Co.
South Turner Mountain, Baxter State Park	Piscataquis Co.
Caribou - Haystack Mountain, White Mountain National Forest	Oxford Co.

Cross-reference to Other Classifications**New Hampshire**

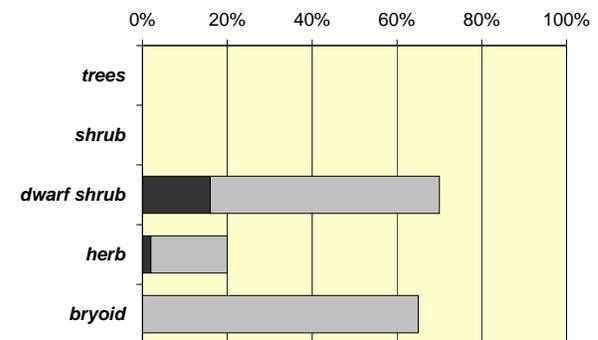
Bilberry - Crowberry Dwarf Shrubland	S1S2
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National Vegetation Classification

CEGL006533	Sibbaldiopsis tridentata - Deschampsia flexuosa Sparse Vegetation [Provisional]	G?
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SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

- Doyle et al. 1987
- Sperduto and Cogbill 1999
- Caljouw and Roeske 1981
- May and Davis 1978

DDU2

State Rarity Rank: S2

Dwarf Heath - Graminoid Alpine Ridge

Heath Alpine Ridge

Community Description

This is the most common community type above treeline. Vegetation can be quite variable and is dominated by a mixture of dwarf evergreen shrubs and herbs. Total vegetation cover is usually 35-65%. Shrubs usually make up 40-75% of the vegetation cover. The most abundant herbs are Bigelow's sedge and highland rush. Several rare species that only occur above treeline are found in this type. In one variant of this type, Bigelow's sedge is dominant, forming carpets, with heath shrubs and other herbaceous species far more sparse; this could be considered a distinct herbaceous type.

Sites occupy exposed, windswept ridges above treeline. Moisture conditions range from fairly xeric in exposed areas to moist patches in protected spots. Substrate varies from gravelly flats to stone pavements to rugged fellfields.

Diagnostics

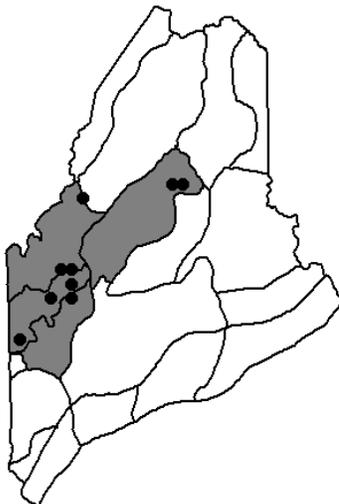
Sites are above treeline and dominated by mixed dwarf shrubs, Bigelow's sedge, and highland rush; alpine bilberry is prominent; other strictly alpine species, such as boreal bentgrass, alpine sweet-grass, Lapland rosebay, bearberry willow, or alpine bearberry, are frequent but often at low cover.

Similar Types

Diapensia Alpine Ridge vegetation has higher cover of diapensia and usually lower cover of graminoids. Subalpine Heath - Krummholz and Crowberry - Bilberry Summit Bald vegetation lack the strictly alpine species (although alpine bilberry and highland rush may occur in both). Bilberry - Mountain-heath Alpine Snowbank vegetation features tundra dwarf birch, moss-plant, or mountain-heath. Cotton-grass - Heath Alpine Bogs also lack the strictly alpine shrubs and have *Sphagnum* mosses and other wetland plants.

Associated Rare Plants

Alpine blueberry
Alpine sweet-grass
Bigelow's sedge
Boott's rattlesnakeroot
Boreal bentgrass
Cutler's goldenrod
Diapensia
Dwarf rattlesnakeroot
Mountain firmoss
Mountain sandwort



Distribution: Upper-elevation ridges of Maine's western and central mountains (mostly in the New England - Adirondack Province), extending westward and southward along the Appalachians.

Landscape Pattern: Small Patch

Characteristic Species**Dwarf Shrub:**

Diapensia (F,C)
Alpine bilberry (F,C)
Mountain cranberry (F)

Herb:

Bigelow's sedge (F,C)
Highland rush (F,C)
Three-toothed cinquefoil (F)

DDU2

State Rarity Rank: S2

Dwarf Heath - Graminoid Alpine Ridge

Heath Alpine Ridge

Conservation, Wildlife and Management Considerations

Most Maine occurrences of this type occur on public or private conservation land; however, hiker traffic has caused degradation in heavily-used areas. As with all above-treeline vegetation in Maine, careful trail siting and efforts to minimize off-trail use are the important management considerations.

On the tablelands of Mt. Katahdin, this community type provides the only known habitat in the world for the Katahdin Arctic butterfly. Mt. Katahdin is also the only known nesting area in the state for the American pipit.

Examples on Conservation Lands

Goose Eye Mountain, Mahoosuc Public Lands	Oxford Co.
Bigelow Preserve Public Lands	Somerset Co.
Saddleback Mountain, Appalachian Trail	Franklin Co.
Mt. Katahdin, Baxter State Park	Piscataquis Co.
Baldpate Mountain, Grafton Notch State Park	Oxford Co.
The Brothers, Baxter State Park	Piscataquis Co.
The Owl, Baxter State Park	Piscataquis Co.

Cross-reference to Other Classifications**New Hampshire**

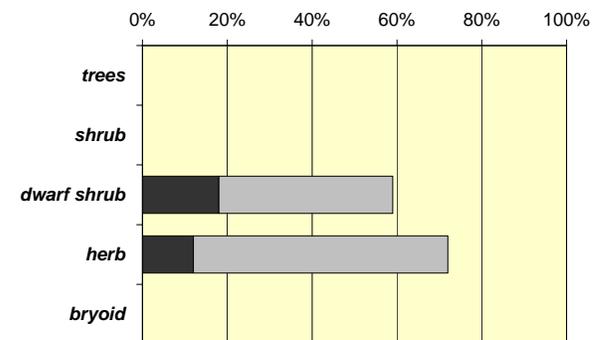
Bigelow Sedge Meadow	?
Dwarf heath/graminoid meadows	S2

National Vegetation Classification

CEGL006419	Lichen spp. Nonvascular Vegetation [Placeholder]	G?
CEGL002540	Vaccinium uliginosum - Diapensia lapponica Dwarf-shrub Herbaceous Vegetation	G?
CEGL006298	Vaccinium uliginosum - Dwarf shrubland	G2G3

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Burke 1982
 Sperduto and Cogbill 1999
 Caljouw and Roeske 1981
 May and Davis 1978
 Bliss 1963

DDU3

State Rarity Rank: S2

Blueberry - Lichen Barren

Blueberry Barren

Community Description

These barrens are wide, flat to hummocky expanses of dwarf shrub vegetation punctuated by sparse pine or spruce trees. Lowbush and/or velvet-leaf blueberry is the predominant shrub, forming a fairly even carpet. Herbs are sparse. In patches among the shrubs, reindeer lichens may form extensive carpets. Characteristic expression of this community is as an opening within woodland barrens such as Pitch Pine - Scrub Oak Barrens or Spruce - Heath Barrens; smaller openings would just be considered inclusions, but larger ones could be segregated as this non-wooded type. This type has only recently been noted as distinct, and more information is needed.

Coarse-textured glacial outwash deposits form a flat to undulating substrate that can encompass a wide moisture gradient. Xeric conditions on hummocks or raised areas can grade into bog-like vegetation in depressions. Soils are highly acidic and nutrient-poor. Sites are typically found in areas where fire has been frequent. Lichen carpets may be characteristic after particularly hot fires.

Diagnostics

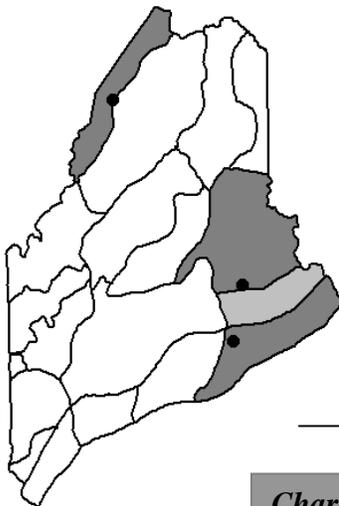
Lowbush blueberry is dominant, lichens are abundant, and conifers and other trees are sparse.

Associated Rare Plants

Canada mountain-ricegrass

Similar Types

Little Bluestem - Blueberry Sandplain Grasslands lack the abundant lichens and feature little bluestem grass as a local dominant. Pine and spruce barrens (Pitch Pine - Scrub Oak Barrens, Pitch Pine - Heath Barrens, Spruce - Heath Barrens) are closely related, but have more tree cover.



Distribution: Known only from downeast and extreme northwestern Maine; poorly documented.

Landscape Pattern: Small Patch

Characteristic Species**Sapling/Shrub:**

Gray birch (F)
White pine (F)
Red pine (F)

Herb:

Bracken fern (F)
Wintergreen (F)

Dwarf Shrub:

Lowbush blueberry (F,C)
Black chokeberry (F)
Meadowsweet (F)
Sheep laurel (F)
Sweetfern (F)

Bryoid:

Reindeer lichen (F,C)
Red-stemmed moss (F)
Juniper hair-cap moss (F)
Awned hair-cap moss (F)

DDU3

State Rarity Rank: S2

Blueberry - Lichen Barren

Blueberry Barren

Conservation, Wildlife and Management Considerations

This type may represent what is left of unmanaged blueberry barrens in downeast Maine. Highly manipulated blueberry barrens are found throughout the state, but pesticide use has changed their composition dramatically. Both documented areas are on state-owned or private conservation land.

Blueberry barrens provide some of the best habitat in the northeast for the upland sandpiper and other ground-nesting species like the short-eared owl and Savannah sparrow. The whimbrel, a non-breeding migrant shorebird, uses near-coastal barrens for foraging. Historical lepidopteran species, like the graceful clearwing, which feeds on blueberries in its larval phase, may have formerly inhabited examples of this community that occur as large openings within pitch pine barrens.

Examples on Conservation Lands

St. John River Preserve Aroostook Co.
Nicatous Public Lands Hancock Co.

Cross-reference to Other Classifications**New Hampshire**

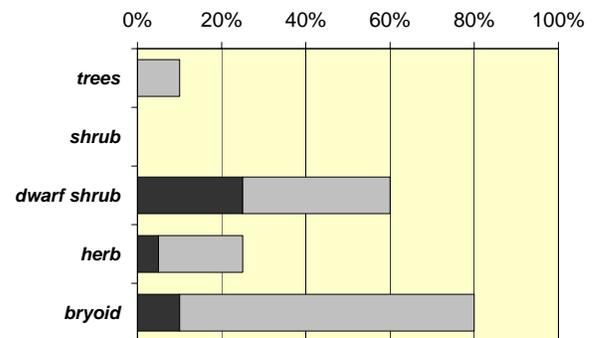
N/A

National Vegetation Classification

Vaccinium (angustifolium, myrtilloides, pallidum) - Cladina rangerifera Dwarf Shrubland

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Norton 1927
Famous 1998

DEU1

State Rarity Rank: S4

Subalpine Heath - Krummholz

Rocky Summit Heath

Community Description

Dwarf shrubs and stunted spruce or fir are the dominant features of this patchy vegetation. The tree layer is sparse (<25% cover) and includes balsam fir, red or black spruce and (especially near the coast) northern white cedar. Dwarf shrub dominants vary, and include Labrador tea, blueberries and bilberries. Interspersed islands of taller shrubs and stunted, wind-flagged trees (< 2 m tall) may grade to krummholz form. Herbs are patchy and less extensive than shrubs; three-toothed cinquefoil is usually present and often prominent. The bryoid layer is usually sparse (<30% cover), but may be more extensive in moist bedrock depressions. In these low spots, *Sphagnum* mosses are typical; otherwise, lichens are the dominant bryoids.

Sites occupy upper slopes and ridges. Inland this type is mostly above 2000', often at the transition from treeline to above-treeline; at lower elevations it occurs near the coast. Soils are patchy, in bedrock pockets, consisting of a thin layer (5-25 cm deep) of organic duff mixed with sand or rock fragments; acidic (pH 4.8-5.0) and excessively well-drained, except in localized peaty pockets.

Diagnostics

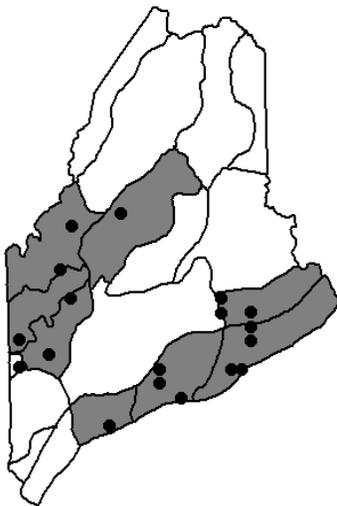
Tree cover is sparse, stunted and patchy (<25%), balsam fir and heart-leaved paper birch are typical; 10-50% shrub cover is typical of lower elevation sites, or in pockets at higher elevations; dwarf shrub cover exceeds herb cover, with lowbush blueberry or mountain cranberry prominent.

Similar Types

Crowberry - Bilberry Summit Balds can occur in similar settings, but lack tree cover and feature crowberry, bilberry, and/or highland rush. Three-toothed Cinquefoil - Blueberry Low Summit Balds also lack tree cover, but usually have herbaceous species exceeding dwarf shrub species in the herb layer. Other open summit upland communities occur at higher elevations and feature at least some strictly alpine species such as Bigelow's sedge, highland rush, diaspensia, lapland rosebay, etc. Red Spruce - Mixed Conifer Woodlands are floristically similar, but have >25% tree cover.

Associated Rare Plants

Alpine blueberry
Alpine sweet-grass
Mountain firmoss
Northern firmoss
Smooth sandwort



Distribution: Western and coastal Maine (New England - Adirondack and Laurentian Mixed Forest Provinces), extending west into northern New England and New York and east into the Canadian Maritimes.

Landscape Pattern: Small Patch

Characteristic Species

Canopy:		Dwarf Shrub:	
Balsam fir	(C)	Lowbush blueberry	(F,C)
Sapling/Shrub:		Alpine bilberry	(C)
Wild-raisin	(C)	Black huckleberry	(C)
Red spruce	(C)	Labrador tea	(C)
Balsam fir	(C)	Sheep laurel	(F,C)
Gray birch	(C)	Rhodora	(C)
Mountain holly	(C)	Herb:	
Red maple	(C)	Balsam fir	(C)
Shadbush	(C)	Bryoid:	
Winterberry holly	(C)	<i>Sphagnum</i> mosses	(C)
Northern white cedar	(C)	Reindeer lichen	(F)

DEU1

State Rarity Rank: S4

Subalpine Heath - Krummholz

Rocky Summit Heath

Conservation, Wildlife and Management Considerations

Because this community type is usually associated with nice views, many sites have moderate to heavy hiker use. Off-trail traffic can seriously degrade the vegetation, but at most sites the relatively dense shrub and conifer vegetation does not invite off-trail wanderings. This type is well represented on public lands and private conservation lands.

This high-elevation dwarfed forest community type provides habitat for Bicknell's thrush, which only inhabits structurally complex forests above 2500 ft. Coniferous forest specialists like blackpoll warblers and spruce grouse are common associates in this community.

Examples on Conservation Lands

Black Mountain, Donnell Pond Public Lands	Hancock Co.
Cold Brook Trail, White Mountain National Forest	Oxford Co.
Blueberry Mountain, White Mountain National Forest	Oxford Co.
Tunk Mountain, Donnell Pond Public Lands	Hancock Co.
Sargent Mountain, Acadia National Park	Hancock Co.
Cadillac Mountain, Acadia National Park	Hancock Co.
Bald Mountain, Little Concord Pond Public Lands	Oxford Co.

Cross-reference to Other Classifications**New Hampshire**

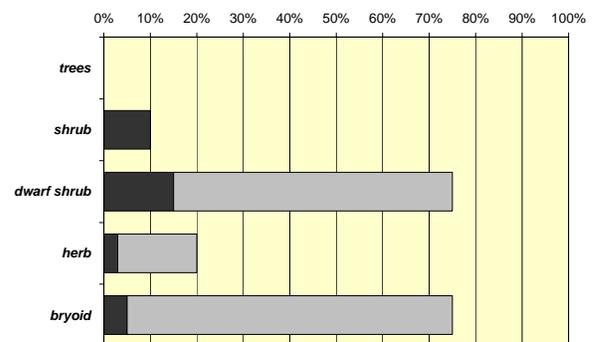
Sheep laurel heath/krummholz	S1
Labrador tea heath/krummholz	S1S2
Red spruce / heath / cinquefoil rocky ridge	S3S4
Montane heath shrub thicket/sparse woodland	S2
Montane alder-heath shrub thicket	S1?

National Vegetation Classification

CEGL006031	<i>Picea mariana</i> / <i>Kalmia angustifolia</i> Dwarf-shrubland	G?
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SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

- Doyle et al. 1987
- Burke 1982
- Sperduto and Cogbill 1999
- Caljouw and Roeske 1981
- May and Davis 1978
- Fahey 1976

DEU2

State Rarity Rank: S1

Diapensia Alpine Ridge

Windswept Alpine Ridge

Community Description

Matted evergreen shrubs and a few herbs are scattered among boulders or in bedrock pockets in an open alpine setting. Cushions of diapensia are the dominant feature, and alpine bilberry is typically common as well. The cover of herb species is usually <20%, and graminoids such as Bigelow's sedge and highland rush are typically more abundant than forbs. Older mats of diapensia may exhibit dieback in their middle or somewhere on the periphery.

Sites occur on very exposed and windswept areas above treeline, with plants growing in gravelly substrate among fractured rocks. Slopes are flat to gentle.

Diagnostics

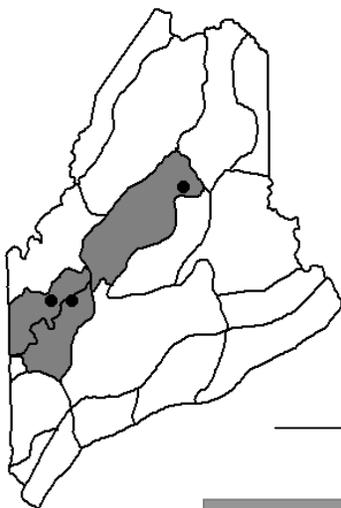
Diapensia is the dominant species (>30% cover, or >40% RD).

Similar Types

Dwarf Heath-Graminoid Alpine Ridge can occur at similar elevations and can grade into this type, but diapensia, if present, is sparse (< 20% cover). Bilberry - Mountain-heath Alpine Snowbanks similarly lack extensive diapensia. Subalpine Heath - Krummholz and Crowberry - Bilberry Summit Balds lack diapensia and other strictly alpine species, and generally occur at lower elevations.

Associated Rare Plants

Alpine bearberry
Alpine sweet-grass
Bearberry willow
Bigelow's sedge
Boreal bentgrass
Cutler's goldenrod
Diapensia
Lapland rosebay
Mountain sandwort
Northern firmoss



Distribution: Restricted to Maine's highest mountains (New England - Adirondack Province), extending west to New Hampshire and along the Appalachians.

Landscape Pattern: Small Patch

Characteristic Species**Dwarf Shrub:**

Alpine bearberry (F)
Diapensia (F,C)
Black crowberry (F)
Alpine azalea (F)
Alpine bilberry (F,C)

Herb:

Boreal bentgrass (F)
Bigelow's sedge (F)
Northern firmoss (F)
Highland rush (F)
Mountain sandwort (F)
Three-toothed cinquefoil (F)

Bryoid:

Cetraria lichen (F)

DEU2

State Rarity Rank: S1

Diapensia Alpine Ridge

Windswept Alpine Ridge

Conservation, Wildlife and Management Considerations

This type is restricted even within the alpine zone, and is very sensitive to hiker impacts. Because the vegetation is characteristically sparse and often occurs on flats, it is easy for hikers to wander off-trail. The documented Maine sites occur on public lands or private conservation lands, where hiker impacts are the main management concern.

Mt. Katahdin is the only known nesting area in the state for the American pipit, which utilizes a variety of natural community types above treeline.

Examples on Conservation Lands

Mt. Katahdin, Baxter State Park	Piscataquis Co.
Mt. Abraham	Franklin Co.
Saddleback Mountain, Appalachian Trail	Franklin Co.

Cross-reference to Other Classifications**New Hampshire**

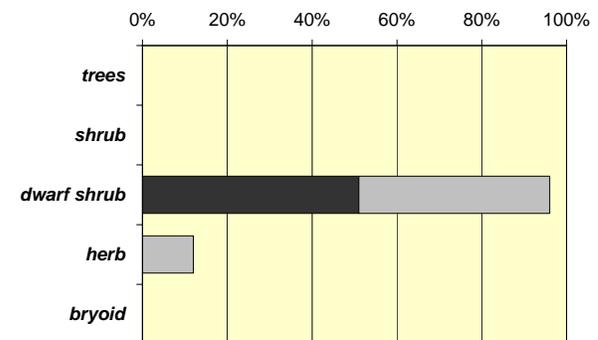
Diapensia - dwarf heath shrubland	S1
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National Vegetation Classification

CEGL006322 Diapensia lapponica Dwarf-shrubland	G2G3
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SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Sperduto and Cogbill 1999
 May and Davis 1978

DEU3

State Rarity Rank: S1

Bilberry - Mountain Heath Alpine Snowbank

Alpine Snowbank

Community Description

Dwarfed alpine shrubs form low mats, with herbs interspersed. Alpine bilberry and/or dwarf bilberry are dominant, but moss-plant and mountain-heath can form extensive patches among the bilberry. The relatively protected habitat allows some lower elevation species to exist, including Canada mayflower, bunchberry, mountain wood fern, bluebead lily, large-leaved goldenrod, and common hairgrass. Bryoids may be locally abundant, and include hair-cap mosses and red-stemmed moss.

Sites occupy protected upper mountain slopes above treeline, such as upper cirque walls. Snow lingers here after it has melted from the rest of the alpine zone.

Diagnostics

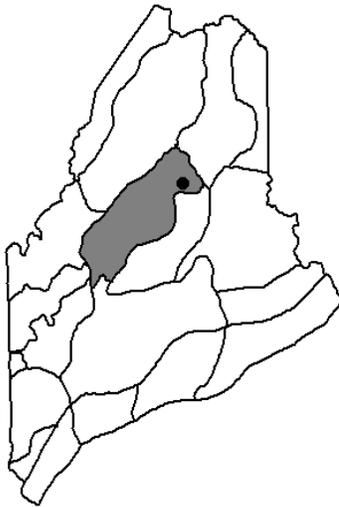
Sites occur in protected habitats above treeline; bilberries are dominant; tundra dwarf birch, mountain-heath, and/or moss-plant are characteristic.

Similar Types

Subalpine Heath-Krummholz occurs at lower elevation and lacks the strictly alpine species typical of this type. Dwarf Heath - Graminoid Alpine Ridge is similar (and often adjacent) but lacks the characteristic snowbank species (moss-plant and mountain-heath), as well as those typical of lower elevations. Diapensia Alpine Ridge can also be adjacent, but is dominated by diapensia. Alpine Cliff vegetation has a higher proportion of herbaceous species and occurs on seeps, with a well developed bryophyte layer.

Associated Rare Plants

Alpine azalea
Alpine bearberry
Bearberry willow
Bigelow's sedge
Boreal bentgrass
Lapland rosebay
Moss-plant
Mountain-heath
Northern comandra



Distribution: Restricted to Maine's highest mountains (New England - Adirondack Province), extending west to New Hampshire and along the Appalachians.

Landscape Pattern: Small Patch

Characteristic Species**Dwarf Shrub:**

Pale laurel (F)
Dwarf bilberry (F,C)
Alpine bilberry (F,C)
Mountain cranberry (F)
Moss-plant (F)
Mountain-heath (F)

Herb:

Bunchberry (F)
Stiff clubmoss (F)
Canada mayflower (F)
Common hairgrass (C)

Bryoid:

Awned hair-cap moss (F)
Juniper hair-cap moss (F)

DEU3

State Rarity Rank: S1

Bilberry - Mountain Heath Alpine Snowbank

Alpine Snowbank

Conservation, Wildlife and Management Considerations

The major documented occurrence of this type in Maine is on Mt. Katahdin. Hiker impacts to this type appear minimal, because most of its area is away from trails. Monitoring of impacts where alpine snowbank vegetation occurs near trails could help determine management needs.

Mt. Katahdin is the only known nesting area in the state for the American pipit, which utilizes a variety of natural community types above treeline.

Examples on Conservation Lands

Mt. Katahdin, Baxter State Park Piscataquis Co.

Cross-reference to Other Classifications**New Hampshire**

Labrador tea - heath Snowbank

Alpine herbaceous snowbank

S1

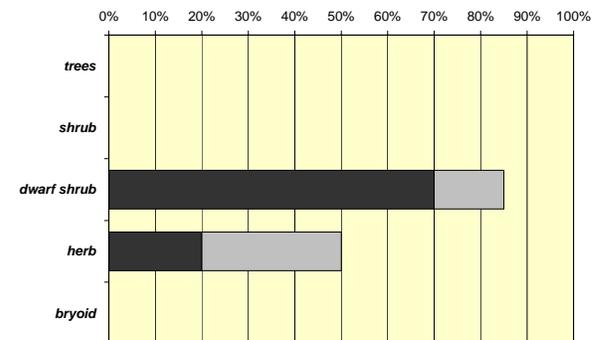
National Vegetation Classification

CEGL006155 Vaccinium uliginosum - Harrimanella
hypnoides - Loiseleuria procumbens
Dwarf-shrubland

G2G3

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Sperduto and Cogbill 1999

May and Davis 1978

DEU4

State Rarity Rank: S2

Labrador Tea Talus Dwarf-shrubland

Cold-air Talus Slope

Community Description

This subalpine assemblage is characterized by patchy mats of dwarf shrubs among the rocks, with scattered and stunted spruce (usually black spruce). Labrador tea and black crowberry are the most characteristic shrubs. Herbs are very sparse. Foliose and fruticose lichens are often extensive.

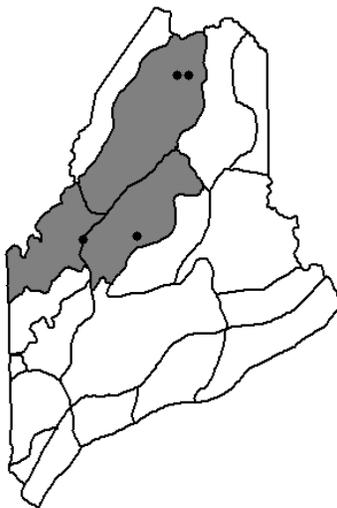
Sites occur near the base of somewhat sheltered or north-facing talus slopes where cold air collects. They are usually steep, though sometimes approaching level. The substrate is large talus blocks with pockets of organic duff among them. Ice blocks may persist into the summer in rock crevices.

Diagnostics

Sites occupy the base of talus slopes; mats of Labrador tea and other heath shrubs are characteristic, as are abundant fruticose and foliose lichens.

Similar Types

Spruce Talus Woodlands lack the abundant Labrador tea characteristic of this community; and also have fewer reindeer lichens. Other spruce woodland types (Red Spruce - Mixed Conifer Woodland and Black Spruce Woodland) have higher tree cover (>25%). Heath - Lichen Subalpine Slope Bogs are similar, but have more continuous vegetation and occur on upper slopes at higher elevations.



Distribution: Restricted in Maine to northern and montane areas; New England - Adirondack Province extending west.

Landscape Pattern: Small Patch

Characteristic Species**Sapling/Shrub:**

Black spruce (F)

Herb:

Rock polypody (F)

Dwarf Shrub:

Labrador tea (F,C)

Sheep laurel (F)

Black crowberry (F,C)

Mountain cranberry (F)

Lowbush blueberry (F)

Bryoid:

Reindeer lichen (F,C)

DEU4

State Rarity Rank: S2

Labrador Tea Talus Dwarf-shrubland

Cold-air Talus Slope

Conservation, Wildlife and Management Considerations

Known sites are on public lands or private conservation lands, and receive little if any use. Heavy foot traffic could damage the vegetation, but has not been a factor to date.

The long-tailed shrew and rock vole may show a preference for these rocky habitats.

Examples on Conservation Lands

Deboullie Ponds Public Lands	Aroostook Co.
Borestone Mountain Sanctuary	Piscataquis Co.

Cross-reference to Other Classifications**New Hampshire**

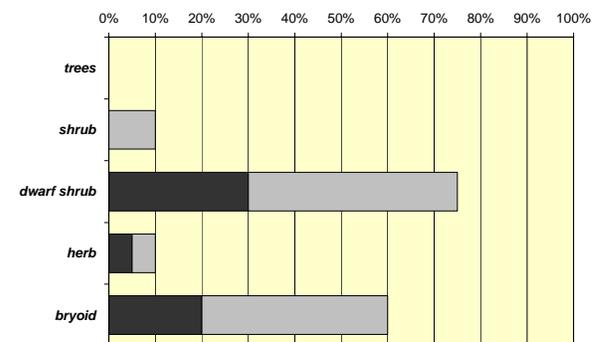
Subalpine cold-air talus woodland/barren	S1
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National Vegetation Classification

CEGL006268	<i>Picea mariana</i> / <i>Ledum groenlandicum</i> - <i>Empetrum nigrum</i> / <i>Cladina</i> spp. Dwarf-shrubland	G3G5
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SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Kern 1985

DEU5

State Rarity Rank: S3

Crowberry - Bayberry Headland

Downeast Maritime Shrubland

Community Description

Mat-forming vegetation occurs on exposed maritime headlands. Most of the cover is dwarf heath shrubs and black crowberry growing only a few inches tall, punctuated by islands of taller shrubs such as bayberry or small spruce. Crowberry may carpet large areas. Creeping juniper or the more upright common juniper are often present. In the herb layer, three-toothed cinquefoil is characteristic. The bryoid layer is minor, but may feature reindeer lichens.

Sites occur on extremely exposed, usually granitic headlands. Sites may contain with pockets of peaty soil developing in rock hollows. Salt spray, fog, and wind are nearly constant elements.

Diagnostics

Sites are characterized by the presence (and often dominance) of black crowberry, forming mats of vegetation with three-toothed cinquefoil and other species on exposed rocky coastal headlands.

Associated Rare Plants

Laurentide primrose
Nova Scotia false-foxglove

Similar Types

Rose - Bayberry Maritime Shrublands occur in similar settings, but are dominated by taller shrubs without a strong component of mat-forming shrubs. Seaside Goldenrod - Goosetongue Open Headlands share many species with Crowberry-Bayberry Headlands, but are much more sparsely vegetated (vegetation often covers < 25% of the rock surface overall), without extensive mats of dwarf shrub vegetation.



Distribution: Coastal Maine, from Mount Desert Island downeast; extending into the Canadian maritimes (Laurentian Mixed Forest Province).

Landscape Pattern: Small Patch

Characteristic Species**Dwarf Shrub:**

Black crowberry (F,C)
Lowbush blueberry (F,C)
Mountain cranberry (F)
Swamp dewberry (C)
Large cranberry (C)
Creeping juniper (F)

Herb:

Red fescue (F)
Canada mayflower (F)
Three-toothed cinquefoil (F)
Bluebell (F)

Bryoid:

Reindeer lichen (F)

DEU5

State Rarity Rank: S3

Crowberry - Bayberry Headland

Downeast Maritime Shrubland

Conservation, Wildlife and Management Considerations

Several known occurrences are on public or private conservation lands. While this protects them from conversion to other uses, it also increases the opportunity for foot traffic. Because the vegetation is so low to the ground, it is easily trampled and some sites have been degraded. The primary management consideration is to keep visitors on established trails as much as possible.

Rocky headland communities, especially those that occur on uninhabited islands, may provide nesting habitat for some pelagic bird species, such as the Atlantic puffin, razorbill, and Leach's storm petrel. Coastal breeders such as the common eider, black duck, herring and great black-backed gulls, and common puffin may also use this habitat in appropriate settings. The crowberry blue butterfly is restricted to coastal heaths in east-coastal Maine. It is typically found in peatlands, where it uses black crowberry as a larval host plant, but could occur in this community as well.

Examples on Conservation Lands

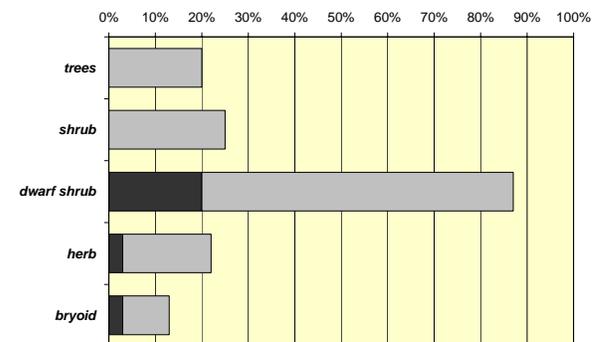
Little Bois Bubert Island, Petit Manan National Wildlife Refuge	Washington Co.
Mistake Island Preserve	Washington Co.
West Quoddy Head State Park	Washington Co.

Cross-reference to Other Classifications**New Hampshire**

N/A

National Vegetation ClassificationCEGL006510 Morella pensylvanica - Empetrum nigrum G?
Dwarf-shrubland**SAF Type**

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Fernald and Wiegand 1910

HFU1

State Rarity Rank: S1

Alpine Cliff

Alpine Cliff

Community Description

Herbaceous - bryoid vegetation occurs with a mix of forbs and graminoids in patches over bare rock. Low heath shrubs including alpine bilberry and Labrador tea are present, but the distinctive feature of the vegetation is the herbaceous component. Several montane herbs, such as star saxifrage, hairy arnica and alpine bistort, may be locally abundant on these seepy sites. The bryoid layer is extensive and may include large patches of the liverwort *Scapania nemorea*.

Sites occur near or above treeline in seeps or rivulets, often associated with vertical to nearly vertical rock faces. The known locations are in cirques, with constant moisture, at elevations > 3000'.

Diagnostics

Sites are at or above treeline, on sheer cliffs or cirque walls, usually with seepage; vegetation is a mixture of herbs, bryophytes, and dwarf shrubs; bulrush sedge is usually present along with other herbaceous species that do not occur at lower elevations.

Similar Types

Other above-treeline community types occur either on drier substrates (lacking extensive bryophytes) or in boggy situations with *Sphagnum* mosses, cotton-grasses, and heath shrubs dominant. Mountain Alder - Bush-honeysuckle Subalpine Meadows may occur just below this community, but these are denser and the dominants much taller. Circumneutral Riverside Seeps may share some of the unusual species, but are at lower elevations along major rivers.

Associated Rare Plants

Alpine bistort
Alpine bitter-cress
Arctic red fescue
Bulrush sedge
Butterwort
Hairy arnica
Hornemann's willow-herb
Livelong saxifrage
Mountain timothy
Star saxifrage

Characteristic Species**Sapling/Shrub:**

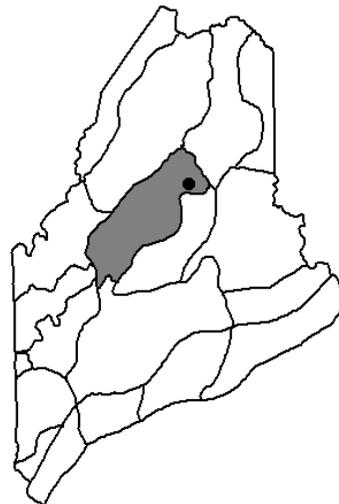
Mountain alder (F)
Squashberry (F)
Shrubby cinquefoil (F,C)

Dwarf Shrub:

Alpine bilberry (F,C)
Labrador tea (F)

Herb:

Bluejoint (F)
Deer-hair sedge (F,C)
Bulrush sedge (F,C)
Highland rush (F)
Low rough aster (F,C)



Distribution: Restricted in Maine to a few of the state's highest mountains (New England - Adirondack Province). Distribution outside of Maine unknown.

Landscape Pattern: Small Patch

HFU1

State Rarity Rank: S1

Alpine Cliff

Alpine Cliff

Conservation, Wildlife and Management Considerations

The known sites in Maine are on public lands or private conservation lands and somewhat removed from hiking trails. This vegetation would be extremely sensitive to foot traffic, but given that access ranges from difficult to dangerous, the sites appear to be protected fairly well by their topography.

Alpine cliffs may provide nesting habitat for ravens, peregrine falcons and golden eagles.

Examples on Conservation Lands

Mt. Katahdin, Baxter State Park Piscataquis Co.

Cross-reference to Other Classifications

New Hampshire

Herbaceous snowbank meadow

Alpine herbaceous heath meadow

S1

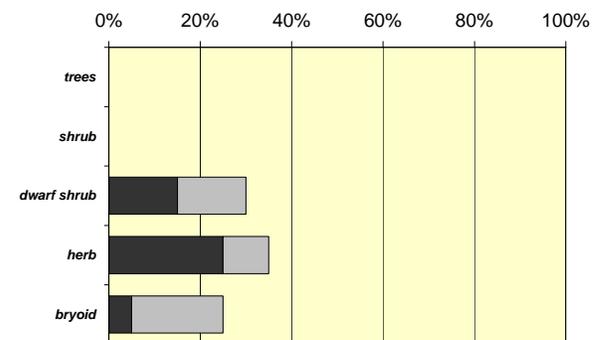
National Vegetation Classification

Trichophorum cespitosum - Saxifraga (foliosa, paniculata, rivularis) herbaceous vegetation

SAF Type

N/A

Vegetation Structure (total cover by stratum)



Literature References

HFU2**Three-toothed Cinquefoil - Blueberry Low Summit Bald**

State Rarity Rank: S3

Low-elevation Bald

Community Description

Patches of blueberry, lichens, low herbs, and bare rock form a mosaic on these summits. Vegetation may be sparse, but usually forms 25-55% cover overall, often comprised of only a few species. Three-toothed cinquefoil may be locally abundant. A few sites feature broom-crowberry, an uncommon species. This is the typical habitat of smooth sandwort, a rare species. Bryoid cover may be low or high, and usually is dominated by lichens rather than bryophytes.

Sites are on bald hilltops, mostly near the coast. Soils are patchy and usually consist of a thin, mostly organic layer, creating dry conditions. Substrate is acidic, and pH ranges from 5.0-5.4. Elevations range from 600'-1500'. Many sites have evidence of recent fire, but it is not clear whether fire is required to maintain this community.

Diagnostics

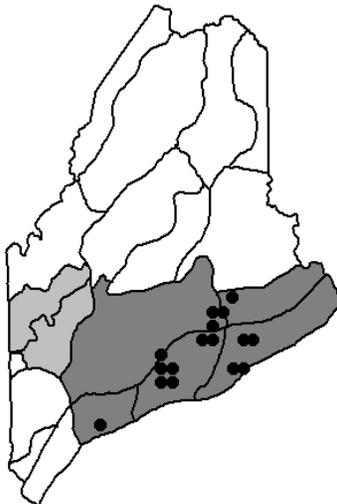
Tree cover is virtually zero; total vegetation cover is 10-60% (rarely more), dominated by a mixture of dwarf ericads, forbs, and graminoids, with three-toothed cinquefoil often locally dominant. Vegetation height rarely exceeds 0.3 m.

Similar Types

Subalpine Heath - Krummholz is floristically similar, and can occur with this type, but it has greater vegetation (especially conifer) cover, taller vegetation (patches > 0.5 m tall frequent), and usually a sparse tree cover. Crowberry - Bilberry Summit Balds are structurally similar, but feature crowberry and bilberry as locally dominant dwarf shrubs; they generally occur at higher elevations and more inland locations than this type.

Associated Rare Plants

Alpine blueberry
 Mountain firmoss
 Mountain sandwort
 New England northern
 reed grass
 Smooth sandwort



Distribution: Mid-coast Maine eastward, along the immediate coast to a short distance inland.

Landscape Pattern: Small Patch

Characteristic Species**Sapling/Shrub:**

Black chokeberry (F)

Herb:

Poverty oatgrass (F)

Three-toothed cinquefoil (F,C)

Dwarf Shrub:

Lowbush blueberry (F,C)

Broom-crowberry (C)

Bryoid:

Reindeer lichen (F)

Awned hair-cap moss (F)

HFU2**Three-toothed Cinquefoil - Blueberry Low Summit Bald**

State Rarity Rank: S3

Low-elevation Bald

Conservation, Wildlife and Management Considerations

Because this community type is usually associated with nice views, many sites have moderate to heavy hiker use. Because the vegetation is rather sparse, it is easy for visitors to wander off the trail. Off-trail traffic can seriously degrade the vegetation and has done so at several sites. Because the vegetation is rather sparse, it is easy for visitors to wander off the trail. This type is well represented on public lands and private conservation lands.

Examples on Conservation Lands

Mt Megunticook, Camden Hills State Park
 Schoodic Mountain, Donnell Pond Public Lands
 Mount Battie, Camden Hills State Park
 Pemetic Mountain, Acadia National Park

Knox Co.
 Hancock Co.
 Knox Co.
 Hancock Co.

Cross-reference to Other Classifications**New Hampshire**

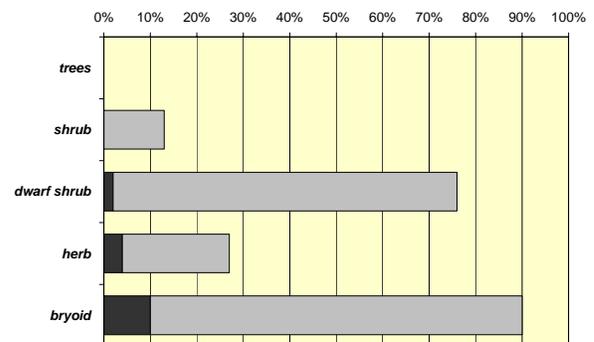
Red oak - pine / heath rocky ridge woodland S2S3

National Vegetation Classification

CEGL005094 Vaccinium angustifolium - Sorbus americana Dwarf-shrubland G?

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

HFU3

State Rarity Rank: S2

Boreal Circumneutral Open Outcrop

Circumneutral Outcrop

Community Description

These rock faces are sparsely vegetated with herbs and scattered meadowsweet and paper birch. Composition varies from site to site, but includes at least some species indicative of higher-pH conditions, such as shrubby cinquefoil, ebony sedge, rock whitlow-cress, lance-leaved draba, Laurentide primrose, smooth woodsia, etc. Graminoids including brownish sedge, and ferns such as fragile fern and bulblet fern, may be locally abundant in moist pockets.

This community occurs on low- to mid-elevation (<2700') outcrops of limestone, dolomite, or other rock where weathering produces circumneutral to calcareous substrates. Sites are usually below the hill summit, on side-slopes or cliffs rather than ridges. Slope varies, often with vertical faces and near-horizontal shelves within the same area. Sites are typically dry but may have moist spots where seepage occurs.

Diagnostics

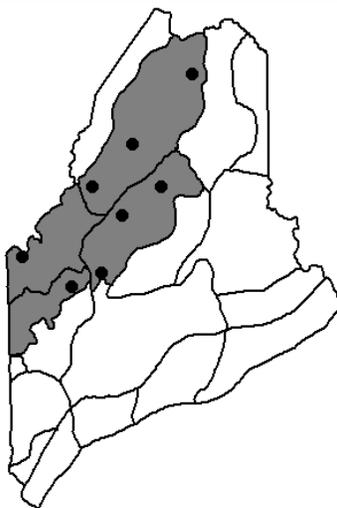
A sparsely vegetated cliff/outcrop setting occurs below treeline, with herbs dominant; circumneutral indicator species are present.

Similar Types

Acidic Cliff - Gorge vegetation is also on bare rock faces, but on more acidic rock, and lacks any circumneutral indicator species. Three-toothed Cinquefoil - Blueberry Low Summit Balds likewise lack circumneutral indicators and typically occur on summits. Alpine Cliff vegetation can have some circumneutral indicators but is found at higher elevations (>3000').

Associated Rare Plants

Ebony sedge
Intermediate sedge
Lance-leaved draba
Laurentide primrose
Northern woodsia
Rock whitlow-cress
Slender cliffbrake
Smooth rockcress
Smooth woodsia
White bluegrass



Distribution: Hills of northwestern and north-central Maine (mostly the New England - Adirondack Province, extending into the Laurentian Mixed Forest Province). Distribution outside of Maine is poorly understood.

Landscape Pattern: Small Patch

Characteristic Species**Sapling/Shrub:**

Meadowsweet (F)

Dwarf Shrub:

Shrubby cinquefoil (F)

Herb:

Fragile fern (F)

Fragrant woodfern (F)

Rusty cliff fern (F)

Brownish sedge (F)

Bulblet fern (F)

Bryoid:

Juniper hair-cap moss (F)

HFU3

State Rarity Rank: S2

Boreal Circumneutral Open Outcrop

Circumneutral Outcrop

Conservation, Wildlife and Management Considerations

Most known sites are relatively inaccessible and minimally affected by either forestry or recreational activities. Retaining a wooded buffer, where one would naturally occur, is important in maintaining the natural microclimate of the cliff and outcrop areas. Several known sites are within public lands or private conservation ownership.

Examples on Conservation Lands

Trout Brook Mountain, Baxter State Park	Piscataquis Co.
Little Kineo Mountain Public Lands	Piscataquis Co.
Mount Kineo Public Lands	Piscataquis Co.
Deboullie Ponds Public Lands	Aroostook Co.

Cross-reference to Other Classifications**New Hampshire**

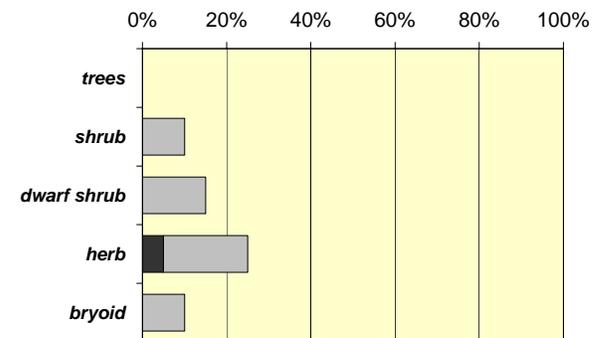
Cliff seep S3S4

National Vegetation Classification

CEGL006526 Carex scirpoidea Alkaline Cliff Sparse Vegetation [Provisional] G?

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

HGU1

State Rarity Rank: S1

Little Bluestem - Blueberry Sandplain Grassland

Sandplain Grassland

Community Description

These grassland barrens are expanses of graminoid and dwarf-shrub vegetation dominated by poverty oatgrass, little bluestem, woodland sedge and lowbush blueberry. Northern blazing star, a globally rare wildflower, is a dominant forb at the one viable Maine occurrence of this community. Local dominants include sweetfern and black chokeberry. Species allied with pine barrens are frequent, such as gray birch, whorled loosestrife, and wood lily. Bryoids are sparse, and up to 30% of the ground is unvegetated, usually with some graminoid or shrub litter.

These grasslands occur on flat sandy plains or deep outwash deposits. Soils are extremely well drained and acidic. Historically, fire was important in maintaining these communities and is now being used as a management tool.

Diagnostics

Canopy cover is less than 15%; tall shrub layer is patchy but less than 25%. Poverty oatgrass, little bluestem and woodland sedge are the dominant graminoids, often over a layer of lowbush blueberry.

Similar Types

Pitch Pine - Scrub Oak Barrens and Pitch Pine - Heath Barrens share many species, but have well developed shrub and/or tree layers. Hudsonia River Beach also features little bluestem, but blueberry is scarce or absent and the riverside setting is distinctive.

Associated Rare Plants

Butterfly weed
Clothed sedge
Dry land sedge
Northern blazing star
Upright bindweed
White-topped aster



Distribution: Extreme southern Maine, extending southward along the Atlantic Coast to Cape Cod (Eastern Broadleaf Forest Province).

Landscape Pattern: Large Patch

Characteristic Species**Sapling/Shrub:**

Thicket shadbush (F)
Pitch pine (F)
Gray birch (F)
Sweetfern (F)
Pin cherry (F)

Dwarf Shrub:

Lowbush blueberry (F,C)
Black chokeberry (F)

Herb:

Woodland sedge (F,C)
Northern blazing star (F,C)
Little bluestem (F,C)
Poverty oatgrass (F)
Arrow-leaved violet (F)
Whorled loosestrife (F)
Pinweed (F)
Silverrod (F)
Sharp-pointed ricegrass (F)

HGU1

State Rarity Rank: S1

Little Bluestem - Blueberry Sandplain Grassland

Sandplain Grassland

Conservation, Wildlife and Management Considerations

The one viable Maine site is in conservation ownership and is managed for the rare community, rare animals, and rare plants. Prescribed burning is a major management tool. This type appears to have been more common in southern Maine historically, but nearby sites that might have supported this community have either been developed or are in commercial blueberry production, where pesticide use precludes development of this community.

This community provides nesting habitat for several rare ground-nesting grassland birds including the grasshopper sparrow, vesper sparrow, upland sandpiper, and short-eared owl. These open grasslands also provide excellent habitat for the northern harrier and, in southern Maine, the northern black racer. The cobweb skipper inhabits open dry fields with bluestem grasses, which it uses as its larval host plant. Several historical lepidoptera species that may have inhabited formerly large tracts of this community include the graceful clearwing, Persius dusky wing, and frosted elfin.

Examples on Conservation Lands

Kennebunk Plains Preserve York Co.

Cross-reference to Other Classifications

New Hampshire

N/A

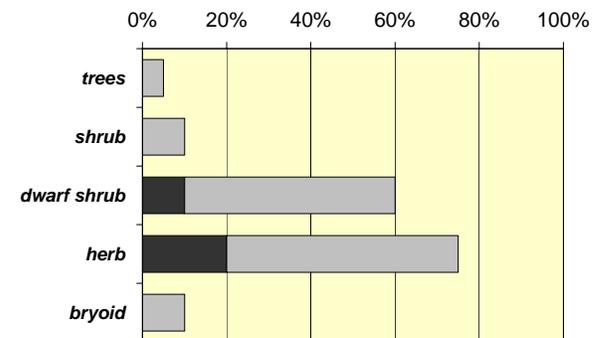
National Vegetation Classification

CEGL006393 Vaccinium angustifolium / Schizachyrium G?
scoparium - Carex lucorum Shrub
Herbaceous Vegetation

SAF Type

N/A

Vegetation Structure (total cover by stratum)



Literature References

Vickery 1990

HGU2

State Rarity Rank: S2

Dune Grassland

Dune Grassland

Community Description

These sand dunes are vegetated with a moderate to dense cover of herbs, strongly dominated by beach grass, with patches of beach-pea, red raspberry, or bristly gooseberry. In depressions or blowouts, grass cover is replaced by a mat of beach heather, golden heather, little bluestem, and pinweed, punctuated by tufts of reindeer lichens. The beach grass has stout rhizomes to allow it to colonize new places in its shifting substrate. Downeast of Acadia National Park, the beach grass may be replaced by the ecologically and morphologically similar Virginia wild rye.

Sites occur on coastal sand dunes between the high tide line and either back-dune marshes abutting uplands; this type is best expressed along the southwest coast.

Diagnostics

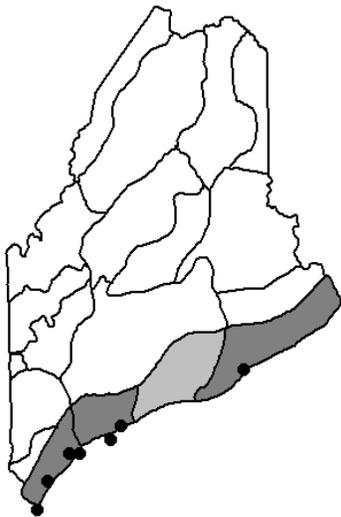
Grass cover of beach-grass or Virginia wild rye, which may include pockets of dwarf shrub - herb vegetation, characterizes these coastal dunes.

Similar Types

Rose - Bayberry Maritime Shrublands can occur with these dune grasslands, but are dominated by shrubs rather than herbs. Beach Strands often occur on the shoreward margin of Dune Grasslands and are dominated by forbs rather than grasses.

Associated Rare Plants

Beach plum
Coast-blite goosefoot
Seabeach sedge



Distribution: Mostly southwest of Merrymeeting Bay, occasionally eastward; extends southward along the Atlantic Coast to New Jersey

Landscape Pattern: Small Patch

Characteristic Species**Sapling/Shrub:**

Red raspberry (F)
Bristly gooseberry (F)

Dwarf Shrub:

Beach heather (C)

Herb:

Beach grass (F,C)
Beach-pea (F,C)
Little bluestem (C)
Pinweed (C)
Jointweed (F)
Virginia wild rye (C)

HGU2

State Rarity Rank: S2

Dune Grassland

Dune Grassland

Conservation, Wildlife and Management Considerations

Beach-dune systems along Maine's southwest coast have been reduced in extent by development. The intact dune systems that remain are almost all in public or private conservation ownership. Even with this protection, however, dunes are subject to degradation from uncontrolled recreational use. Even light foot traffic can initiate blowouts that will persist for years. Attempts over the last decade to educate people about the importance of staying out of dune areas are helping, but constant vigilance will be required in the face of increasing beach use.

Dune grasslands and adjacent upper beaches are critical breeding habitat for two species of endangered shorebirds--least terns and piping plovers. Nesting habitat for these birds has been reduced by human use of beaches and the known nesting sites in Maine are carefully monitored. Other ground-nesting bird species that may utilize these habitats include laughing gulls and short-eared owls.

Examples on Conservation Lands

Seawall Beach, Morse Mountain Preserve	Sagadahoc Co.
Reid Beach, Reid State Park	Sagadahoc Co.
Popham Beach State Park	Sagadahoc Co.
Laudholm & Crescent Surf Beaches	York Co.
Crescent Beach State Park	Cumberland Co.
Rachel Carson National Wildlife Refuge	York Co.

Cross-reference to Other Classifications

New Hampshire

Beach grass grassland

S1

National Vegetation Classification

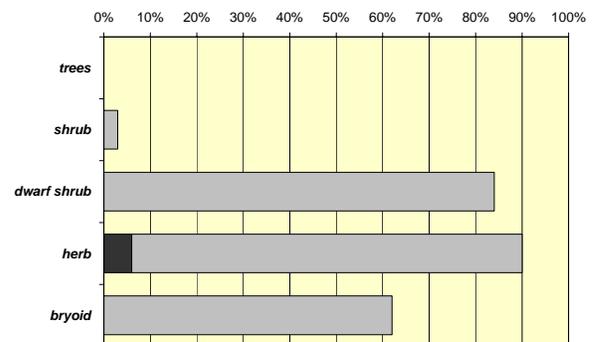
CEGL006274 *Ammophila breviligulata* - *Lathyrus japonicus* Herbaceous Vegetation

G4?

SAF Type

N/A

Vegetation Structure (total cover by stratum)



Literature References

Dunlop and Crow 1985
Nelson and Fink 1980

VCU1

State Rarity Rank: S4

Seaside Goldenrod - Goosetongue Open Headland

Open Headland

Community Description

In this community patchy herbaceous vegetation of seaside goldenrod, goosetongue, bluebell, and yarrow covers coastline bedrock. Overall vegetation cover is usually 10% - 35%, but may be locally more extensive. Crowberry or creeping juniper may be present, but they do not cover extensive areas. Downeast of Acadia National Park, species of the Canadian maritimes may be present, such as roseroot, beachhead iris, marsh-felwort, and glabrous knotted pearlwort. The primary bryoids are crustose lichens on the rock, including the lime-green map lichen and bright orange *Xanthoria* lichen. Where the forest edge abuts, cover is more dense, and often includes shrubs such as meadowsweet, currants, or small white spruce.

Sites occur on bedrock areas exposed to salt spray and storm tides, typically between the high tide line and the upland forest. Sites are flat to slightly sloping (<20%), and plants grow in the fissures of the rock or in small depressions with almost no soil.

Diagnostics

Sparse herb-dominated vegetation occurs on oceanside bedrock.

Similar Types

Crowberry - Bayberry Headlands share many species, but have more vegetation (usually >50% total cover, and >25% shrub or dwarf-shrub cover), and are dominated by shrubs rather than by herbs. Rose - Bayberry Maritime Shrublands are dominated by shrubs >1 m tall.

Associated Rare Plants

Blinks
Laurentide primrose
Marsh-felwort
Nova Scotia false-foxglove



Distribution: Coastwide, largest occurrences east of Penobscot Bay, extending into the Canadian maritimes and south to Massachusetts (Laurentian Mixed Forest Province and Eastern Broadleaf Forest Province).

Landscape Pattern: Small Patch

Characteristic Species

Herb:	
Yarrow	(F)
Goosetongue	(F)
Gall of the earth	(F)
Seaside goldenrod	(F)
Bluebell	(F)
Bluejoint	(C)
Roseroot	(C)
Red fescue	(F)

VCU1

State Rarity Rank: S4

Seaside Goldenrod - Goosetongue Open Headland

Open Headland

Conservation, Wildlife and Management Considerations

This type is well distributed along the Maine coast. Many sites are on public lands or private conservation lands. Some areas receive moderate to heavy foot traffic. To the degree that users remain on the bare rock, impacts can be minimal, but visitor impact should be monitored at heavy-use sites. A few sites with rare plants are currently monitored for recreational impacts.

Rocky headland communities, especially those that occur on uninhabited islands, may provide nesting habitat for some pelagic bird species.

Examples on Conservation Lands

Acadia National Park	Hancock Co.
Quoddy Head State Park	Washington Co.
Great Wass Island Preserve	Washington Co.
Cutler Public Lands	Washington Co.
Petit Manan National Wildlife Refuge	Washington Co.

Cross-reference to Other Classifications**New Hampshire**

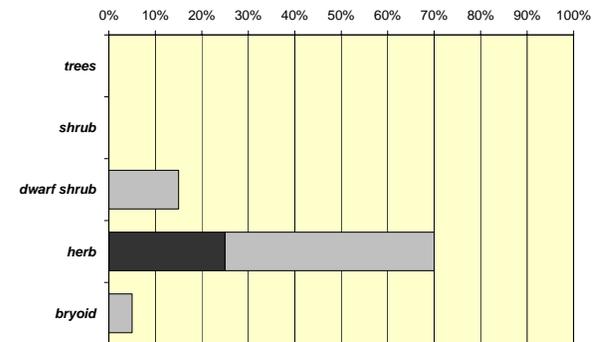
N/A

National Vegetation Classification

CEGL006529 Solidago sempervirens - (Rhodiola rosea) - Juniperus horizontalis Sparse Vegetation G?

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Fernald and Wiegand 1910
Olday et al. 1982

VCU2

State Rarity Rank: S4

Acidic Cliff - Gorge

Acidic Cliff

Community Description

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

Sites occupy nearly vertical to vertical outcrops of non-calcareous, resistant rocks. Most are dry, with large unvegetated areas; a moist microclimate is maintained over local areas by runoff from higher elevations, or, in gorges, by the flowing streamwater. Most sites are at low to moderate elevations below treeline.

Diagnostics

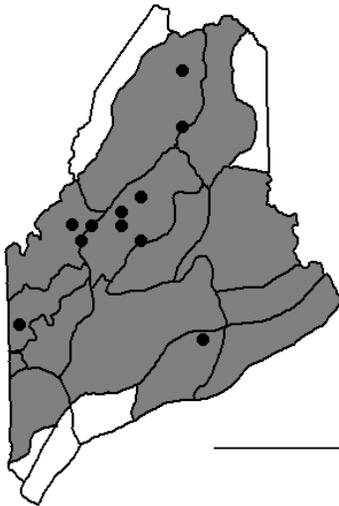
Sparsely vegetated cliffs occur below treeline, without circumneutral indicator species.

Associated Rare Plants

Fragrant woodfern

Similar Types

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



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

Landscape Pattern: Small Patch

Characteristic Species**Herb:**

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

Bryoid:

Rocktripe lichen	(F)
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VCU2

State Rarity Rank: S4

Acidic Cliff - Gorge

Acidic Cliff

Conservation, Wildlife and Management Considerations

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

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

Examples on Conservation Lands

Deboullie Ponds Public Lands	Aroostook Co.
Dunn Falls, Appalachian Trail	Oxford Co.
Grindstone Falls	Penobscot Co.
Mount Kineo Public Lands	Piscataquis Co.
Tunk Mountain, Donnell Pond Public Lands	Hancock Co.

Cross-reference to Other Classifications**New Hampshire**

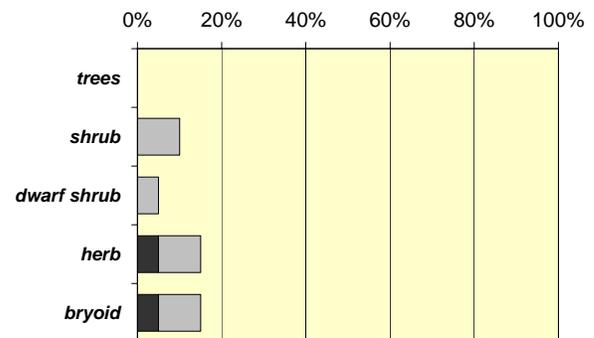
Cliff seep S3S4

National Vegetation Classification

CEGL006528 Polypodium virginianum Cliff Sparse Vegetation [Provisional] G?

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

VCU3

State Rarity Rank: S3

Bluebell - Balsam Ragwort Shoreline Outcrop

Rivershore Outcrop

Community Description

Sparse rivershore vegetation is dominated by herbs with occasional low shrubs. Total cover rarely exceeds 25%. Typical herbs include three-toothed cinquefoil, common hairgrass, hairy goldenrod, silverrod, bluebell, and narrow false oats. Shrubs include dwarf bilberry, lowbush blueberry, shrubby cinquefoil, and shadbush; poison-ivy may be locally abundant. Where soil allows the growth of taller shrubs (e.g. at the upland transition into adjacent shrub vegetation), redosier dogwood, round-leaved dogwood, and willows may occur. The rare species associated with most of these ledges show an affinity to northern areas; in central Maine, one may find more temperate indicator species, such as Indian grass and little bluestem.

This type occurs on dry ledges and adjacent cobble along rivershores. Substrate is typically circumneutral or calcareous slate, with plants growing in the vertical fissures. Sites are subject to annual flooding and ice-scour, which allows at least a small amount of silt to accumulate in the rock crevices.

Diagnostics

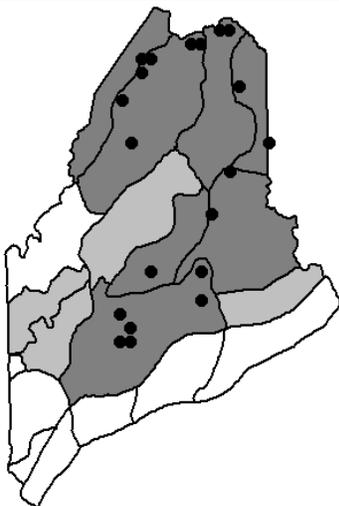
Herb-dominated sparse vegetation occurs on rivershore outcrops.

Similar Types

This is the only herb-dominated rivershore ledge community type. Circumneutral Riverside Seeps share many species with moist pockets of these outcrops, but occur on gravelly (unconsolidated) substrates. The geographic transition seen from northern Maine rivers to those in central Maine may warrant splitting the central Maine occurrences into a "Bluestem Shoreline Outcrop" type, but more information is needed from both within and outside of Maine.

Associated Rare Plants

Alpine milk-vetch
 Clinton's bulrush
 Cut-leaved anemone
 Indian grass
 Mistassini primrose
 New England violet
 Pale green orchis
 Purple clematis
 Soft-leaf muhly
 St. John oxytrope



Distribution: Along the major rivers from central Maine northward and eastward. Extends east and north into New Brunswick and west into New Hampshire and Vermont.

Landscape Pattern: Small Patch

Characteristic Species**Sapling/Shrub:**

Morrow's honeysuckle (F)
 Western poison-ivy (F)
 Round-leaved dogwood (F)
 Red osier dogwood (F)
 Shining willow (F)
 Meadowsweet (F)

Dwarf Shrub:

Dwarf bilberry (F)
 Lowbush blueberry (F)
 Velvet-leaf blueberry (F)

Herb:

Silverrod (F)
 Narrow false oats (F)
 Kalm's lobelia (F)
 Tufted hairgrass (F)
 Wild chive (F)
 Northern meadow groundsel (F)
 Common pussytoes (F)
 Field pussytoes (F)
 Bluebell (F)
 Stiff aster (C)
 Dwarf raspberry (F)
 Early goldenrod (F)

VCU3

State Rarity Rank: S3

Bluebell - Balsam Ragwort Shoreline Outcrop

Rivershore Outcrop

Conservation, Wildlife and Management Considerations

Many sites are visited on foot for recreation. In sites with moderate to heavy foot traffic, some degradation of the vegetation is apparent. A few sites show some degradation by exotic species such as Japanese knotweed. Several sites are in public ownership or private conservation ownership; many are privately owned.

These rivershore shrublands provide habitat for common bird species that inhabit open shrublands such as common yellowthroat, alder flycatcher, Wilson's warbler, and Lincoln's sparrow. These rivershore shrublands provide habitat for common bird species that inhabit open shrublands such as common yellowthroat, alder flycatcher, Wilson's warbler, and Lincoln's sparrow.

Examples on Conservation Lands

Rocky Island Preserve

Aroostook Co.

Coburn Park

Somerset Co.

Allagash Lake, Allagash Wilderness Waterway

Piscataquis Co.

Allagash Public Lands

Aroostook Co.

Cross-reference to Other Classifications**New Hampshire**

Riverside outcrop

S1S3

Circumneutral riverbank outcrop

S1

National Vegetation Classification

CEGL006284 Andropogon gerardii - Campanula rotundifolia - Solidago simplex Herbaceous Vegetation

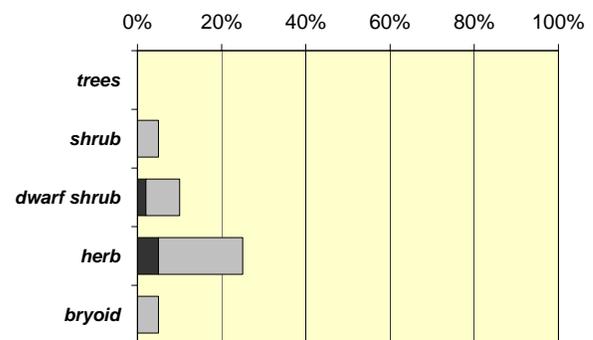
G2

CEGL006532 Carex eburnea sparse vegetation [Provisional]

G?

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

SDF1

State Rarity Rank: S2

Dogwood - Willow Shoreline Thicket

Rivershore Shrub Thicket

Community Description

Dense riparian shrub vegetation (>80% cover) is dominated by a mixture of redosier dogwood and shrub willows. Alders may be present but are not dominant. A band of bush-honeysuckle often forms at the upslope edge, where the shrub vegetation abuts upland forest. Herb richness may be high in openings among the shrubs, and typically includes some calciphiles as well as more widespread species. Bryoids are minor, and consist of bryophytes rather than lichens. More thorough study of alluvial shrub communities is needed.

Sites occupy shores of larger rivers, below the annual high-water line, in areas somewhat protected from the extremes of ice-scour and flooding. Riverbanks are moderate to steep, not flat; the silty to sandy soils are not constantly saturated. Successional dynamics have not been studied, but at least some sites appear to persist through disturbance.

Diagnostics

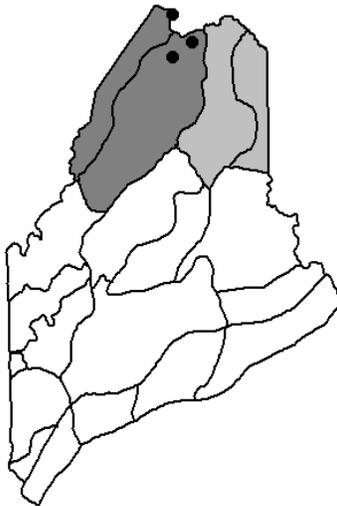
This type is characterized by 1-3 m tall shrub vegetation with redosier dogwood and willows prominent, on riverbanks where annual disturbance creates a non-forested zone between the summer water level and adjacent forest. It occurs on soils that are not regularly saturated; and mostly on larger rivers.

Similar Types

Related to and sometimes contiguous with other rivershore communities. Bluejoint Meadows are strongly dominated by bluejoint and occur on flatter substrates. Circumneutral Riverside Seeps have more sweetgale and sedges, often have seepage waters at the surface, and have indicators such as grass-of-Parnassus and yellow sedge. Sand Cherry - Tufted Hairgrass River Beaches are dominated by herbs and low shrubs.

Associated Rare Plants

Auricled twayblade
Blueleaf willow
Furbish's lousewort
Nantucket shadbush
Northern painted-cup
Sandbar willow



Distribution: Documented from extreme northern Maine along the St. John River; may occur on other fairly large rivers in northern Maine (Laurentian Mixed Forest Province and New England - Adirondack Province). Presumably extends into Quebec and New Brunswick.

Landscape Pattern: Small Patch

Characteristic Species**Sapling/Shrub:**

Red osier dogwood (F,C)
Red-tipped willow (F,C)
Shining willow (F)
Bush-honeysuckle (F,C)
Speckled alder (F)
Round-leaved dogwood (F)

Herb:

Bluejoint (F)
Fringed bromegrass (F)
Fringed loosestrife (F)
Flat-topped white aster (F)
Spotted joe-pye weed (F)

SDF1

State Rarity Rank: S2

Dogwood - Willow Shoreline Thicket

Rivershore Shrub Thicket

Conservation, Wildlife and Management Considerations

Natural river hydrology, with annual fluctuations, is important in the maintenance of this community. These areas receive little direct use but may be affected by adjacent land use, so a buffer of adjoining upland would be helpful. No studies of the dynamics of this community have been done.

These rivershore shrublands provide habitat for common bird species that inhabit open shrublands such as common yellowthroat, alder flycatcher, Wilson's warbler, and Lincoln's sparrow. Wood turtles may also use this riparian habitat.

Cross-reference to Other Classifications**New Hampshire**

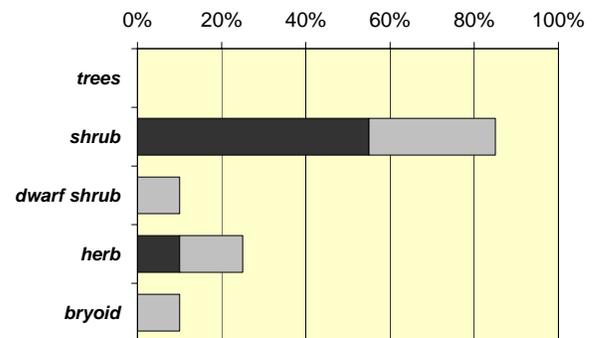
Alder-dogwood-meadowsweet-arrowwood riverbank/ floodplain	S4
Willow low riverbank	S3

National Vegetation Classification

CEGL006062 Alder-dogwood-meadowsweet- arrowwood riverbank/ floodplain	G4G5
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SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Gawler 1988

SDS1

State Rarity Rank: S4

Sweetgale Mixed Shrub Fen

Sweetgale Fen

Community Description

A mixture of shrubs, typically about 1 m high (i.e. generally taller than bog shrubs, but shorter than most alder thickets), is dominated by sweetgale, leatherleaf, and hardhack or meadowsweet. Alder is usually present, but not dominant. Graminoids, typically slender sedge, tussock sedge, and/or bluejoint grass, are usually mixed with the shrubs but less abundant (averaging around 20% cover). Where shrubs are dense, herb cover is very limited. The bryoid layer is usually very minor; when present it is dominated by peat mosses.

These basin wetlands occur either as part of peatlands with open water, or in impounded areas with peat or muck soils (e.g. beaver flowages). Open water usually borders this vegetation. The substrate is seasonally to semi-permanently flooded organic soil.

Diagnostics

This type has a dominance of medium-height shrub mixture of sweetgale, meadowsweet, and leatherleaf. Graminoids are present but subordinate to shrubs. Sites occur on saturated or flooded organic soils.

Associated Rare Plants

Long's bulrush

Similar Types

Mixed Tall Sedge Fens occur in similar settings, but have graminoids far more dominant than shrubs. Mountain Holly - Alder Woodland Fens have more alder or mountain holly and usually occur at the peatland/upland interface. Mixed Graminoid - Shrub Marshes have graminoids equalling or exceeding shrub cover, and occur on mineral soils or with only a thin organic layer over saturated mineral soil. Alder Shrub Thickets likewise usually occur on mineral soils rather than on peat or muck, and have a stronger dominance of alder.

Characteristic Species**Sapling/Shrub:**

Meadowsweet	(F,C)
Black spruce	(C)
Larch	(C)
Leatherleaf	(C)
Alder	(C)
Mountain holly	(C)
Red maple	(C)
Sweetgale	(C)
Winterberry holly	(C)
Mountain alder	(C)

Dwarf Shrub:

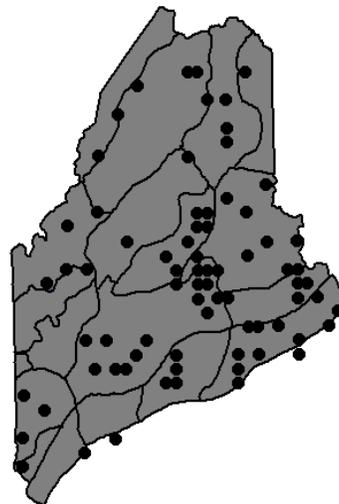
Leatherleaf	(F,C)
Sweet gale	(F,C)
Rhodora	(C)
Sheep laurel	(C)

Herb:

Tussock sedge	(F,C)
Bog aster	(C)
Few-seeded sedge	(C)
Royal fern	(C)
White beak-rush	(C)
Slender sedge	(F)
Bluejoint	(F)

Bryoid:

<i>Sphagnum</i> mosses	(F,C)
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Distribution: Statewide; extends westward and probably eastward and northward as well.

Landscape Pattern: Small Patch

SDS1

State Rarity Rank: S4

Sweetgale Mixed Shrub Fen

Sweetgale Fen

Conservation, Wildlife and Management Considerations

Well-distributed throughout the state, this wetland type receives little direct use. Maintaining appropriate wetland buffers and water quality are appropriate conservation measures. Public lands and private conservation lands contain many examples of this community.

These shrublands, especially when they occur in close proximity to open water, may provide habitat for bird species such as common yellowthroat, alder flycatcher, Wilson's warbler, Lincoln's sparrow, and the uncommon rusty blackbird. Thaxter's pinion moth uses sweetgale as one of its larval host plants and may be found in this community. The black meadowhawk, a rare dragonfly of open fens and marshes, may be found here as well. Occurrences of this community type in northern Maine may be inhabited by the subarctic bluet, a rare damselfly.

Examples on Conservation Lands

Moosehorn National Wildlife Refuge	Washington Co.
Baxter State Park	Piscataquis Co.
Mattagodus Wildlife Management Area	Penobscot Co.
Knight Pond, St. Clair Preserve	Waldo Co.
Middle Pond State Park	Oxford Co.
Gardner - Deboullie Public Lands	Aroostook Co.
Acadia National Park	Hancock Co.
Moose River	Somerset Co.
Wiggins Brook, Squaw Mountain Public Lands	Piscataquis Co.
Cold Stream, Passadumkeag	Penobscot Co.
Nahmakanta Public Lands	Piscataquis Co.

Cross-reference to Other Classifications**New Hampshire**

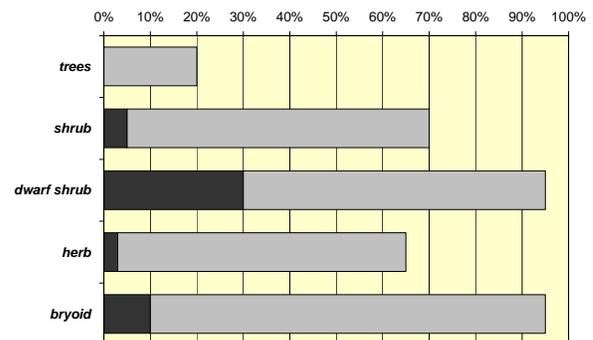
Sweet gale-meadow-sweet/tussock sedge streamside/pond-border fen	S4
Highbush blueberry/sweet gale-meadow-sweet tall-medium shrub thicket	S4

National Vegetation Classification

CEGL006512	Myrica gale - Spiraea alba - Chamaedaphne calyculata Shrubland	G?
CEGL002494	Betula pumila / Chamaedaphne calyculata / Carex lasiocarpa Shrubland	G4G5

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Anderson and Davis 1997
 Gawler 1998
 Sperduto 1994
 McPhedran 1998
 Davis and Anderson 2001

SDS2

State Rarity Rank: S5

Alder Shrub Thicket

Alder Thicket

Community Description

These tall (1-3 m) shrub-dominated wetlands are characterized by dense growth of alder. Speckled alder is most typical, but rarely mountain alder or smooth alder may predominate. Red maple, gray birch, or other trees may be scattered sparsely above the shrubs. The herb layer is usually well developed (>35%), and is a variable mixture of forbs, graminoids, and ferns. The bryoid layer is patchy and dominated by peat mosses, especially *Sphagnum girghensonii*, *S. palustre* and *S. magellanicum*.

This type occurs in basin wetlands that are seasonally flooded and usually saturated throughout the season. It is usually on mineral soil but occasionally on peat. This type is very common as wet cleared areas revert to forest; examples developing without human disturbance are not well documented.

Diagnostics

These are shrub-dominated wetlands, often only temporarily flooded, in which alders dominate: alders comprise >20% cover, usually >40%; heath shrubs are absent or virtually so.

Similar Types

Tussock Sedge Meadows, Bluejoint Meadows, and Mixed Graminoid - Shrub Marshes may have alder as a sub-dominant species, with lower cover than the graminoids. Mountain Holly - Alder Woodland Fens occur as part of a peatland and have mountain holly or heath shrubs mixed with the alder. Dogwood - Willow Shoreline Thickets often contain alder, but it is sub-dominant.

Associated Rare Plants

Bog bedstraw
 Eastern joe-pye weed
 Hollow joe-pye weed
 Northern bog sedge

Characteristic Species**Sapling/Shrub:**

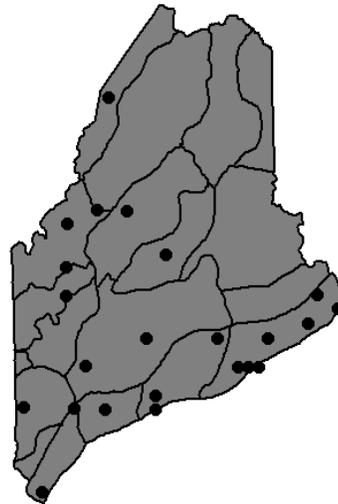
Meadowsweet	(F)
Speckled alder	(F,C)
Gray birch	(C)
Red maple	(F,C)
Balsam fir	(C)
Black spruce	(C)
Common blackberry	(C)
Hardhack	(C)
Mountain alder	(C)

Herb:

Bluejoint	(F,C)
Tall meadow-rue	(C)
Flat-topped white aster	(C)
Wild calla	(F)
Three-seeded sedge	(F)
Royal fern	(F)
Cinnamon fern	(F)
Sensitive fern	(F,C)
Woodland horsetail	(C)
Swamp dewberry	(C)
Tussock sedge	(C)

Bryoid:

<i>Sphagnum</i> mosses	(C)
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Distribution: Statewide; extending in all directions from Maine.

Landscape Pattern: Small Patch

SDS2

State Rarity Rank: S5

Alder Shrub Thicket

Alder Thicket

Conservation, Wildlife and Management Considerations

This type is well distributed and well replicated. Many examples occur on public lands and private conservation lands where no land use conflict exists.

These shrublands, especially when they occur in close proximity to open water may, provide habitat for common bird species such as common yellowthroat, alder flycatcher, Wilson's warbler, and Lincoln's sparrow. Some occurrences of this community type support vernal pools, which are important breeding habitat for a variety of amphibians including wood frogs, spotted salamanders, and blue-spotted salamanders. Rare turtles like the wood turtle, or Blanding's and spotted turtles in southern Maine, may feed on amphibian egg masses present in such pools.

Examples on Conservation Lands

Redington Pond Public Lands	Franklin Co.
Narraguagus Wildlife Management Unit	Washington Co.
Bigelow Preserve Public Lands	Somerset Co.
Bradley Wildlife Management Area	Penobscot Co.
Branch Lake Wildlife Management Unit	Hancock Co.
Muddy River Wildlife Management Area	Sagadahoc Co.
Kennebunk Plains Preserve	York Co.

Cross-reference to Other Classifications**New Hampshire**

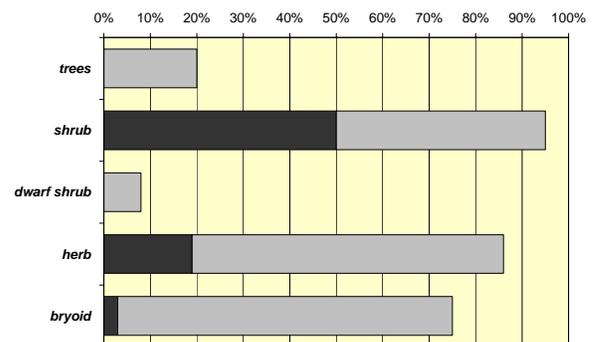
Speckled alder/bryophyte shrub-herb thicket	S3
Alder moderate-energy riverbank/floodplain	S3

National Vegetation Classification

CEGL002381	<i>Alnus incana</i> Swamp Shrubland	G5?
CEGL006511	<i>Alnus incana</i> ssp. <i>rugosa</i> - <i>Myrica gale</i> - <i>Spiraea alba</i> var. <i>latifolia</i> Shrubland [Provisional]	G5?

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

McPhedran 1998

SDS3

State Rarity Rank: S4

Mountain Holly - Alder Woodland Fen

Tall Shrub Fen

Community Description

This peatland vegetation is characterized by tall shrubs, with spotty tree cover above. Shrub cover is usually >70%, with alder and mountain holly almost always present and with other shrubs locally common. Red maple is typical in the tree layer, along with black spruce. The herb layer is patchy, with 10-50% cover. Labrador tea and pitcher plants are ubiquitous, though not necessarily in high abundance. Wild calla is a good indicator, as is Virginia chainfern (the latter in the southern half of the state). The bryoid layer is mostly peat mosses and is patchy, averaging ~50% cover.

Sites occur in peat-filled basin wetlands, often at the upland-peatland ecotone. Areas bordering the upland (the peatland "lagg") have standing water for much of the growing season; however, this community can be found in settings other than the peatland lagg. Substrates are somewhat acidic to circumneutral, with relatively high levels of nitrogen, presumably from the nitrogen-fixing alders.

Diagnostics

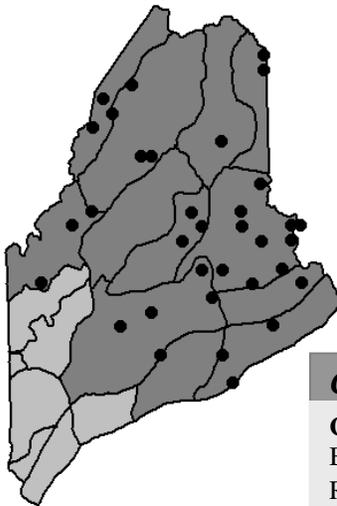
Vegetation associated with a peatland, with well-developed shrub layer (1-3 m) is dominated by non-ericaceous shrubs and often with scattered trees. Some ericads and other peatland species are present. The substrate is peat or is transitional from peat to mineral soil.

Associated Rare Plants

Bog bedstraw

Similar Types

Alder Shrub Thickets can be similar, but occur on mineral soil and are not associated with peatlands. Sweetgale Mixed Shrub Fens can have similar structure, and can be associated with peatlands, but are more strongly dominated by sweetgale and ericads than alder or other shrubs. Spruce - Larch Wooded Bogs and Red Maple Woodland Fens have greater tree cover, less tall shrub cover, and typically occur on deeper peat.



Distribution: Central Maine northward, extending west through New England and New York, and presumably north and east into Canada.

Landscape Pattern: Small Patch

Characteristic Species**Canopy:**

Black spruce (F)
Red maple (F)

Sapling/Shrub:

Wild-raisin (F)
Highbush blueberry (F)
Balsam fir (F)
Mountain holly (F,C)
Red maple (F)
Speckled alder (F,C)

Dwarf Shrub:

Leatherleaf (F)
Labrador tea (F)
Small cranberry (F)

Herb:

Three-seeded sedge (F)
Three-leaved false Solomon's seal (F)
Pitcher plant (F)
Marsh St. Johnswort (F)
Cinnamon fern (C)

Bryoid:

Sphagnum mosses (F)

SDS3

State Rarity Rank: S4

Mountain Holly - Alder Woodland Fen

Tall Shrub Fen

Conservation, Wildlife and Management Considerations

This community is common around the perimeter of peatlands, and in some non-peatland drainages as well. It often receives runoff from adjacent uplands, so maintenance of appropriate wetland buffers can help retain the quality of individual occurrences.

Wetland species that use this community type include common yellowthroat, wilson's warbler, lincoln's sparrow, spotted salamander, wood frog, and northern waterthrush. The black meadowhawk, a rare dragonfly of open fens and marshes, may be found in this community. Some occurrences of this community type host vernal pools, which are important breeding habitat for a variety of amphibians including wood frogs, spotted salamanders, and blue-spotted salamanders. The rusty blackbird may occur in this type in northern Maine.

Examples on Conservation Lands

Colby Marston Preserve
Great Heath Public Lands
Sunkhaze Meadows National Wildlife Refuge
Acadia National Park
Number Five Bog Public Lands
No. 26 Swamp, Bradley Wildlife Management Area
Appleton Bog Preserve

Kennebec Co.
Washington Co.
Penobscot Co.
Hancock Co.
Somerset Co.
Penobscot Co.
Knox Co.

Cross-reference to Other Classifications**New Hampshire**

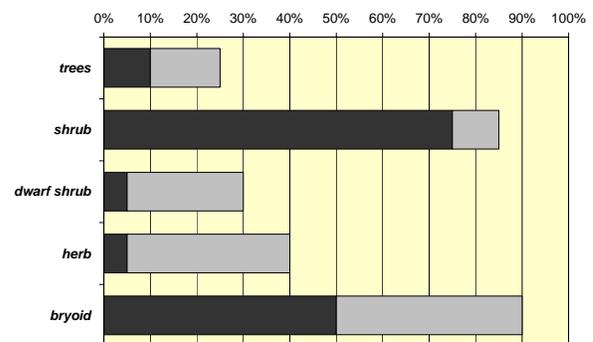
Speckled alder basin/seepage shrub thicket S3S4
Highbush blueberry-mountain holly shrub thicket/sparse woodland S3S4

National Vegetation Classification

CEGL006158 *Alnus serrulata* - *Nemopanthus mucronatus* / *Sphagnum* spp. Shrubland G5

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Damman and French 1987
Anderson and Davis 1997
Gawler 1998
Davis and Anderson 2001
Sorenson 1986

DEF1

State Rarity Rank: S1

Hudsonia River Beach

Riverwash Sand Barren

Community Description

These riverside barrens support dwarf shrub - graminoid vegetation dominated by little bluestem and other grasses, with beach heather in patches. Big bluestem is characteristic, as are pinweed and goldenrod species. Small white pine may be scattered throughout. The vegetation is patchy, with blowouts and other areas of bare sand or gravel. Some occurrences also support populations of the rare silverling. Although the individual plants shift over time as their substrates are reworked by floods, the overall composition of the community does not change appreciably over the short term (10-20 years).

Sites occur on gravelly or sandy barrens along river beaches and back-beach areas where periodic flooding and xeric soils produce a distinctive disturbance regime. Most are in the two-year floodplain. Soils are very nutrient-poor.

Diagnostics

Sites occur on sandy floodplains with tree cover less than 25%. Little bluestem is prominent in the herb layer, and beach heather is present and locally dominant.

Associated Rare Plants

Branching needle-grass
Silverling

Similar Types

Quite distinct. Little Bluestem - Blueberry Sandplain Grasslands share some species with this type, but are on flat outwash plains, not in rivercourses. Little Bluestem - Gray Birch Sand Barrens (Provisional) may share dominant species, but typically lack beach heather and are not in rivercourses.

Characteristic Species**Sapling/Shrub:**

White pine (F)
Pitch pine (F)
Red Oak (F)

Dwarf Shrub:

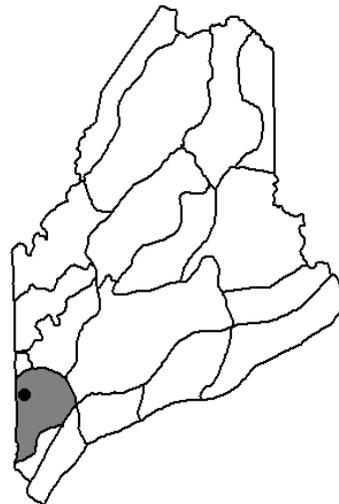
Beach heather (F,C)

Herb:

Little bluestem (F,C)
Big bluestem (F)
Pinweed (F)
Early goldenrod (F)
Rand's goldenrod (F)
Silverling (F)
Poverty oatgrass (F)
Gray goldenrod (F)
Wooly panic-grass (F)
Flat-topped goldenrod (F)
Jointweed (F)
Silverrod (F)

Bryoid:

Reindeer lichen (F)
Awned hair-cap moss (F)



Distribution: Known only from the Saco River in southern Maine and adjacent New Hampshire.

Landscape Pattern: Small Patch

DEF1

State Rarity Rank: S1

Hudsonia River Beach

Riverwash Sand Barren

Conservation, Wildlife and Management Considerations

All occurrences in Maine are on private land. Heavy canoe use on the Saco River poses a threat to some occurrences, which can be attractive picnicking or camping spots. ATV use has degraded some examples as well; although this is a disturbance-adapted community, the impacts of ATVs can be more concentrated and ecologically different from the natural flooding. Because of the dynamic riparian environment required by this community, conservation entails protection of the entire floodplain on particular segments of the river where these communities occur.

Cross-reference to Other Classifications

New Hampshire

Hudsonia-silverling river channel S1

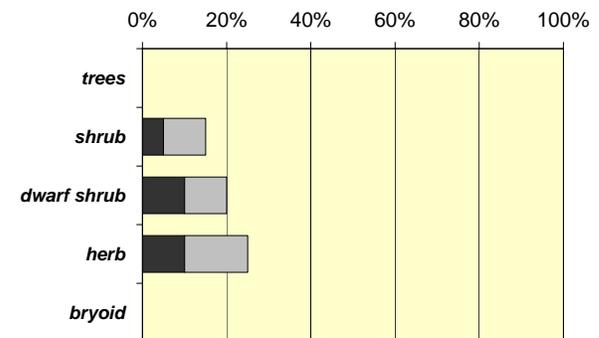
National Vegetation Classification

CEGL006232 Hudsonia tomentosa - Paronychia argyrocoma Dwarf-shrubland G1

SAF Type

N/A

Vegetation Structure (total cover by stratum)



Literature References

Engstrom 1997

DES1

State Rarity Rank: S4

Sheep Laurel Dwarf Shrub Bog

Dwarf Shrub Bog

Community Description

A dense layer of dwarf ericaceous shrubs dominates this open peatland community. Stunted and scattered black spruce and larch trees form < 25% cover. Heath shrubs carpet the hummocks and hollows of the peat substrate; sheep laurel or rhodora are typically dominant. Sedges contribute little cover (usually <15%, occasionally 20-25%); the most common is tufted cotton-grass, whose bright white tufts decorate the bog vegetation through the summer. Insectivorous plants such as pitcher plant and sundew can be quite numerous. The ground surface is covered by a spongy carpet of peat mosses. The floristic composition varies depending upon bog morphology and nutrient availability.

This type occurs within raised portions of peatlands, where ombrotrophic conditions prevail (i.e. plant growth is raised above the water table, and virtually all nutrients come from precipitation). Although standing water may not be visible, the peat is commonly saturated with water throughout most of the year. The substrate is highly acidic; average pH in the four subtypes recognized by Anderson and Davis (1997) ranged from 3.9 - 4.6.

Diagnostics

Open peatland vegetation is raised above the regional water table and dominated by sheep laurel, rhodora, and/or Labrador tea. Leatherleaf is less abundant. Tufted cotton-grass is present. Black spruce is common as scattered trees, but tree cover < 25%.

Associated Rare Plants

Swamp birch

Similar Types

Spruce - Larch Wooded Bogs have more trees (canopy > 25%). Huckleberry - Crowberry Bogs also feature sheep laurel, but have patches of dwarf huckleberry and crowberry or deer-hair sedge. These types can grade into each other within a peatland. Other dwarf shrub peatland types occur in more minerotrophic conditions and are dominated by leatherleaf, bog rosemary, and/or shrubby cinquefoil. Heath-Lichen Subalpine Slope Bogs and Heath-Crowberry Maritime Slope Bogs are vegetationally similar, but overlay rock rather than occurring as part of a peatland.

Characteristic Species

Sapling/Shrub:

Black spruce	(F,C)
Highbush blueberry	(C)
Mountain holly	(C)

Dwarf Shrub:

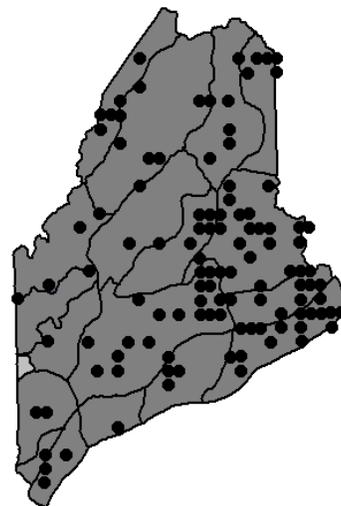
Leatherleaf	(F,C)
Sheep laurel	(F,C)
Labrador tea	(F,C)
Small cranberry	(F)
Rhodora	(F,C)
Black huckleberry	(C)
Pale laurel	(F)

Herb:

Tufted cotton-grass	(C)
Narrow-leaved cotton-grass	(C)
Pitcher plant	(F)
Black spruce	(C)

Bryoid:

<i>Sphagnum</i> mosses	(F,C)
Reindeer lichen	(F,C)



Distribution: Common throughout the state, occurring as a large uniform community or as a small component of a complex bog. Extends south and west through northern New England and New York, and northward and eastward into Canada.

Landscape Pattern: Large Patch

DES1

State Rarity Rank: S4

Sheep Laurel Dwarf Shrub Bog

Dwarf Shrub Bog

Conservation, Wildlife and Management Considerations

This community type is well-represented in Maine, and fairly stable in extent, with many examples on public lands and private conservation lands. Peat harvesting is a direct threat to a few sites. Changes to bog hydrology, through impoundment or draining, leads to vegetation changes. Slow vegetation growth rates, due to the nutrient-poor environment, result in slow recovery from physical disturbances, such as recreational trail use. If disturbance, such as foot traffic, is a necessity, traversing during frozen conditions or using boardwalks can minimize impacts.

Occurrences of this community type in northwestern Maine may include the bog fritillary butterfly, which uses small cranberry as its larval host plant. The bog elfin butterfly populates bogs with black spruce, which it uses as a larval host plant, and may be found in this community when black spruce is abundant. Several rare dragonfly species may be found in examples of this community where bog pools occur including the zigzag damer, subarctic damer, and incurvate emerald.

Examples on Conservation Lands

Crystal Bog Preserve	Aroostook Co.
Wiggins Bog, Squaw Mountain Public Lands	Piscataquis Co.
Sunkhaze Meadows National Wildlife Refuge	Penobscot Co.
The Heath, Massabesic Experimental Forest	York Co.
Bradley Wildlife Management Area	Penobscot Co.
Saco Heath Preserve	York Co.
Middle Pond State Park	Oxford/Cumberland Co.
Gassabias Stream, Duck Lake Public Lands	Hancock Co.
Second Lake, Rocky Lake Public Lands	Washington Co.
Harmon Heath, Cutler Public Lands	Washington Co.
Number Five Bog Public Lands	Somerset Co.

Cross-reference to Other Classifications**New Hampshire**

Leather-leaf-sheep laurel/black spruce dwarf heath shrub bog/very poor fen S3

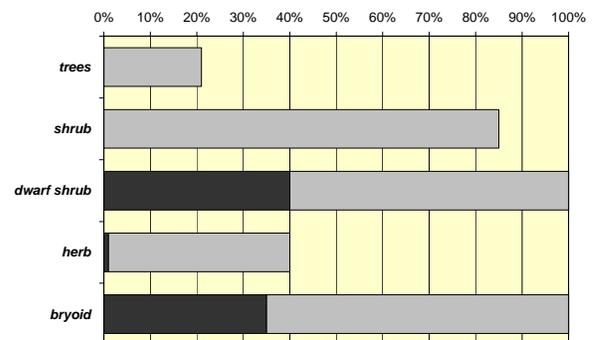
National Vegetation Classification

CEGL006225 *Kalmia angustifolia* - *Chamaedaphne calyculata* - (*Picea mariana*) / *Cladina* spp. Dwarf-shrubland G5

CEGL006514 *Rhododendron canadense* - *Chamaedaphne calyculata* - *Myrica gale* Dwarf shrubland G?

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

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

DES2

State Rarity Rank: S4

Leatherleaf Boggy Fen

Leatherleaf Bog

Community Description

This peatland vegetation type is dominated by leatherleaf and other low heath shrubs. Most of the vegetation is usually less than 1 m tall, although taller shrubs including black huckleberry, maleberry, and sweetgale may be sporadic. In the dwarf shrub / herb layer, leatherleaf is always present and usually dominant (30-60% cover at most sites). Other heath shrubs and sedges are mixed in with the leatherleaf; graminoid cover is usually less than 30%. Typical bog plants like pitcher plant, sundew and small cranberry are scattered on the *Sphagnum* substrate. Trees, if present at all, are < 15% total cover.

This type is common in bogs and acidic, nutrient-poor fens. The average pH is 4.0. It usually occurs in settings where groundwater contact is maintained, and so is technically a fen, although it is often referred to as "bog" vegetation. The substrate is peat. This type is often a major constituent of "kettlehole bog" systems.

Diagnostics

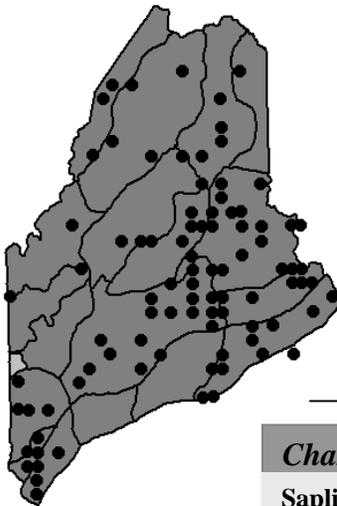
In a peatland setting, dwarf shrub cover exceeds herb cover, but sheep laurel is not dominant because most sites are hydrologically fens. Tufted cotton-grass and/or tawny cotton-grass are common sedges; white beak-rush is frequent but does not form high cover as it can in other types.

Associated Rare Plants

Inkberry
Long's bulrush
Screwstem
Swamp birch
Wiegand's sedge

Similar Types

Intermediate in composition and nutrient regime between a Sheep Laurel Dwarf Shrub Bog (which has sheep laurel more abundant) and Sedge-Leatherleaf Fen Lawn or other graminoid-dominated fen community types (which have graminoids more dominant).



Distribution: Statewide; extends in all directions from Maine.

Landscape Pattern: Small Patch

Characteristic Species**Sapling/Shrub:**

Black huckleberry (C)
Maleberry (C)

Dwarf Shrub:

Leatherleaf (F,C)
Sheep laurel (C)
Bog rosemary (F,C)
Inkberry (C)
Sweetgale (C)
Small cranberry (F)

Herb:

Few-flowered sedge (C)
Beaked sedge (C)
Bog aster (C)
Tufted cotton-grass (C)
Pitcher plant (C)
Tawny cotton-grass (F)
Three-leaved false Solomon's seal (C)
Virginia chain fern (C)
White beak-rush (C)

Bryoid:

Sphagnum mosses (F,C)

DES2

State Rarity Rank: S4

Leatherleaf Boggy Fen

Leatherleaf Bog

Conservation, Wildlife and Management Considerations

This type is well-represented in Maine, and fairly stable in extent, with several examples on public lands and private conservation lands. Some sites in kettlehole settings have been degraded by adjacent gravel mining. Changes to bog hydrology through impoundment or draining could lead to vegetation changes. Slow vegetation growth rates, due to the nutrient-poor environment, mean slow recovery from physical disturbances, such as recreational trail use. If disturbance, such as foot traffic, is a necessity, traversing during frozen conditions or using boardwalks can minimize impacts.

Two rare dragonflies, the ringed boghaunter and the ebony boghaunter, are found in this community, especially in very wet locations with abundant inundated sphagnum (often suspended in the water column). The ebony boghaunter is found statewide, but the ringed boghaunter is restricted to the southern part of the state in York and southern Oxford Counties. Occurrences of this community type in northwestern Maine may include the bog fritillary butterfly, which uses small cranberry as its larval host plant. Occurrences in northern Maine may be inhabited by the subarctic bluet, a rare damselfly that inhabits open marshes and fens and reaches the southern edge of its range in northern Maine. Other rare dragonfly species that may be found where bog pools occur include the zigzag darner, subarctic darner, and incurvate emerald.

Examples on Conservation Lands

Salmon Brook Lake Bog Public Lands	Aroostook Co.
Brownfield Bog Wildlife Management Area	Oxford Co.
Middle Pond State Park	Oxford/Cumberland Co.
Sebago Lake State Park	Cumberland Co.
Acadia National Park	Hancock Co.
Baxter State Park	Piscataquis Co.
Great Heath Public Lands	Washington Co.
Sunkhaze Meadows National Wildlife Refuge	Penobscot Co.
Number Five Bog Public Lands	Somerset Co.
Tarwater Pond, Massabesic Experimental Forest	York Co.

Cross-reference to Other Classifications**New Hampshire**

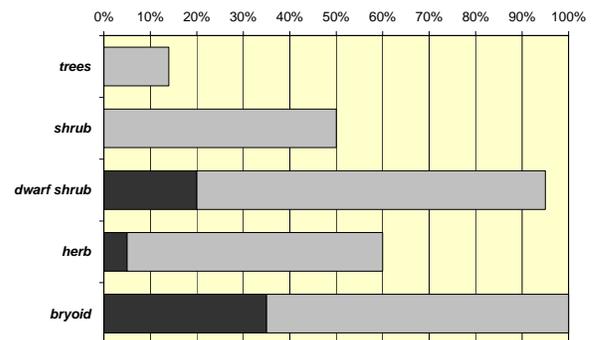
Sphagnum cuspidatum/large cranberry moss lawn	S3
Leather-leaf-sheep laurel/Sphagnum capillifolium dwarf heath shrub bogs	S1S3
Water willow/Sphagnum recurvum-S. flexuosum border thicket	S3

National Vegetation Classification

CEGL006513	Chamaedaphne calyculata / Eriophorum vaginatum / Sphagnum rubellum Dwarf-shrubland [Provisional]	G?
CEGL006008	Chamaedaphne calyculata - (Gaylussacia dumosa) - Decodon verticillatus / Woodwardia virginica Dwarf-shrubland	G5

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

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

DES3

State Rarity Rank: S3

Huckleberry - Crowberry Bog

Maritime Huckleberry Bog

Community Description

This peatland type is characterized by low (usually < 60 cm) heath shrubs, such as sheep laurel and leatherleaf, forming the dominant layer. Dwarf huckleberry is typically prominent. Black crowberry and/or deer-hair sedge are also present, though not necessarily abundant. In far downeast examples, black crowberry may entirely replace dwarf huckleberry. Small islands of stunted black spruce may be scattered among the shrubs. Pitcher plants, sundews, bog goldenrod, and other typical bog herbs are mixed in with the shrubs; herb cover is usually < 40%. Deer-hair sedge may be locally dominant. A dense layer of *Sphagnum* mosses underlies the plants.

These are coastal or near-coastal peatlands, either in raised bogs or in weakly minerotrophic areas transitional to true bogs. They are saturated during the growing season and typically highly acidic (pH < 5.0, occasionally slightly higher).

Diagnostics

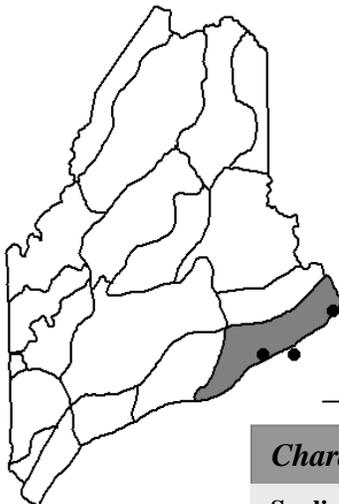
Dwarf shrub peatland vegetation is characterized by dwarf huckleberry and/or black crowberry forming > 20% cover. Sheep laurel and leatherleaf are usually present, but at lower cover than in other dwarf-shrub peatland community types.

Associated Rare Plants

Northern comandra

Similar Types

Sheep Laurel Dwarf Shrub Bog and Leatherleaf Boggy Fen communities are similarly found in true bogs and dominated by heath shrubs. They may be contiguous with this type in some bogs. A few of these sites in south-coastal Maine have dwarf huckleberry even though they are not Huckleberry - Crowberry Bogs. The dominance of dwarf huckleberry with either crowberry or deer-hair sedge distinguishes Huckleberry-Crowberry Bogs from other bog vegetation types.



Distribution: Most typical of downeast Maine from Penobscot Bay eastward. Always within 15 miles of the shore. (Laurentian Mixed Forest Province.) Extends east into the Canadian Maritimes.

Landscape Pattern: Small Patch

Characteristic Species**Sapling/Shrub:**

Black spruce (F)

Dwarf Shrub:

Leatherleaf (F,C)

Black crowberry (F,C)

Dwarf huckleberry (F,C)

Sheep laurel (F,C)

Pale laurel (F)

Labrador tea (F,C)

Small cranberry (F)

Herb:

Pitcher plant (F)

Deer-hair sedge (C)

Round-leaved sundew (F)

Bog goldenrod (F)

Bryoid:

Reindeer lichen (F,C)

Sphagnum fuscum (F,C)*Cladonia* lichen (F,C)

DES3

State Rarity Rank: S3

Huckleberry - Crowberry Bog

Maritime Huckleberry Bog

Conservation, Wildlife and Management Considerations

This community type is not widely distributed, but has been subject to few threats to date. Slow vegetation growth rates, due to the nutrient-poor conditions, mean slow recovery from physical disturbances, such as recreational trail use. If disturbance, such as foot traffic, is a necessity, traversing during frozen conditions or using boardwalks can minimize impacts. Peat harvesting could threaten some sites. Changes to bog hydrology, through impoundment or draining, could lead to vegetation changes. Several occurrences are on public lands or private conservation lands.

The rare crowberry blue butterfly is restricted to coastal heaths in east-coastal Maine. It uses black crowberry as a larval host plant. Several rare dragonfly species may be found in examples of this community where bog pools occur including the zigzag darner, subarctic darner, and incurvate emerald.

Examples on Conservation Lands

Cutler Public Lands	Washington Co.
Larrabee Heath Preserve	Washington Co.
Quoddy Head State Park	Washington Co.
Great Wass Island Preserve	Washington Co.
Acadia National Park	Hancock Co.

Cross-reference to Other Classifications

New Hampshire

N/A

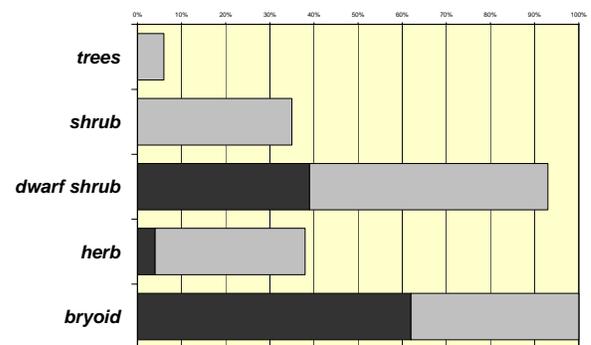
National Vegetation Classification

CEGL006248 Empetrum nigrum - Gaylussacia dumosa - G3G5
Rubus chamaemorus / Sphagnum spp.
Dwarf-shrubland

SAF Type

N/A

Vegetation Structure (total cover by stratum)



Literature References

Anderson and Davis 1997
Gawler 1998
Fernald and Wiegand 1910
Davis and Anderson 2001

DES4

State Rarity Rank: S1

Heath - Lichen Subalpine Slope Bog

Subalpine Hanging Bog

Community Description

A dwarf shrub bog tilted on its side, this community consists of typical ericaceous bog shrubs growing on a dense *Sphagnum* moss carpet over rocky slopes. Typical species include Labrador tea, sheep laurel, and rhodora. Stunted trees, such as northern white cedar, heart-leaved paper birch, or black spruce, may be scattered among the shrubs, but form < 25% cover overall. Herbs are sparse, but may include boreal species such as northern comandra.

Known sites are documented from nearly vertical talus slides in a subalpine cirque at elevations >2000', but this type may occur in other subalpine settings.

Diagnostics

Heath shrubs (sheep laurel, Labrador tea, leatherleaf) are dominant on a *Sphagnum* substrate, but not a peatland: vegetation occurs as a thin layer over bedrock, talus, or scree in a subalpine setting.

Associated Rare Plants

Northern comandra
Northern firmoss

Similar Types

Sheep Laurel Dwarf Shrub Bog vegetation is compositionally similar, but occurs in a peatland setting. Heath - Crowberry Maritime Slope Bogs are floristically almost identical but occur in a different setting. (Comparative study of these two types would help illuminate any differences beyond their geographic setting.) Cotton-grass - Heath Alpine Bogs occur in basins rather than on slopes and typically have higher herbaceous cover. Labrador Tea Talus Dwarf-shrublands have less vegetation cover and occur at lower elevations; a careful comparison of these types cannot be made with the available data.

Characteristic Species**Sapling/Shrub:**

Larch	(F)
Northern white cedar	(F)
Heart-leaved paper birch	(F)
Mountain alder	(F)

Dwarf Shrub:

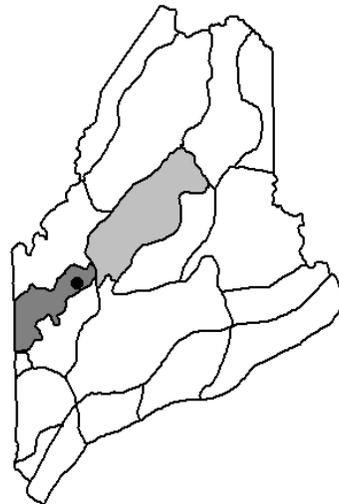
Sheep laurel	(F,C)
Labrador tea	(F,C)
Rhodora	(F)
Alpine bilberry	(F)
Squashberry	(F)
Leatherleaf	(F)

Herb:

Northern comandra	(F)
Bunchberry	(F)
Goldthread	(F)

Bryoid:

<i>Sphagnum</i> mosses	(F,C)
Reindeer lichen	(F,C)



Distribution: Montane western Maine, extending west into New Hampshire and possibly Vermont and upstate New York (New England - Adirondack Province).

Landscape Pattern: Small Patch

DES4

State Rarity Rank: S1

Heath - Lichen Subalpine Slope Bog

Subalpine Hanging Bog

Conservation, Wildlife and Management Considerations

The one documented site is off-trail. Access is difficult to dangerous, and foot traffic could damage the vegetation, which grows densely enough that one cannot avoid it by picking one's way over rocks, as can be done with some other alpine/subalpine vegetation types. Other subalpine settings where this might occur would have similar access constraints. Because alpine vegetation grows slowly under harsh conditions, recovery from damage can take a long time.

Examples on Conservation Lands

Crocker Mountain, Appalachian Trail Franklin Co.

Cross-reference to Other Classifications**New Hampshire**

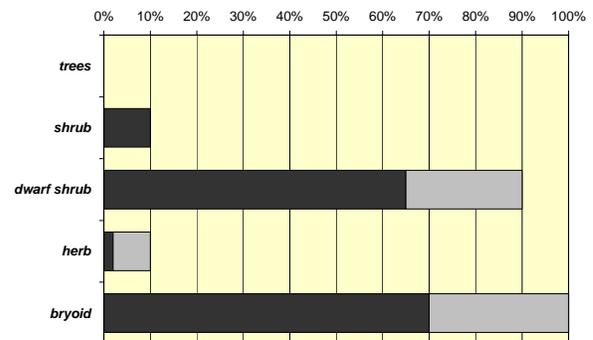
Subalpine wooded heath snowbank, slope bog, and bog margin S1S2

National Vegetation Classification

CEGL006268 Kalmia angustifolia - Chamaedaphne calyculata / Rubus chamaemorus /Cladina ssp. Dwarf -shrubland

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Doyle et al. 1987

Fahey 1976

Sperduto and Cogbill 1999

DES5

State Rarity Rank: S2

Heath - Crowberry Maritime Slope Bog

Maritime Slope Bog

Community Description

A well-developed layer of dwarf shrubs is dominated by ericads and black crowberry in a dense carpet. There may be scattered small conifers, and typically at least a small amount of common juniper. Baked apple-berry is diagnostic and is restricted to this type and other coastal or subalpine peatlands. Herbaceous "bog" species (deer-hair sedge, pitcher plant, etc.) are also common. The bryoid layer is extensive (>70% cover, usually close to 100%) and is dominated by peat mosses and small islands of reindeer-lichens.

Sometimes called "blanket bogs," these occur on bedrock or other rocky substrate. Soil is a thin organic layer over rock, and slopes are usually 5-10%. Sites occur on cool microsites near the coast.

Diagnostics

Tree cover is less than 25% and heath shrubs are dominant. Although the ground layer is composed of *Sphagnum* mosses, and peat forms only a thin layer over bedrock or mineral substrate; this is not a true peatland type. Sites are restricted to a narrow band near the coast.

Similar Types

Sheep Laurel Dwarf Shrub Bogs and Huckleberry - Crowberry Bogs share species and structure with Heath - Crowberry Maritime Slope Bogs; however, those are found in true peatlands (basins with deep accumulations of saturated peat), not on thin peat over rock. Heath - Lichen Subalpine Slope Bogs are compositionally similar, but occur in the mountains.

Characteristic Species**Sapling/Shrub:**

Common juniper	(F)
Mountain holly	(F)
Black chokeberry	(F)
Wild-raisin	(F)
Jack pine	(C)

Dwarf Shrub:

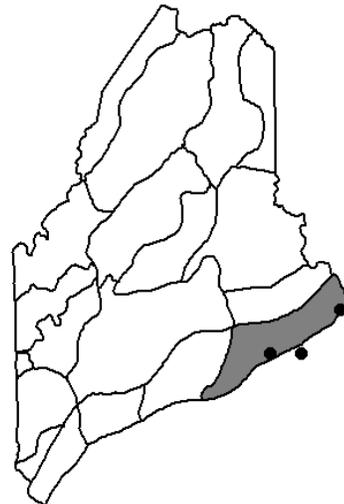
Black crowberry	(F,C)
Black huckleberry	(F)
Sheep laurel	(F,C)
Rhodora	(F)
Labrador tea	(F)
Baked apple-berry	(F)
Mountain cranberry	(F)

Herb:

Round-leaved sundew	(F)
White beak-rush	(F)
Pitcher plant	(F)
Bog goldenrod	(F)
Starflower	(F)
Deer-hair sedge	(F)

Bryoid:

Grey reindeer-lichen	(F)
Woodland reindeer-lichen	(F)
Bog hair-cap moss	(F)
<i>Sphagnum</i> mosses	(F,C)



Distribution: Downeast coastal Maine, extending eastward into the Canadian maritimes (Laurentian Mixed Forest Province).

Landscape Pattern: Small Patch

DES5

State Rarity Rank: S2

Heath - Crowberry Maritime Slope Bog

Maritime Slope Bog

Conservation, Wildlife and Management Considerations

This is an extremely restricted community type, but most documented occurrences are on public lands or private conservation lands. Recreation is the primary use that threatens its integrity; careful planning of trails and ensuring that users stay on trails can help minimize impacts.

The rare crowberry blue butterfly is restricted to coastal heaths in east-coastal Maine. It uses black crowberry as a larval host plant.

Examples on Conservation Lands

Petit Manan Point, Petit Manan National Wildlife Refuge
Great Wass Island Preserve

Washington Co.
Washington Co.

Cross-reference to Other Classifications**New Hampshire**

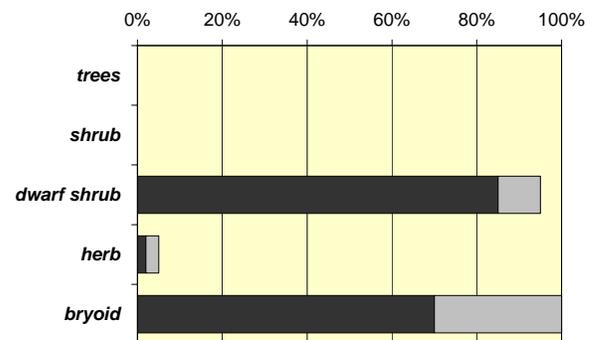
N/A

National Vegetation Classification

CEGL006248 Empetrum nigrum - Gaylussacia dumosa - G3G5
Rubus chamaemorus / Sphagnum spp.
Dwarf-shrubland

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Damman 1977
Fernald and Wiegand 1910
Widoff 1988

HFF1**Three-way Sedge - Goldenrod Outwash Plain Pondshore**

State Rarity Rank: S1

Outwash Plain Pondshore

Community Description

This community consists of concentric zones of different herbs around a central pond. A band of shrubs (highbush blueberry, maleberry, buttonbush, leatherleaf) is typical at the upland/pondshore edge. Moving pondward, the next zone is dominated by narrow-leaved goldenrod and three-way sedge, with patches of flat-sedge and brown-fruited rush; in a narrow band at the top of this zone, golden pert and meadow beauty are characteristic and may form dense patches. The next zone, exposed less frequently and for a shorter time, is dominated by pipewort and spikerush species. There is no well-developed bryoid layer, but there may be pockets of *Sphagnum* mosses in the perimeter zone adjacent to the upland.

This community forms a band around the perimeter of shallow, sandy-bottomed ponds in outwash plains. It occurs on shores that are inundated for part of the growing season and exposed for part of the growing season, although actual exposure varies from year to year. The substrate is sandy, occasionally mucky, and usually saturated to the surface or nearly so. Slope is <10%. Most sites are on the coastal plain at less than 500' elevation.

Diagnostics

Three-way sedge and usually narrow-leaved goldenrod are dominant in a sandy pondshore setting, with evidence of water level changes through the season.

Similar Types

Mixed Graminoid - Shrub Marshes can also occur on temporarily flooded mineral soils and can share some dominants such as three-way sedge, but lack the concentric zonation of outwash plain pondshores and typically intermingle shrubs and herbs rather than segregating them into zones. Lakeshore Beaches (Provisional) may have some similar species but lack zonation; however, that type is as yet not well defined.

Associated Rare Plants

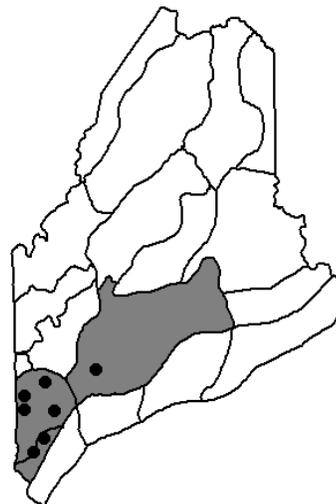
Dwarf bulrush
Englemann's spikerush
Fall fimbry
Huron tansy
Long-tuberclad spikerush
Narrow-leaved goldenrod

Characteristic Species**Herb:**

Canada rush	(F)
Fly-away grass	(F)
Yellow loosestrife	(F)
Toothed flat-sedge	(F,C)
Three-way sedge	(F)
Pipewort	(F,C)
Narrow-leaved goldenrod	(F,C)
Golden pert	(F,C)
Brown-fruited rush	(F,C)
Bur-reed	(C)
Bluejoint	(C)
Robbin's spikerush	(C)

Bryoid:

<i>Sphagnum</i> mosses	(F)
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Distribution: Extreme southwestern Maine (Eastern Broadleaf Forest Province), extending southward along the coast to Massachusetts; disjunct in Nova Scotia and Ontario.

Landscape Pattern: Small Patch

HFF1**Three-way Sedge - Goldenrod Outwash Plain Pondshore**

State Rarity Rank: S1

Outwash Plain Pondshore

Conservation, Wildlife and Management Considerations

This extremely rare community is under pressure from adjacent land uses and recreational impacts. The periphery of several sites has been developed or converted to other uses. Two known sites are in public or private conservation ownership. The major recreational impact is off-road vehicle use: at low water, the broad shorelines invite off-road vehicle use. This has seriously degraded some sites. Hydrologic integrity is also a concern: as water use increases, aquifer drawdowns could affect these water-dependent systems and lead to vegetational changes.

These outwash plain pondshores provide excellent foraging habitat for the ribbon snake. The pondshores also provide habitat for rare damselflies including the big bluet, pine barrens bluet, and New England bluet, whose ranges reach their northern limit in southern and central Maine. Other more wide-ranging rare odonates are likely to be found in this community. At sites very close to the coast, this community may also provide important feeding habitat for rare wading birds such as the little blue heron.

Examples on Conservation Lands

Waterboro Barrens Preserve Oxford Co.
 Killick Pond Wildlife Management Area York Co.

Cross-reference to Other Classifications**New Hampshire**

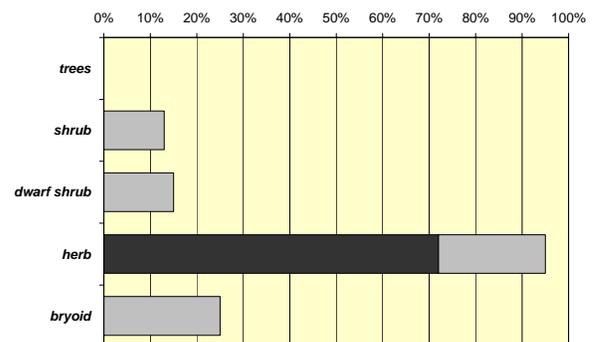
Meadow beauty-slender spike-rush spurned panic-grass-one-flowered muhly sand plain marsh S1
 Three-way sedge-Small's spike-rush-manna-grass mud flat marsh S2S3
 Blunt and olive-brown spike-rush-floating-leaved aquatic mud flat S1

National Vegetation Classification

CEGL006261 Eleocharis (obtusata, flavescens) - Eriocaulon aquaticum Herbaceous Vegetation G3G5
 CEGL006345 Juncus militaris Herbaceous Vegetation G?
 CEGL006243 Calamagrostis canadensis - Dichanthelium meridionale Herbaceous Vegetation G?
 CEGL006035 Lysimachia terrestris - Dulichium arundinaceum Herbaceous Vegetation G2G3

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Sperduto 1994
 Keddy 1983
 Keddy and Wisheu 1989

HFF2

State Rarity Rank: S2

Circumneutral Riverside Seep

Riverside Seep

Community Description

This broad type can include graminoid-dominated, graminoid-forb, or shrubby vegetation, often with all three types adjacent. Shrubs include sweetgale, willows, and alders, either low or tall depending on how recently they have been scoured by ice. An array of forbs and graminoids grows among the shrubs or downslope on the shore. Forbs and graminoids are best developed in areas with only sparse or low shrubs. They include fen indicators such as sticky false asphodel and grass-of-parnassus, various sedges and grasses, and forbs both native (various asters, Canada goldenrod, rose twisted-stalk) and introduced (clovers, ox-eye daisy, cow vetch). The bryoid layer is typically extensive, and features numerous bryophytes other than *Sphagnum*.

These riparian seeps are below the annual high water mark on a substrate of unconsolidated coarse-textured soil, constantly saturated by groundwater. The substrate varies from fairly steep gravelly banks with locally extensive mosses to lower-shore flats with stabilized cobble. It is restricted to larger rivers where spring floods and ice maintain a semi-open shore, instead of dense shrubs to the water's edge. Continued exposure of glacial tills produces comparatively high pH.

Diagnostics

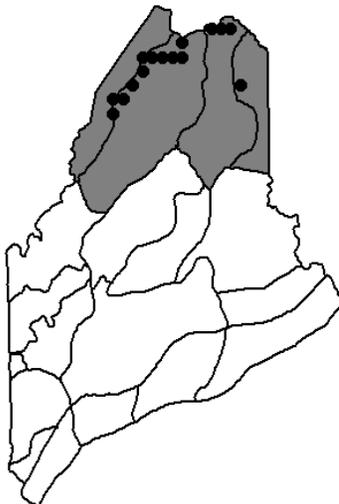
Intermingled short graminoids, forbs, and shrubs grow on an open rivershore. The substrate is usually unconsolidated sandy to gravelly soil, saturated by groundwater seepage. Indicator species include grass-of-parnassus, hidden-scale sedge, and sweetgale.

Similar Types

Shrubby Cinquefoil - Sedge Circumneutral Fens contain many of the same species but occur in a peatland setting, not on a rivershore. Bluejoint Meadows, which may be adjacent to these seeps, are more homogeneous and dominated by tall graminoids, particularly bluejoint grass. Sand Cherry - Tufted Hairgrass River Beach vegetation occurs on somewhat drier substrates and includes few if any sedges.

Associated Rare Plants

Auricled twayblade
Black sedge
Furbish's lousewort
Garber's sedge
Glaucous rattlesnake-root
Grass-of-parnassus
Mistassini primrose
Mountain timothy
Northern gentian
Northern painted-cup



Distribution: Extreme northern Maine, west to other parts of northern New England (New England - Adirondack and Laurentian Mixed Forest Provinces). Many Canadian affinities, but distribution there unknown.

Landscape Pattern: Small Patch

Characteristic Species**Sapling/Shrub:**

Shining willow (F)
Meadowsweet (F)
Speckled alder (F,C)
Mountain alder (F,C)
Red-tipped willow (F)
Bush-honeysuckle (C)
Beaked hazelnut (C)
Mountain maple (C)

Dwarf Shrub:

Sweetgale (F,C)
Shrubby cinquefoil (C)

Herb:

Grass-of-parnassus (F)
Purple-stemmed aster (F)
Flat-topped white aster (F)
Bluejoint (F)
Common horsetail (F,C)
Wild strawberry (F,C)
Dwarf raspberry (F)
Sticky false asphodel (F)
Field mint (F)
Fowl mannagrass (F)
Tall meadow-rue (F)
Swamp buttercup (F)

HFF2

State Rarity Rank: S2

Circumneutral Riverside Seep

Riverside Seep

Conservation, Wildlife and Management Considerations

The structure and richness of this community is linked to naturally fluctuating water levels and occasional ice scour. Maintenance of an intact forest buffer is important, both for light conditions and for ensuring the flow of seepage waters. Along the upper portions of the St. John River, many seeps are protected; but elsewhere conservation depends on the individual landowner. Some sites have been degraded by clearing the adjacent overstory. Foot traffic has been light and poses no threat, but where off-road vehicles use the shore, the effects can be devastating.

Seeps with large populations of shrubby cinquefoil may provide habitat for the rare Clayton's copper butterfly, whose larvae feed on this plant. However, limited searches in this community type have yet to document this species.

Examples on Conservation Lands

St. John River Preserve Aroostook Co.
Allagash Public Lands Aroostook Co.

Cross-reference to Other Classifications

New Hampshire

Circumneutral/calcareous riverbank seep S1
Calcareous sedge/moss fen S2

National Vegetation Classification

CEGL006142 Triantha glutinosa - Carex garberi G3?
Herbaceous Vegetation

SAF Type

N/A

Vegetation Structure (total cover by stratum)



Literature References

Fernald and Wiegand 1910
Gawler 1988
St. John 1929

HFF3

State Rarity Rank: S2

Sand Cherry - Tufted Hairgrass River Beach

Laurentian River Beach

Community Description

These exposed river beaches feature sparse to extensive cover of low shrubs, forbs, and grasses, with species of northern affinity characteristic. Dominant plants include tufted hairgrass, roses, and mats of sand cherry. Poison-ivy may be locally abundant. Canadian tick-trefoil, wild chive, New York aster, and freshwater cordgrass are characteristic herbs. Several rare plants such as Huron tansy, alpine sweet-broom or alpine milk-vetch may be locally common. Bryoids are virtually absent.

These are rivershores where coarse deposits remain after flooding and ice-scour. The substrate is usually cobbly and often dry at the surface. Sites flood in the spring and may be partially underwater for brief periods in the summer. The slope is usually very slight and the sites are exposed to full sun.

Diagnostics

Patchy herbs and low shrubs, with tufted hairgrass prominent, occur on a rivershore below the high-water mark and adjacent trees. The cover of grasses and forbs exceeds that of sweetgale and sedges, and the substrate is unconsolidated gravelly to cobbly glaciofluvial deposits.

Similar Types

Related to and sometimes contiguous with other rivershore types. Bluejoint Meadows are dominated by bluejoint and occur on finer substrates. Circumneutral Riverside Seeps have more sweetgale and sedges, seepage waters at the surface, and indicators (e.g. grass-of-parnassus and yellow sedge). Dogwood - Willow Shoreline Thickets are dominated by shrubs over 1 m tall. Hudsonia River Beach features beach heather, little bluestem, and other temperate species compared to the northern plants typical of this type.

Associated Rare Plants

Alpine milk-vetch
Alpine sweet-broom
Anticosti aster
Canada burnet
Glaucous rattlesnake-root
Huron tansy
Northern gentian
Purple false-oats
Soft-leaf muhly
St. John oxytrope

Characteristic Species**Sapling/Shrub:**

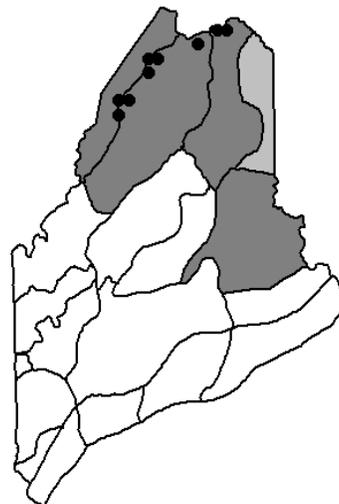
Western poison-ivy (F)
Meadowsweet (F)
Smooth rose (F)
Red osier dogwood (F)
Willow (F)

Dwarf Shrub:

Sand cherry (F,C)

Herb:

Wild chive (F)
Hemp dogbane (F)
Silverweed (F)
New York aster (F)
Bluebell (F)
Canadian tick-trefoil (F)
Tufted hairgrass (F,C)
Northern blue flag (F)
Reed canarygrass (F)
Bladder campion (F)
Early goldenrod (F)
Freshwater cordgrass (F)



Distribution: Currently known only from the St. John River, but may be elsewhere; poorly documented. Presumably extends to eastern Canadian rivers. (New England - Adirondack and Laurentian Mixed Forest Provinces.)

Landscape Pattern: Small Patch

HFF3

State Rarity Rank: S2

Sand Cherry - Tufted Hairgrass River Beach

Laurentian River Beach

Conservation, Wildlife and Management Considerations

This community is tightly linked to naturally fluctuating water levels and occasional ice scour. Most known sites are privately owned and conservation depends on the landowner. Foot traffic has been light and poses no threat, but if off-road vehicles are used, the shore the vegetation could be easily degraded. Exotic agricultural species are common at some sites. At least one site has the invasive Japanese knotweed.

Examples on Conservation Lands

St. John River Preserve Aroostook Co.

Cross-reference to Other Classifications**New Hampshire**

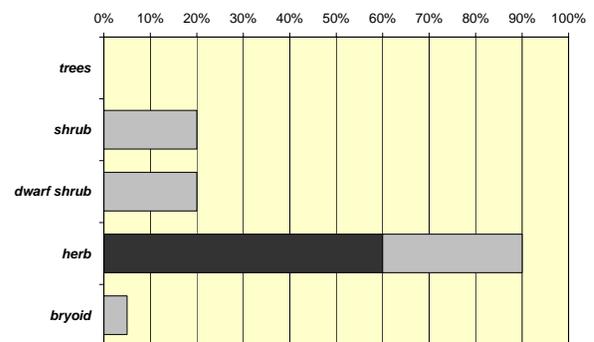
Dwarf cherry river channel	S2
Undifferentiated gravel-cobble river channel	S3
Sparsely vegetated boulder-cobble river channel	S3

National Vegetation Classification

N/A

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Gawler 1988

HFP1

State Rarity Rank: S5

Pickerelweed - Macrophyte Aquatic Bed

Pickerelweed Marsh

Community Description

This shallow-water aquatic type is dominated by a mixture of emergent plants, floating plants, and submerged plants suspended in the water column. Pickerelweed, yellow water-lily, and bladderworts are almost always present, and one or more is typically dominant. A variety of pondweed species, bur-reed species, and other aquatics may be present. Total cover ranges from 30-100%, and is typically >50%.

This community occupies quiet waters along the shores of lakes, ponds, and streams. The substrate is usually mucky, and the water is generally < 0.7 m deep. Waters are acidic to circumneutral.

Diagnostics

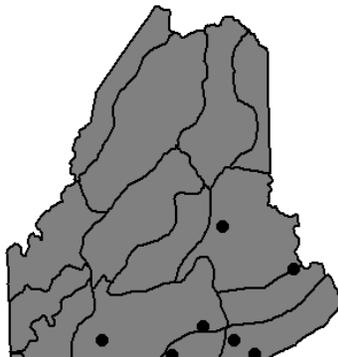
This type is characterized by emergent aquatic vegetation with pickerelweed and/or yellow water-lily prominent. Water bulrush and Oakes' pondweed are also indicator species.

Similar Types

Water-lily - Macrophyte Aquatic Bed vegetation shares many species but is dominated by floating or submerged plants, not emergent plants. Both types have water-lily species, but they are less abundant in the pickerelweed type than in the water-lily type. Pipewort - Water Lobelia Aquatic Bed has more of its vegetation on the bottom surface, and fewer floating-leaved plants. Cattail Marshes may be adjacent but feature cattails and shrubs rather than plants that die back below the surface at the end of the growing season.

Associated Rare Plants

Common mare's-tail
Prickly hornwort
Thread-like naiad



Distribution: Statewide (undersampled), extending into lower New England and Canada.

Landscape Pattern: Small Patch

Characteristic Species**Herb:**

Water bulrush	(C)
Pipewort	(F)
Yellow water-lily	(F,C)
Pickerelweed	(F,C)
Spotted bladderwort	(C)
White water-lily	(C)

HFP1

State Rarity Rank: S5

Pickerelweed - Macrophyte Aquatic Bed

Pickerelweed Marsh

Conservation, Wildlife and Management Considerations

This aquatic vegetation type is widespread and abundant in Maine. It can be found in the quieter portions of streams and rivers as well as in lakes and ponds. It provides habitat for a variety of water-dependent animals. Many examples occur on public lands and private conservation lands; however, this common type is often not documented. The major threats to this community are water quality degradation from excess nutrients in runoff, and the spread of invasive aquatic plants such as Eurasian water-milfoil and variable water-milfoil.

In southern and central parts of the state, this community type hosts a number of common reptiles such as northern water snakes, common snapping turtles, and Eastern painted turtles. Bullfrogs and green frogs inhabit this community statewide and mink frogs may be found in occurrences from central Maine northward. Northern leopard frogs may utilize these wetlands as breeding grounds. These productive wetlands provide foraging habitat for a number of waterfowl including rare species such as the common moorhen and American coot. Dragonfly and damselfly diversity is typically high in these wetlands and may include rare species such as the turquoise bluet, little bluet, lilypad forktail, and spatterdock damner.

Examples on Conservation Lands

Merrymeeting Bay Wildlife Management Area	Sagadahoc Co.
Sebago Lake State Park	Cumberland Co.
Range Ponds State Park	Androscoggin Co.

Cross-reference to Other Classifications**New Hampshire**

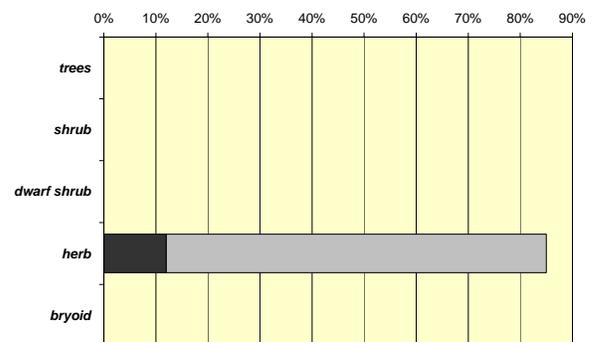
Aerenchymatous herbaceous river channel	S3S4
Deep emergent marsh/aquatic bed	S4S5

National Vegetation Classification

CEGL004291	Pontederia cordata - Peltandra virginica Semipermanently Flooded Herbaceous Vegetation [Placeholder]	G?
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SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Cameron 2000
Sperduto 1994

HGF1

State Rarity Rank: S3

Bluejoint Meadow

Tall Grass Meadow

Community Description

These dense swards of tall grassy vegetation are dominated by bluejoint, with smaller amounts of shrubs (alder, meadowsweet, willow) mixed in. Depending on the disturbance history, the shrubs may be low and not easily visible among the grasses, or taller, in which case the vegetation appears as mixed shrub-graminoid. Other graminoids, such as tussock sedge and other sedge species, are occasional. Flat-topped white aster and spotted joe-pye weed are common tall forbs. Freshwater cordgrass is often present in small amounts. Bryophytes are very minor (0-10% cover), and lichens are absent. Two principal variants occur: those in alluvial soils of larger rivers and those of more peaty soils along small streams.

Sites occupy mineral soils in temporarily flooded rivershores or streamsides that are flat to slightly sloped. At some sites this type extends onto uplands as grassy barrens. Soils are sandy to silty along rivers, with higher clay or organic content in other settings. The acidic to neutral soils (pH 5.0-7.0) are saturated or moist not far from the surface. Most sites are disturbance-maintained, either by ice-scour flooding (larger rivers), or by fire (some downeast grasslands).

Diagnostics

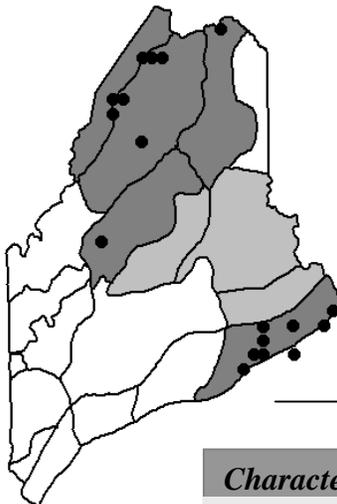
Bluejoint grass exceed 50% cover and shrubs are less than 25% cover. Sites are flooded for only part of the season. Whether the two variants should be separated as distinct types needs additional study.

Associated Rare Plants

Blueleaf willow

Similar Types

Tussock Sedge Meadows share many species, but have less bluejoint grass (usually <30% cover) and more tussock sedge (>30%). Mixed Graminoid-Shrub Marshes also can be floristically similar, but are not strongly dominated by bluejoint grass (usually <20%, rarely up to 50%). Other open non-peat wetland types are shrub-dominated, not herb-dominated.



Distribution: Larger rivers of far northern Maine and coastal grasslands of downeast Maine (New England - Adirondack and Laurentian Mixed Forest Provinces). Distribution outside of Maine is not clear.

Landscape Pattern: Small patch; some downeast grasslands approaching Large Patch

Characteristic Species**Sapling/Shrub:**

Speckled alder (F)
Meadowsweet (F)

Herb:

Tall meadow-rue (F)
Flat-topped white aster (F)
Bluejoint (F,C)
Tussock sedge (C)

Bryoid:

Sphagnum mosses (F)

HGF1

State Rarity Rank: S3

Bluejoint Meadow

Tall Grass Meadow

Conservation, Wildlife and Management Considerations

In the absence of disturbance (flooding or fire, the latter often human-initiated), this community develops into dense shrublands dominated by alder. Maintaining both the natural disturbance regime and the hydrologic integrity of these systems is key to their conservation. Several high-quality examples occur on public lands and private conservation lands.

Northern leopard frogs inhabit large grassy meadows associated with rivers in mid-summer where they forage. Northern harriers, Lincoln's sparrows, and short-eared owls may also nest and forage in these meadows. Northern Maine sites may provide grassy nesting sites for very rare breeding waterfowl such as northern pintail, northern shoveler, and gadwall.

Examples on Conservation Lands

Petit Manan Point, Petit Manan National Wildlife Refuge	Washington Co.
Allagash Public Lands	Aroostook Co.
Cutler Public Lands	Washington Co.
St. John River Preserve	Aroostook Co.
Narraguagus Wildlife Management Area	Washington Co.

Cross-reference to Other Classifications

New Hampshire

Undifferentiated mesic-wet graminoid-forb meadow/barren	S3
Reed bent-grass-goldenrod-Clematis meadow/shrubland	S3S4
Tall graminoid emergent marshes	S4

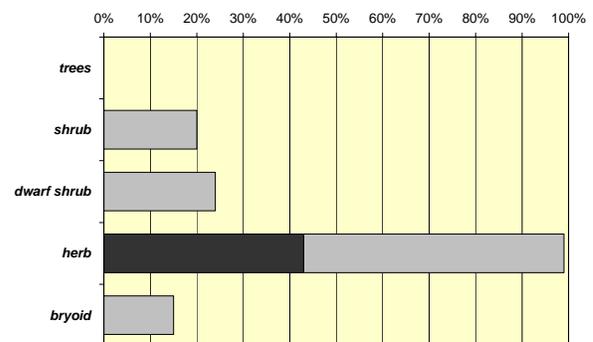
National Vegetation Classification

CEGL005174	Calamagrostis canadensis - Phalaris arundinacea Herbaceous Vegetation	G4G5
In development	Calamagrostis canadensis - Doellingeria umbellata - Spartina pectinata Herbaceous Vegetation	

SAF Type

N/A

Vegetation Structure (total cover by stratum)



Literature References

- Gawler 1988
- Dieffenbacher-Krall 1994
- Famous and Spencer 1992

HGF2

State Rarity Rank: S5

Mixed Graminoid - Shrub Marsh

Grassy Shrub Marsh

Community Description

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

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

Diagnostics

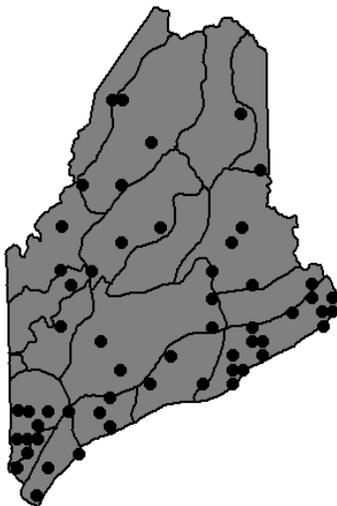
Herb and shrub wetland species are mixed (herbs 25-95%, shrubs 0-70% cover), without a dominance of tussock sedge, bluejoint grass, or alder. Sites occur on mineral soil (may have a thin organic layer). Sweetgale and leatherleaf are frequent but usually total less than 50% cover.

Similar Types

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

Associated Rare Plants

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



Distribution: Statewide, extending southward, westward, and into Canada.

Landscape Pattern: Small Patch

Characteristic Species**Sapling/Shrub:**

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

Dwarf Shrub:

Leatherleaf (C)
 Sweetgale (C)

Bryoid:

Sphagnum mosses (C)

Herb:

Bluejoint (F,C)
 Yellow loosestrife (F,C)
 Beaked sedge (C)
 Black bulrush (C)
 Expanded bulrush (C)
 Few-seeded sedge (C)
 Marsh St. Johnswort (C)
 Rattlesnake mannagrass (C)
 Royal fern (C)
 Sallow sedge (C)
 Sensitive fern (C)
 Three-way sedge (C,F)
 Wool-grass (C)

HGF2

State Rarity Rank: S5

Mixed Graminoid - Shrub Marsh

Grassy Shrub Marsh

Conservation, Wildlife and Management Considerations

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

Several rare reptiles may be found in this community type. The ribbon snake seeks out prey in these wetlands. In Southern Maine, spotted turtles and Blanding's turtles may overwinter in marshes where water levels remain reliably deep throughout most years. Some occurrences may function as vernal pools, which provide important breeding habitat for a variety of amphibians including wood frogs, spotted salamanders, and blue-spotted salamanders. These wetlands provide nesting and foraging habitat for a number of wading birds including the green heron and rare species such as the American bittern and least bittern. The rare sedge wren nests in graminoid marshes and wet meadows and may inhabit these wetlands.

Examples on Conservation Lands

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

Cross-reference to Other Classifications**New Hampshire**

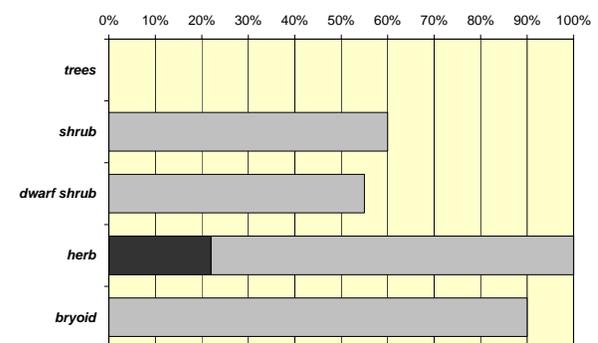
Mixed tall graminoid/medium to tall shrub marsh	S4S5
Oxbow marsh	S3
Buttonbush basin swamp	S3
Robust graminoid/medium shrub/Sphagnum marsh	S3S4
Northern basin marsh	S1

National Vegetation Classification

CEGL006519	Calamagrostis canadensis - Scirpus cyperinus - Dulichium arundinaceum Herbaceous Vegetation	G?
CEGL006345	Juncus militaris Herbaceous Vegetation	G?
CEGL006349	Scirpus cyperinus Seasonally Flooded Herbaceous Vegetation	G?
CEGL003908	Cephalanthus occidentalis Semipermanently Flooded Shrubland [Placeholder]	G?

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

- Sperduto 1994
Calhoun et al. 1994

HGP1

State Rarity Rank: S4

Bulrush Bed

Bulrush Marsh

Community Description

Tall rushes and other non-persistent graminoids dominate this lakeshore community. Hardstem bulrush, softstem bulrush, chair-maker's rush, and bayonet rush are common dominants. Aquatic macrophytes such as pickerelweed, pondweeds, and water-lilies may be present, but are not usually abundant. Species richness is often low.

These deepwater marshes have standing water over 15 cm deep all year, except during unusually prolonged low water levels. Bulrush beds are often near inlets and outlets of lakes or along slow-moving portions of larger streams and rivers.

Diagnostics

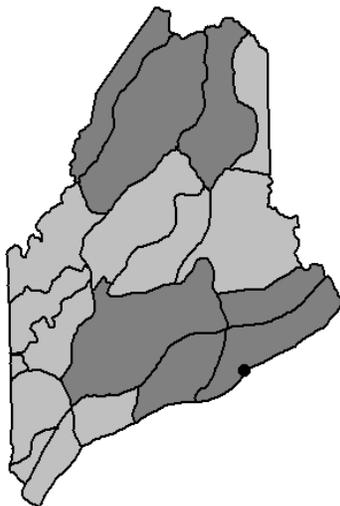
This type is distinguished by a dominance of tall bulrushes and rushes to the exclusion of most other species. Standing water is present through most or all of season.

Associated Rare Plants

Steinmetz's bulrush

Similar Types

Pickerelweed - Macrophyte Aquatic Bed vegetation can share species, but will be dominated by pickerelweed and floating-leaved macrophytes (water-lilies, pondweeds, etc.). Water-lily - Macrophyte Aquatic Bed vegetation will have few emergent plants. Freshwater Tidal Marshes and Brackish Tidal Marshes may share some of the bulrush species, but occur in tidal situations and have different associated species.



Distribution: Statewide, although not well documented. Extends southward and westward from Maine, and presumably into Canada.

Landscape Pattern: Small Patch

Characteristic Species**Herb:**

Hardstem bulrush	(C)
Softstem bulrush	(F,C)
Chair-maker's rush	(F,C)
Bayonet rush	(F,C)

HGP1

State Rarity Rank: S4

Bulrush Bed

Bulrush Marsh

Conservation, Wildlife and Management Considerations

This type appears to be well distributed and secure in Maine, but documentation of its distribution and characteristics is needed. Anecdotal information indicates that the waters of numerous public lands and private conservation lands include these marshes. Maintaining appropriate wetland buffers can help ensure that adjacent land uses do not result in degradation.

These deep emergent marshes provide foraging and nesting habitat for a large number of wading birds and waterfowl including rare species such as the least bittern, common moorhen, American coot and pied-billed grebe. They also offer excellent habitat for a number of odonates including several rare damselflies: the New England bluet, the pine barrens bluet, the scarlet bluet and the citrine forktail.

Examples on Conservation Lands

Acadia National Park Hancock Co.

Cross-reference to Other Classifications**New Hampshire**

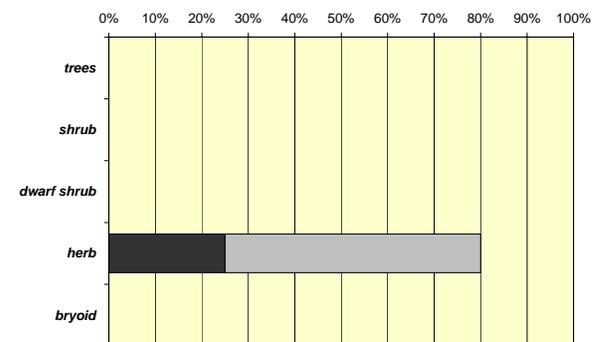
Undifferentiated tall graminoid medium-depth emergent marsh S4

National Vegetation Classification

CEGL006275 Schoenoplectus (tabernaemontani, acutus) Eastern Herbaceous Vegetation G?

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Sperduto 2000
 Calhoun et al. 1994
 Hill 1923

HGP2

State Rarity Rank: S5

Cattail Marsh

Cattail Marsh

Community Description

Tall marsh vegetation is dominated by cattails and mostly deciduous shrubs. The cattails may be patchy, locally dominant, and grow taller than the other plant species. Common cattail, narrow-leaved cattail, or both may be present: the latter is common near the coast or in brackish settings and the former is more widespread. Shrubs include winterberry, meadowsweet, and others. The dense growth of shrubs and cat-tails leaves little room for other herbaceous species; additional occasional species include swamp milkweed, wild calla, and a few sedges and grasses. Bryophytes are usually sparse, and occur on vegetation hummocks.

Cattail marshes often occur in impounded or semi-permanently flooded waters. Documented sites are at low elevations (<500') and generally associated with large basins and adjacent to open water. The substrate is muck or mineral soil rather than peat.

Diagnostics

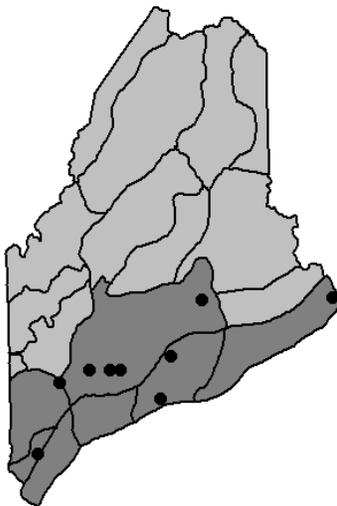
Standing water persists through all or most of season. Sites are non-tidal, and cattails are prominent above a mixture of low shrubs and sedges.

Associated Rare Plants

Tall beak-rush

Similar Types

Mixed Graminoid-Shrub Marshes share many species, but lack cattails (rarely present at <5% cover) and typically occur in settings that are only temporarily flooded rather than with semi-permanent standing water. Brackish Tidal Marshes and Freshwater Tidal Marshes can share species, but are tidal.



Distribution: Statewide, more common near the coast and at lower inland elevations. Extends southward and westward from Maine, and presumably into Canada.

Landscape Pattern: Small Patch

Characteristic Species

Sapling/Shrub:

Sweetgale (F)
Leatherleaf (F)
Winterberry (F)
Meadowsweet (F,C)

Herb:

Pickeralweed (F)
Small St. Johnswort (F)
Common cattail (F,C)

Bryoid:

Sphagnum mosses (F)

HGP2

State Rarity Rank: S5

Cattail Marsh

Cattail Marsh

Conservation, Wildlife and Management Considerations

This community is well distributed statewide and apparently well-represented (although not well documented) on public lands and private conservation lands. Maintaining appropriate wetland buffers can help ensure that adjacent land uses do not result in degradation.

These deep emergent marshes provide foraging and nesting habitat for a large number of wading birds and waterfowl including rare species such as the least bittern, common moorhen, American coot and pied-billed grebe. Black terns may nest colonially in large inland occurrences of this community type with about 50% vegetative and 50% open water. Other bird species commonly associated with cattail marshes include Virginia rails, red-winged blackbirds, and the uncommon marsh wren.

Examples on Conservation Lands

Hurds Pond Wildlife Management Area	Waldo Co.
Jamie's Pond Wildlife Management Area	Kennebec Co.
Sebago Lake State Park	Cumberland Co.
Alonzo Garcelon Wildlife Management Area	Kennebec Co.

Cross-reference to Other Classifications

New Hampshire

Open-basin cattail marsh	S4
River channel cattail marsh	SU

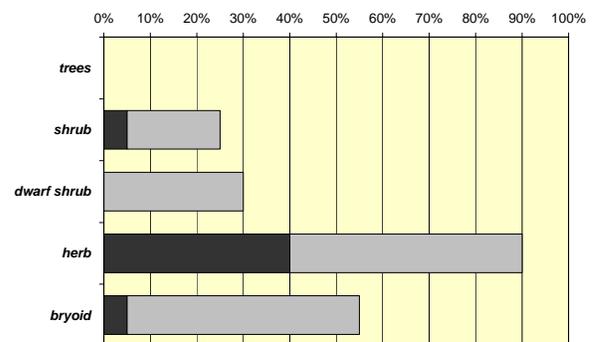
National Vegetation Classification

CEGL006153 Typha (angustifolia, latifolia) - (Schoenoplectus spp.) Eastern Herbaceous Vegetation	G5
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SAF Type

N/A

Vegetation Structure (total cover by stratum)



Literature References

HGP3

State Rarity Rank: S3

Tussock Sedge Meadow

Sedge Meadow

Community Description

These graminoid marshes are dominated by hummocks of tussock sedge, interspersed with bluejoint, other graminoids, and a few shrubs. Shrub cover is usually less than 30% but may occasionally be higher; meadowsweet is a characteristic shrub. Other wetland sedges and grasses are scattered in with the tussock sedge and bluejoint grass, usually in small amounts; species vary from site to site, but typically include royal fern, cinnamon fern, sensitive fern, St. Johnswort, flat-topped goldenrod, or wool-grass. Bryophytes are usually very sparse.

Soils are saturated and usually flooded, sometimes only seasonally. Soils may be entirely organic peat or muck, or a layer of organic matter over mineral soil. Standing water is present through much of the growing season. This type typically occurs in large flat basins that are often associated with drainage streams.

Diagnostics

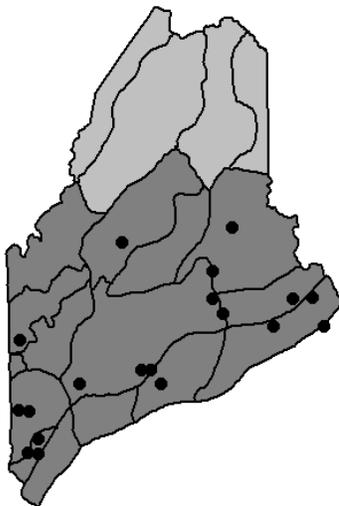
Tussock sedge forms greater than 30% cover (usually >50%); shrub cover usually is less than 30%. Vegetation is strongly hummocked with standing water between hummocks for much of the season.

Associated Rare Plants

Bog bedstraw

Similar Types

Bluejoint Meadows share many species, but have lower abundance of tussock sedge and are usually only temporarily flooded. Sweetgale Mixed Shrub Fens and Alder Shrub Thickets can also share species with this type, but are more strongly dominated by shrubs (>25% shrub or dwarf shrub cover, and usually >50%), and with <25% cover of tussock sedge. Mixed Graminoid-Shrub Marshes also have <25% tussock sedge.



Distribution: Statewide, extending throughout the northeastern U.S.; Canadian distribution unknown.

Landscape Pattern: Large Patch

Characteristic Species**Sapling/Shrub:**

Meadowsweet (F,C)
Winterberry (C)
Speckled alder (C)

Herb:

Bluejoint (F,C)
Tussock sedge (F,C)

Dwarf Shrub:

Leatherleaf (C)

Bryoid:

Sphagnum mosses (C)

HGP3

State Rarity Rank: S3

Tussock Sedge Meadow

Sedge Meadow

Conservation, Wildlife and Management Considerations

While graminoid marshes are common throughout the state, this Tussock Sedge Meadow type of graminoid marsh is more restricted in its distribution. Several are known from public lands and private conservation lands, including some very large and intact examples. Maintaining appropriate wetland buffers can help ensure that adjacent land uses do not result in degradation.

The rare Tomah mayfly is found in large sedge meadows in central, eastern, and northern Maine. In addition to numerous common bird species, the uncommon sedge wren nests in graminoid marshes and wet meadows. Northern harriers may also nest and forage in these meadows. Northern leopard frogs forage in large grassy meadows associated with watercourses in mid-summer. Some sites may function as vernal pools, which are important breeding habitat for a variety of amphibians including wood frogs, spotted salamanders, and blue-spotted salamanders. In southern Maine, these wetlands may provide foraging habitat for ribbon snakes, Blanding's turtles and spotted turtles.

Examples on Conservation Lands

Cold Stream, Passadumkeag
Roberts Pond Inlet, Massabesic Experimental Forest
Great Heath Public Lands
Middle Pond State Park
Wiggins Brook, Squaw Mountain Public Lands

Penobscot Co.
York Co.
Washington Co.
Oxford Co.
Piscataquis Co.

Cross-reference to Other Classifications

New Hampshire

Tall graminoid emergent marshes S4

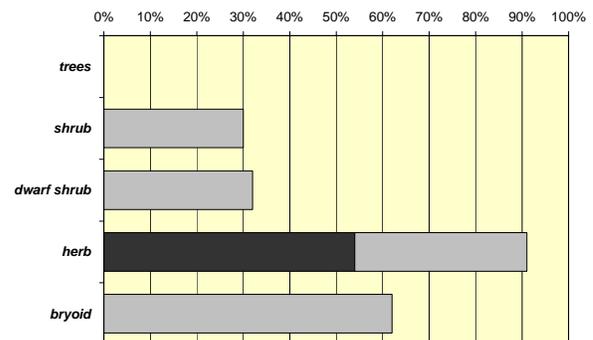
National Vegetation Classification

CEGL006412 (Myrica gale) / Carex stricta Seasonally
Flooded Herbaceous Vegetation G?

SAF Type

N/A

Vegetation Structure (total cover by stratum)



Literature References

Anderson and Davis 1997

HGS1

State Rarity Rank: S4

Sedge - Leatherleaf Fen Lawn

Sedge - Heath Fen

Community Description

This open peatland vegetation is dominated by a layer of mixed dwarf heath shrubs and sedges. Small larches, rarely tree-sized, are often scattered across the surface but contribute little cover. Leatherleaf, sweetgale, or bog rosemary may be the dominant shrub, and shrub cover is generally 20-40%. Sedges contribute 20 - 70% cover. Narrow-leaved cotton-grass, few-seeded sedge, and Michaux's sedge are typical dominants. Pitcher plants are usually present. The ground layer is a carpet of *Sphagnum* mosses, often with tracings of small cranberry or large cranberry running across the surface.

This type occurs in in peatlands, often in areas transitional from raised bog (ombrotrophic) to fen (minerotrophic) conditions. Sites are typically acidic (pH 4.0-5.4) but sometimes circumneutral. Peat substrate is saturated to the surface, or nearly so. This type most often occurs at low to moderate elevations.

Diagnostics

Open peatland vegetation consists of sedges and dwarf shrubs (leatherleaf, bog rosemary, sweetgale). Sedge cover exceeds shrub cover. Dominant sedges include few-seeded sedge, coast sedge, Michaux's sedge, white beak-rush, and narrow-leaved cotton-grass.

Similar Types

Leatherleaf Boggy Fen is shrubbier (leatherleaf > sedge cover) with tufted cotton-grass or tawny cotton-grass as prominent sedges. Sheep Laurel Dwarf Shrub Bog is also shrubbier and features sheep laurel as the dominant shrub. Low Sedge - Buckbean Fen Lawn occurs in similar, although usually somewhat wetter settings. It has a greater dominance of sedges than shrubs and often features mud sedge and podgrass. Mixed Tall Sedge Fen can consist of leatherleaf among sedges, but the sedges will be large and robust species such as slender sedge, beaked sedge, and inflated sedge.

Characteristic Species**Sapling/Shrub:**

Larch	(C)
Mountain holly	(C)

Dwarf Shrub:

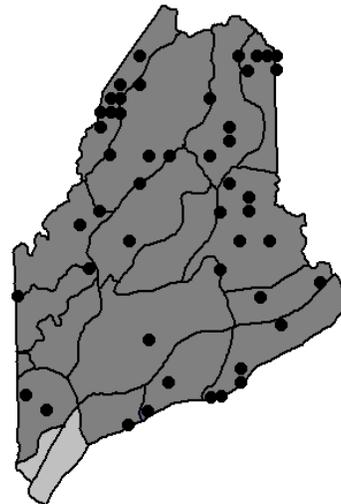
Bog rosemary	(F,C)
Leatherleaf	(F,C)
Small cranberry	(F)
Sheep laurel	(F)
Large cranberry	(C)

Herb:

Round-leaved sundew	(F)
Bog aster	(F,C)
White beak-rush	(F,C)
Pitcher plant	(F)
Bog goldenrod	(F)
Few-flowered sedge	(C)
Few-seeded sedge	(C)
Narrow-leaved cotton-grass	(C)
Slender sedge	(C)
Spatulate-leaved sundew	(C)
Yellowish sedge	(C)
Coast sedge	(C)

Bryoid:

<i>Sphagnum magellanicum</i>	(F,C)
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Distribution: Statewide and throughout northern New England and New York; Canadian distribution unknown.

Landscape Pattern: Small Patch

HGS1

State Rarity Rank: S4

Sedge - Leatherleaf Fen Lawn

Sedge - Heath Fen

Conservation, Wildlife and Management Considerations

This community type is well-represented in Maine, and fairly stable in extent, with several examples on public lands and private conservation lands. Impoundment or draining would have negative impacts on bog hydrology and on vegetation. Peat harvesting is a threat to a small percentage of the sites. Slow vegetation growth rates, due to the nutrient-poor setting, result in slow recovery from physical disturbances, such as recreational trail use. If disturbance, such as trail crossing, is a priority, traversing during frozen conditions or using boardwalks can minimize impacts.

Several rare dragonflies may be found in this community, especially in very wet locations with abundant inundated sphagnum (often suspended in the water column). The ebony boghaunter is found statewide, the Quebec emerald is found in northern Maine, and the ringed boghaunter is restricted to the southern part of the state in York and southern Oxford Counties. In northwestern this type may support the bog fritillary butterfly, which uses small cranberry as its larval host plant.

Examples on Conservation Lands

Isle au Haut, Acadia National Park	Knox Co.
Borestone Mountain Sanctuary	Piscataquis Co.
Salmon Brook Lake Bog Public Lands	Aroostook Co.
Great Heath Public Lands	Washington Co.
Great Wass Island Preserve	Washington Co.
Number Five Bog Public Lands	Somerset Co.
St. John River Preserve	Aroostook/Somerset
Marble Fen Preserve	Penobscot Co.
Acadia National Park	Hancock Co.

Cross-reference to Other Classifications**New Hampshire**

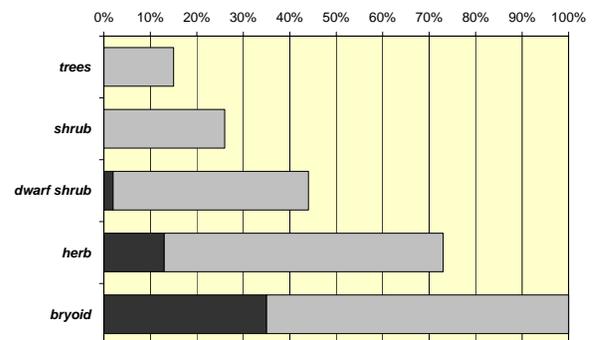
Sphagnum torreyanum/large cranberry/white beak-rush moss lawn	S3
Bog rosemary-sweet gale/bottle-shaped sedge/Sphagnum fallax fen	S3

National Vegetation Classification

CEGL005256	Carex oligosperma - Carex pauciflora - Eriophorum vaginatum / Sphagnum spp. Herbaceous Vegetation	G4G5
CEGL006524	Carex (oligosperma, exilis) - Chamaedaphne calyculata Shrub Herbaceous Vegetation	G?

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

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

HGS2

State Rarity Rank: S4

Mixed Tall Sedge Fen

Tall Sedge Fen

Community Description

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

In wetland basins, this fen type occurs as part of a peatland or on peaty deposits adjacent to open water in a minerotrophic setting. The substrate is always saturated and may be flooded at high water. Sites are acidic to circumneutral, with a pH from 4.8 to 6.8.

Diagnostics

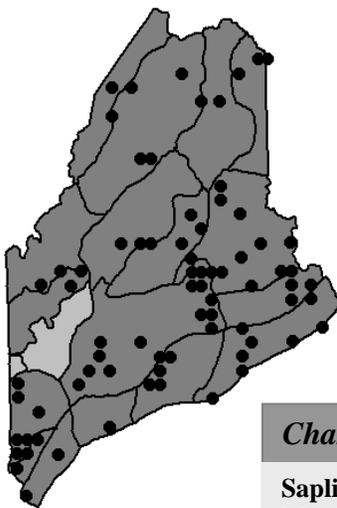
Tall peatland sedges, including slender sedge and beaked sedge, are dominant. Grasses such as bluejoint are present. Sites are often adjacent to open water. Sweetgale, leatherleaf, and meadowsweet, if present, are subdominant to the sedges.

Associated Rare Plants

Long's bulrush

Similar Types

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



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

Landscape Pattern: Small Patch

Characteristic Species**Sapling/Shrub:**

Meadowsweet (C)
Speckled alder (C)

Dwarf Shrub:

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

Herb:

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

Bryoid:

Sphagnum mosses (F,C)

HGS2

State Rarity Rank: S4

Mixed Tall Sedge Fen

Tall Sedge Fen

Conservation, Wildlife and Management Considerations

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

In southern Maine, these wetlands may provide habitat for several rare reptiles including ribbon snakes, Blanding's turtles and spotted turtles. Two rare dragonflies, the ringed boghaunter and the ebony boghaunter, are found in this community, especially in very wet locations with abundant inundated sphagnum (often suspended in the water column). The ebony boghaunter is found statewide, but the ringed boghaunter is restricted to the southern part of the state in York and southern Oxford Counties. The black meadowhawk, a rare dragonfly of open fens and marshes, may also be found in this community. Sites in northern Maine may be inhabited by the subarctic bluet, a rare damselfly that inhabits open marshes and fens and reaches the southern edge of its range in northern Maine.

Examples on Conservation Lands

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

Cross-reference to Other Classifications**New Hampshire**

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

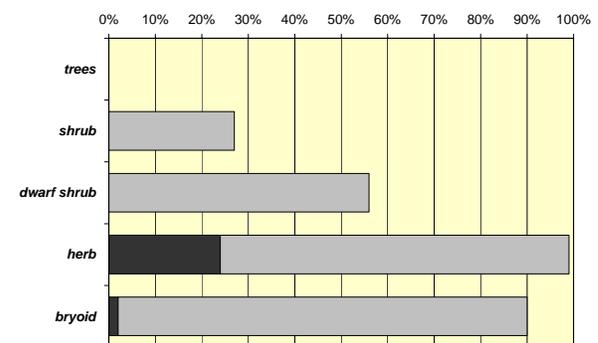
National Vegetation Classification

CEGL002257 Carex rostrata - Carex lacustris - (Carex vesicaria) Herbaceous Vegetation G4G5

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

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

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

HGS3

State Rarity Rank: S3

Low Sedge - Buckbean Fen Lawn

Low Sedge Fen

Community Description

Peatland vegetation is dominated by low mats of sedges (typically 40% - 60% cover), sometimes with sparse low heaths, over a continuous and very wet *Sphagnum* moss substrate. The sedges white beak-rush, mud sedge, and few-seeded sedge are usually dominant. Podgrass and buckbean are particularly characteristic, and sundews and horned bladderwort are typical in openings among the sedges. Heath shrubs are sparse: the most frequent are leatherleaf or bog rosemary, with other heaths on scattered hummocks. Bog-mat liverwort is an indicator species, although it is not present in all examples of this community type.

This community occurs in very wet portions of peatlands, but not in raised portions of peatland nor adjacent to open water. It is often found as the wetter and more minerotrophic margin around or between raised portions of a peatland. It occasionally occurs in mineral-soil marshes that grade into peatland areas. The substrate is constantly saturated, often unstable, and acidic (pH 4.0-5.0).

Diagnostics

In a peatland, graminoids are dominant over a well-developed bryoid layer. White beak-rush, mud sedge and occasionally few-seeded sedge are the dominant sedges; dwarf shrubs < 20% cover; substrate is saturated to surface.

Associated Rare Plants

Bog rush
Livid sedge
Sparse-flowered sedge

Similar Types

Sedge - Leatherleaf Fen Lawns are closely related but have more leatherleaf (usually > 25%) and often have coast sedge as a characteristic species. Leatherleaf Boggy Fens are shrub dominated, rather than sedge-dominated. Shrubby Cinquefoil - Sedge Circumneutral Fens are also typically graminoid-dominated but by different sedges, and will have the characteristic calciphilic species that are generally absent from this type. Mixed Tall Sedge Fens feature taller and denser graminoids and usually have abundant slender sedge.

Characteristic Species**Sapling/Shrub:**

Speckled alder (F)

Dwarf Shrub:

Bog rosemary (F)

Leatherleaf (F)

Rhodora (F)

Labrador tea (F)

Small cranberry (F)

Herb:

Mud sedge (F)

Round-leaved sundew (F)

Tawny cotton-grass (F)

Three-leaved false Solomon's seal (F)

Buckbean (F)

White beak-rush (F,C)

Pitcher plant (F)

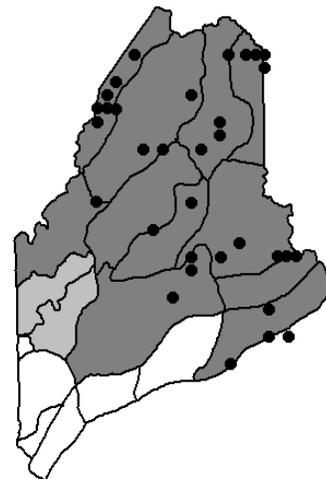
Podgrass (F)

Bog goldenrod (F)

Few-seeded sedge (C)

Bryoid:

Sphagnum mosses (F,C)



Distribution: Northern and eastern Maine (New England Adirondack and Laurentian Mixed Forest Provinces), presumably extending into Canada.

Landscape Pattern: Small Patch

HGS3

State Rarity Rank: S3

Low Sedge - Buckbean Fen Lawn

Low Sedge Fen

Conservation, Wildlife and Management Considerations

This community type is not particularly common, but has been subject to few threats to date. Some examples occur on public lands and private conservation lands. Impoundment or draining would have negative impacts on hydrology and on vegetation. Slow vegetation growth rates, due to the nutrient-poor environment, result in slow recovery from physical disturbances. Degradation from recreational use is unlikely, because of the unstable substrate; but if disturbance, such as foot traffic, is a necessity, traversing during frozen conditions or using boardwalks can minimize impacts.

Several rare dragonfly species may be found where bog pools and seasonally inundated depressions occur, including the zigzag darner, the subarctic darner, and the incurvate emerald. Other rare dragonflies that may be associated with this community include the ebony boghaunter and the Quebec emerald. Occurrences in northern Maine may be inhabited by the subarctic bluet, a rare damselfly that inhabits open marshes and fens and reaches the southern edge of its range in northern Maine. The delicate emerald, a dragonfly that inhabits bogs and fens covered with a carpet of low sedges, is also a likely associate.

Examples on Conservation Lands

Marble Fen Preserve

Bois Bubert Island, Petit Manan National Wildlife Refuge

St. John River Preserve

Telos Lake Public Lands Unit

Penobscot Co.

Washington Co.

Aroostook Co.

Piscataquis Co.

Cross-reference to Other Classifications

New Hampshire

Sphagnum pulchrum/sedge moss lawn

S2S3

National Vegetation Classification

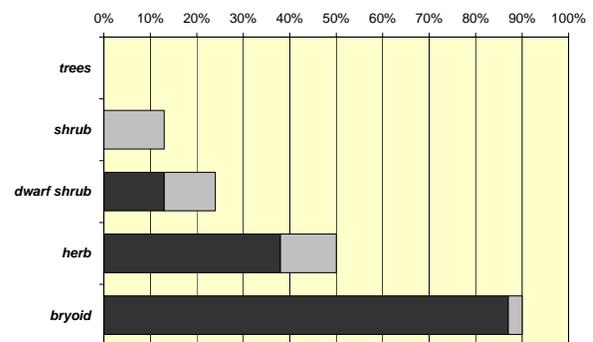
CEGL006522 Carex limosa - Rhynchospora alba /
Cladopodiella sp. Herbaceous Vegetation
[Provisional]

G?

SAF Type

N/A

Vegetation Structure (total cover by stratum)



Literature References

Anderson and Davis 1997

Gawler 1998

Davis and Anderson 2001

Sorenson 1986

HGS4

State Rarity Rank: S2

Shrubby Cinquefoil - Sedge Circumneutral Fen

Circumneutral Fen

Community Description

This peatland vegetation type is dominated by sedges or grades into dwarf shrubs. Dwarf shrub and graminoid cover each range from 10-75% and are inversely proportional to each other. Sparse cedar or larch may dot the fen. Shrubs may be patchy. Dominant sedges include deer-hair sedge and slender sedge; white beak-rush is locally common. Alpine cotton-grass, with its white wispy fruiting heads, is often obvious but not abundant. Shrubby cinquefoil and bog rosemary are characteristic. Northern bog aster and marsh muhly are good indicators, as are the calciphiles livid sedge, yellow sedge, sparse-flowered sedge, and northern bog sedge. The bryoid layer is extensive, with *Campyllum* fen moss indicative.

These peatlands are influenced by calcium-rich (higher pH) water. The peat substrate pH is 5.6 or higher, and remains saturated through the year. These occur in minerotrophic basins where contact with groundwater provides some nutrients to the plants. Sites are typically at lower elevations (<1000'), usually in areas underlain by limestone or other calcareous bedrock.

Diagnostics

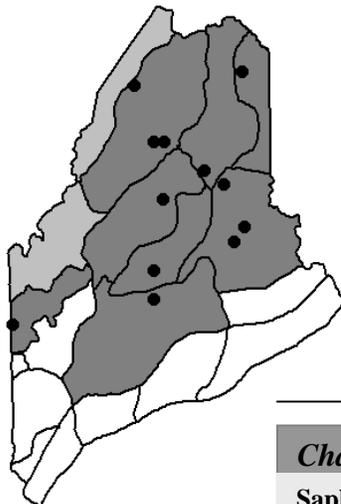
Peatland vegetation is dominated by sedges or sedge/shrub mixtures including deer-hair sedge, slender sedge, and bog rosemary. Circumneutral indicators are present, such as shrubby cinquefoil, livid sedge, marsh muhly, grass-of-Parnassus, and Kalm's lobelia.

Similar Types

Other peatland communities lack the circumneutral indicators typical of this type. Circumneutral Riverside Seeps have many similar species, but do not occur on peat substrate.

Associated Rare Plants

Bog rush
 Capillary sedge
 Dioecious sedge
 Grass-of-pannassus
 Livid sedge
 Low spikemoss
 Prairie sedge
 Slender-leaved sundew
 Sparse-flowered sedge
 Swamp birch



Distribution: Most typically in the limestone regions of northern Maine, sporadically westward, eastward, and southward. (Laurentian Mixed Forest and New England - Adirondack Provinces.) Extends to northern New England and New York; Canadian distribution not documented.

Landscape Pattern: Small Patch

Characteristic Species**Sapling/Shrub:**

Sweetgale (F,C)
 Larch (C)
 Northern white cedar (F,C)

Dwarf Shrub:

Bog rosemary (F,C)
 Leatherleaf (F,C)
 Shrubby cinquefoil (F,C)
 Sweetgale (C)

Herb:

Slender sedge (F,C)
 Northern blue flag (F)
 Deer-hair sedge (C)
 Tussock sedge (C)
 Marsh muhly (F)
 Northern bog aster (F)

Bryoid:

Sphagnum warnstorffii (F,C)
Campyllum fen moss (F)

HGS4

State Rarity Rank: S2

Shrubby Cinquefoil - Sedge Circumneutral Fen

Circumneutral Fen

Conservation, Wildlife and Management Considerations

This very rare community type has been subject to few threats to date. Some examples occur on public lands and private conservation lands. Impoundment or draining would have negative impacts on hydrology and consequently on vegetation. Maintaining appropriate wetland buffers is important in minimizing the effects of adjacent land use. Degradation from recreational use has not been an issue in most places, but if disturbance, such as foot traffic, is a necessity, traversing during frozen conditions or using boardwalks can reduce impacts.

This community is inhabited by Clayton's copper butterfly, which uses shrubby cinquefoil as its larval host plant. This butterfly is found at only ten sites worldwide, nine in Maine and one in New Brunswick. All known locations are circumneutral fens with large populations of shrubby cinquefoil. Thaxter's pinion moth uses sweetgale and larch as larval host plants and may be found in this community as well.

Examples on Conservation Lands

Mattagodus Wildlife Management Area	Penobscot Co.
Lake Umbagog National Wildlife Refuge	Oxford Co.
Crystal Bog Preserve	Aroostook Co.
Dwinal Flowage Wildlife Management Area	Penobscot Co.
Chamberlain Lake Public Lands	Piscataquis Co.
Salmon Brook Lake Bog Public Lands	Aroostook Co.
Woodland Bog Preserve	Aroostook Co.

Cross-reference to Other Classifications**New Hampshire**

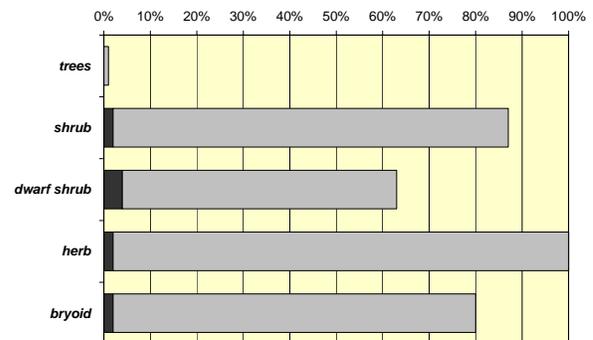
Circumneutral-calcareous flark S1

National Vegetation Classification

CEGL006085	Myrica gale - Dasiphora fruticosa ssp. floribunda / Carex lasiocarpa - Carex exilis Shrub Herbaceous Vegetation	G3G4
CEGL006525	Dasiphora fruticosa ssp. Floribunda / Carex lasiocarpa - Campyllum stellatum Herbaceous Vegetation (provisional)	G?
CEGL006160	Myrica gale / Carex lasiocarpa - Lobelia kalmii - Trichophorum alpinum Shrub Herbaceous Vegetation	G3G4

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Anderson and Davis 1997
 Gawler 1998
 Fernald and Wiegand 1910
 Davis and Anderson 2001
 Sorenson 1986

HGS5

State Rarity Rank: S3

Deer-hair Sedge Bog Lawn

Coastal Sedge Bog

Community Description

This raised bog type is dominated by carpets or patches of deer-hair sedge, often with very stunted (< 0.3 m) heath shrubs such as black crowberry, dwarf huckleberry, or leatherleaf. Round-leaved sundew, pitcher plant, and small cranberry grow among the peat mosses, which form a dense and spongy ground layer. Reindeer lichen are scattered among the mosses.

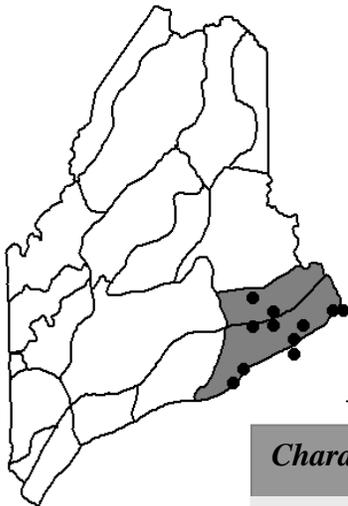
This community is restricted to raised bogs along or near the coast, often forming expansive "lawns" on the raised portions. The substrate is saturated *Sphagnum* moss and pH is acidic (averaging ~ 4.5). As with other bog vegetation, it occurs in nutrient-poor (usually ombrotrophic) settings.

Diagnostics

Sites are in a peatland setting; with a dominance of deer-hair sedge and a lack of other circumneutral indicators. Dwarf huckleberry is characteristic but not dominant.

Similar Types

Shrubby Cinquefoil - Sedge Circumneutral Fens can also be dominated by deer-hair sedge but are in fens, not raised coastal bogs, lack dwarf huckleberry, and have other circumneutral indicators present such as shrubby cinquefoil or certain sedges. Huckleberry - Crowberry Bogs can occur in similar settings to Deer-hair Sedge Bog Lawns, and can share many species, but will have dwarf shrubs more dominant than sedges; the two types can occur adjacent to each other with a continuous gradation from one type to the next.



Distribution: Downeast Maine, extending eastward into the Canadian Maritimes (Laurentian Mixed Forest Province).

Landscape Pattern: Small Patch

Characteristic Species**Sapling/Shrub:**

Mountain holly (F)
Black chokeberry (F)

Dwarf Shrub:

Leatherleaf (F,C)
Black crowberry (F,C)
Sheep laurel (F,C)
Pale laurel (F)
Labrador tea (F)
Small cranberry (F)
Dwarf huckleberry (C)

Herb:

Horned bladderwort (F)
Round-leaved sundew (F)
Pitcher plant (F)
Bog goldenrod (F)
Deer-hair sedge (F,C)
Coast sedge (C)

Bryoid:

Bog broom-moss (F)
Bog hair-cap moss (F)
Sphagnum rubellum (F,C)
Little-tree reindeer-lichen (F)

HGS5

State Rarity Rank: S3

Deer-hair Sedge Bog Lawn

Coastal Sedge Bog

Conservation, Wildlife and Management Considerations

This community type is not widely distributed, but has been subject to few threats to date. Slow vegetation growth rates, due to the nutrient-poor setting, mean slow recovery from physical disturbances, such as recreational use. If disturbance, such as foot traffic, is a necessity, traversing during frozen conditions or using boardwalks can minimize impacts. Peat harvesting could threaten some sites but is not currently much of a factor. Draining or other hydrologic changes would have negative impacts on bog vegetation. Several occurrences are on public lands or private conservation lands.

The rare crowberry blue butterfly is restricted to coastal heaths in east-coastal Maine. It uses black crowberry as a larval host plant.

Examples on Conservation Lands

Great Wass Island Preserve	Washington Co.
Great Heath Public Lands	Washington Co.
Quoddy Head State Park	Washington Co.
Acadia National Park	Hancock Co.
Larrabee Heath Preserve	Washington Co.

Cross-reference to Other Classifications

New Hampshire

N/A

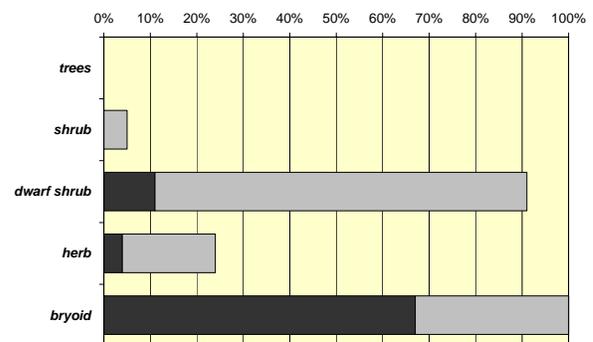
National Vegetation Classification

CEGL006260 Trichophorum caespitosum - Gaylussacia dumosa / Sphagnum (fuscum, rubellum, magellanicum) Herbaceous Vegetation G?

SAF Type

N/A

Vegetation Structure (total cover by stratum)



Literature References

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

HGS6

State Rarity Rank: S2

Cotton-grass - Heath Alpine Bog

Alpine Bog

Community Description

Sphagnum mosses form a carpet on which dwarf bog shrubs and herbs are scattered. The herb layer generally totals 25-40% cover, and consists of patches of graminoids such as deer-hair sedge and tufted cotton-grass interspersed with patches of dwarf shrubs, mostly ericaceous: bilberries, crowberry, Labrador tea, leatherleaf, rhodora, and sheep laurel (the latter less abundant here than in other dwarf shrub bog vegetation types). A few islands of stunted balsam fir and black spruce may be present. On the *Sphagnum* grow small cranberry and round-leaved sundew. Baked apple-berry is frequent, and is restricted in Maine to these bogs and downeast peatlands.

These wetlands occur in alpine or subalpine settings near or above treeline. Sites are usually level, in small bedrock depressions, or slightly sloping on the edge of basins (generally <5%; needs documentation). The substrate is permanently saturated organic soil. Unlike its lower elevation counterparts, these bogs often have lenses of peat beneath the vegetation that remain frozen well into the growing season.

Diagnostics

This type occurs near or above treeline on a substrate saturated. Bryoids > dwarf shrubs > herbs. Herbs are mostly graminoids. Bryoids are mostly *Sphagnum*, with reindeer lichens essentially absent. Shrubs include lower-elevation species as well as the more restricted bilberry and crowberry.

Associated Rare Plants

Northern comandra

Similar Types

The montane setting differentiates this from other peatland community types. The *Sphagnum* substrate differentiates it from other high-elevation types, except for Heath - Lichen Subalpine Slope Bogs, which occur on steeper slopes (>20%), have the dwarf shrub - herb cover > bryoid cover, have more krummholz (spruce, fir, or cedar) and fruticose lichens, and usually lack deer-hair sedge and cotton-grass. Both types are floristically similar to certain coastal raised peatlands and Heath - Crowberry Maritime Slope Bogs.

Characteristic Species**Dwarf Shrub:**

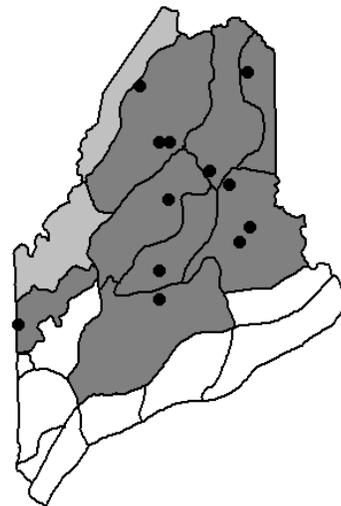
Leatherleaf	(F,C)
Black crowberry	(F,C)
Pale laurel	(F)
Labrador tea	(F)
Baked apple-berry	(F)
Small cranberry	(F,C)
Alpine bilberry	(F)

Herb:

Few-flowered sedge	(C)
Bog sedge	(C)
Round-leaved sundew	(F)
Tufted cotton-grass	(F,C)
Deer-hair sedge	(C)

Bryoid:

<i>Cetraria</i> lichen	(F,C)
Fen sickle-moss	(F,C)
<i>Sphagnum</i> mosses	(F,C)



Distribution: Montane western Maine, extending westward into New Hampshire.

Landscape Pattern: Small Patch

HGS6

State Rarity Rank: S2

Cotton-grass - Heath Alpine Bog

Alpine Bog

Conservation, Wildlife and Management Considerations

Most Maine occurrences of this type occur on public or private conservation land; however, hiker traffic has caused degradation in heavily-used areas. As with all above-treeline vegetation in Maine, careful trail siting and efforts to minimize off-trail use are the important management considerations. In these alpine wetlands, boardwalks or log crossings are helpful.

This high elevation bog community provides potential habitat for the rare northern bog lemming.

Examples on Conservation Lands

Saddleback Mountain, Appalachian Trail	Franklin Co.
Mahoosuc Public Lands	Oxford Co.

Cross-reference to Other Classifications**New Hampshire**

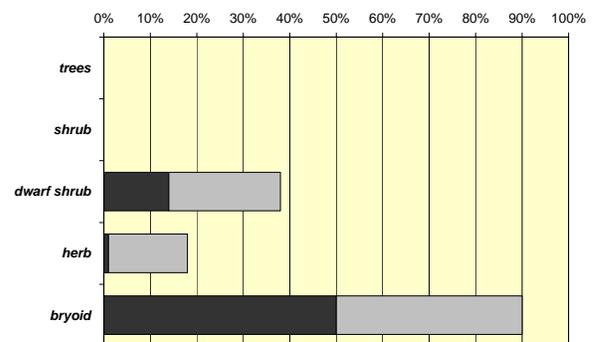
Wet alpine/subalpine level and sloping bog	S1
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National Vegetation Classification

CEGL006140 Empetrum nigrum - Vaccinium uliginosum / Geum peckii Dwarf-shrubland	G?
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SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Doyle et al. 1987
 Burke 1982
 Sperduto and Cogbill 1999
 May and Davis 1978
 Marchand 1977

HGT1

State Rarity Rank: S3

Spartina Saltmarsh

Salt-hay Saltmarsh

Community Description

These tidal marshes consist of expanses of saltmeadow cordgrass, smooth cordgrass, and/or black-grass. Shrubs are virtually absent, and the herbaceous cover is usually >85%. Much of the marsh is high marsh, where saltmeadow cordgrass forms meadows, and where black-grass may be dominant at slightly higher elevations. In the low marsh, along creeks or at elevations just below mean high water, smooth cordgrass is abundant. Salt pannes with abundant seashore saltgrass may dot the high marsh; goosetongue may also be locally common. Sea lavender and seaside goldenrod are often found at the upper tidal fringe. The dominant species typically form bands corresponding to tidal inundation zones.

Spartina saltmarshes are typically associated with beach-dune systems (back-barrier marshes) or the outer reaches of estuaries (finger marshes). They are extensive along both sides of the tidal river or stream. The extensive high marsh zone is only flooded by above-average tides. Peat is typically several meters thick. Most are large (> 10 acres), but they occasionally occur as smaller pockets along estuaries and coves.

Diagnostics

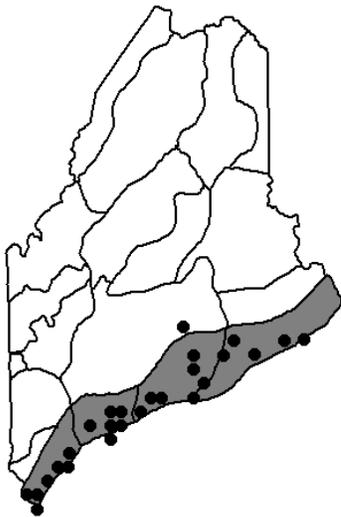
These types are coastal back-dune marshes, or near the outer reaches of estuaries, with saltmeadow cordgrass, smooth cordgrass, and black-grass totalling >35% cover, often in bands. The high marsh is well developed.

Similar Types

Mixed Graminoid-Forb Saltmarshes may also have cordgrasses and/or black-grass abundant, but will also have a mix of other co-dominant species, which tend to occur in patches rather than tidal zones; they are typically smaller, often under 5 acres, and tend to occur further upstream in estuaries or in smaller, more protected pockets. Brackish Tidal Marshes, which also occur further upstream in estuaries, lack saltmarsh cordgrasses.

Associated Rare Plants

Dwarf glasswort
Lilaeopsis
Rich's sea-blite
Saltmarsh bulrush
Saltmarsh false-foxglove
Seabeach sedge
Slender blue flag



Distribution: Coastal Maine, mostly southwest of Merrymeeting Bay (Eastern Broadleaf Forest Province); sporadic and less well developed downeast. Extends southward along the Atlantic coast.

Landscape Pattern: Large Patch

Characteristic Species

Herb:

Wire rush	(C)
Sea milkwort	(F,C)
Smooth cordgrass	(F,C)
Saltmeadow cordgrass	(F,C)
Common arrow-grass	(F,C)
Alkali bulrush	(C)
Purple-stemmed aster	(C)
Seashore saltgrass	(C)
Seaside goldenrod	(C)
Black-grass	(C)
Goosetongue	(C)

HGT1

State Rarity Rank: S3

Spartina Saltmarsh

Salt-hay Saltmarsh

Conservation, Wildlife and Management Considerations

Few of the larger saltmarshes in Maine are pristine, with some having been filled and others ditched at one time or another. With wetland protection in recent decades many of those that remain are reverting to a more natural hydrologic regime. Many of the remaining high-quality *Spartina* Saltmarshes are on public land or private conservation land. With development of the uplands that border these marshes, maintenance of appropriate wetland buffers can help reduce degradation that could result from adjacent land uses.

Saltmarshes are important nesting habitat for several sparrows: Nelson’s sharp-tailed sparrow and two uncommon species, the saltmarsh sharp-tailed sparrow and the seaside sparrow. These wetlands also provide foraging habitat for a large number of wadingbirds and shorebirds, including rare species such as the glossy ibis and least tern. The big bluet, a rare damselfly, inhabits saltmarsh ponds with emergent vegetation in southern Maine.

Examples on Conservation Lands

Chewonki Marsh	Lincoln Co.
Bass Harbor Marsh, Acadia National Park	Hancock Co.
Back River Marsh, Winship Island Wildlife Management Area	Sagadahoc Co.
Fort Popham State Historic Site	Sagadahoc Co.
Rachel Carson National Wildlife Refuge	York Co.
Scarborough Marsh Wildlife Management Area	Cumberland Co.
Reid State Park	Sagadahoc Co.
Morse Mountain Preserve	Sagadahoc Co.

Cross-reference to Other Classifications

New Hampshire

Low salt marsh	S3
High salt marsh	S3
Coastal salt pond marsh	S1
Low brackish tidal river-bank marsh	S1S2

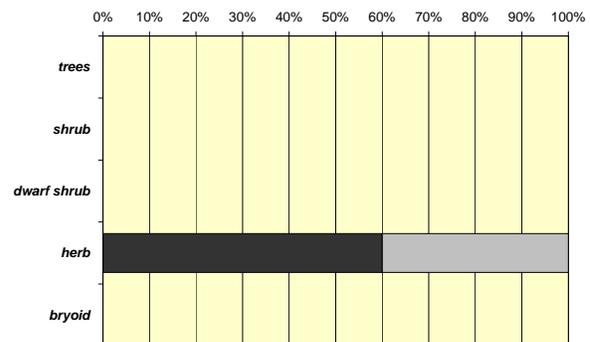
National Vegetation Classification

CEGL004308	<i>Sarcocornia perennis</i> - <i>Salicornia</i> spp. - <i>Spartina alterniflora</i> Dwarf-shrubland	G5
CEGL006167	<i>Ruppia maritima</i> Acadian/Virginian Zone Temperate Herbaceous Vegetation	G?
CEGL006006	<i>Spartina patens</i> - <i>Distichlis spicata</i> - <i>Plantago maritima</i> Herbaceous Vegetation	G5

SAF Type

N/A

Vegetation Structure (total cover by stratum)



Literature References

Jacobson and Jacobson 1989
 Niering and Warren 1980
 Nixon 1982
 Teal 1986
 Bryan et al. 1997

HGT2

State Rarity Rank: S4

Mixed Graminoid - Forb Saltmarsh

Mixed Saltmarsh

Community Description

These saltmarshes contain a mixture of graminoids and forbs, sometimes with local dominance of saltmarsh cordgrasses, but saltmeadow cordgrass is not strongly dominant. Chair-maker's rush is almost always present, at least in small amounts. Dominants can vary, but indicator species include creeping bentgrass, freshwater cordgrass, wire rush, saltmarsh bulrush, New England aster, saltmarsh sedge, and narrow-leaved cattail. Sweetgrass is often present, though not abundant. The vegetation occurs as a mosaic of dominants and lacks the strong zonation typical of the larger *Spartina* Saltmarshes.

These are often fringe marshes in sheltered coastal pockets, estuaries, and tidal creeks; not typically covering large acreages although they may be strung along a fairly long stretch of shoreline. They often occur along tidal creeks, or as a shoreline fringe in coves. Vegetation consists predominantly of low marsh (saltmarsh regularly inundated twice daily by tides).

Diagnostics

These are saltmarshes in which various saltmarsh plants share dominance with cordgrasses and/or black-grass; chair-maker's rush typically present, and may be dominant; saltmarsh sedge is also characteristic. Vegetation tends to be patchy rather than zoned.

Similar Types

Spartina Saltmarshes have many of the same species, but have much greater relative cover of saltmeadow cordgrass, smooth cordgrass, and black-grass. They also appear more uniform, and tend to occur at the outer reaches of estuaries (back-barrier marshes and finger marshes). Brackish Tidal Marshes also share many species, but lack the saltmarsh cordgrasses and other strictly saltmarsh species (black-grass, saltmarsh bulrush, saltmarsh false-foxglove, sea lavender, etc.).

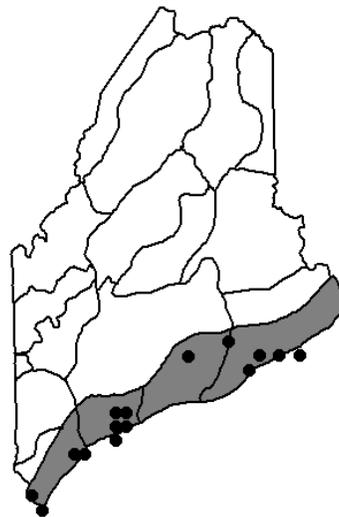
Associated Rare Plants

Gaspé arrow-grass
Marsh-elder
Rich's sea-blite
Saltmarsh false-foxglove
Saltmarsh sedge
Small saltmarsh aster

Characteristic Species

Herb:

Saltmeadow cordgrass	(C)
Wire rush	(C)
Chair-maker's rush	(F,C)
Freshwater cordgrass	(F)
Common arrow-grass	(F)
Chaffy sedge	(F,C)
Salt-loving spikerush	(C)
New York aster	(C)
Twig-rush	(C)
Alkali bulrush	(C)
Black-grass	(C)
Creeping bentgrass	(C)



Distribution: Coastwide; almost all of the east coastal Maine saltmarshes are of this type. Extends eastward into the Canadian Maritimes (Laurentian Mixed Forest Province).

Landscape Pattern: Small Patch

HGT2

State Rarity Rank: S4

Mixed Graminoid - Forb Saltmarsh

Mixed Saltmarsh

Conservation, Wildlife and Management Considerations

Saltmarshes have received considerable conservation attention. Many occur on public lands or private conservation lands, only a few of which are listed. With development of the uplands that border these marshes, maintenance of appropriate wetland buffers can help reduce degradation that could result from adjacent land uses.

Saltmarshes are important nesting habitat for several sparrows: Nelson's sharp-tailed sparrow and two uncommon species, the saltmarsh sharp-tailed sparrow and the seaside sparrow. These wetlands also provide foraging habitat for a large number of wadingbirds and shorebirds, including rare species such as the glossy ibis and least tern. The big bluet, a rare damselfly, inhabits saltmarsh ponds with emergent vegetation in southern Maine.

Examples on Conservation Lands

Bald Head Preserve	Sagadahoc Co.
Flying Point Preserve	Sagadahoc Co.
Acadia National Park	Hancock Co.
Cobscook Bay State Park	Washington Co.
Petit Manan National Wildlife Refuge	Hancock Co.
Great Wass Island Preserve	Washington Co.
Scarborough Marsh Wildlife Management Area	Cumberland Co.

Cross-reference to Other Classifications**New Hampshire**

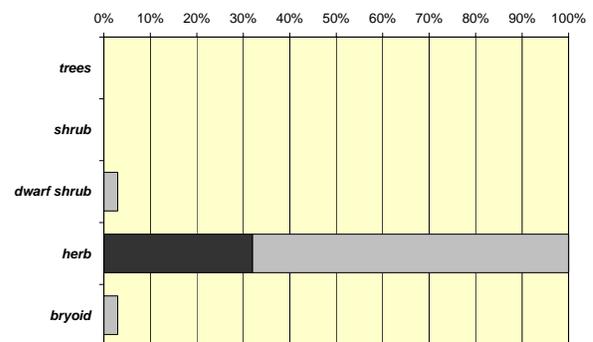
High brackish tidal river-bank marsh S1S2

National Vegetation Classification

CEGL004192	Spartina alterniflora / (Ascophyllum nodosum) Acadian/Virginian Zone Herbaceous Vegetation	G5
CEGL006369	Salicornia bigelovii - Triglochin maritima Herbaceous Vegetation	G?

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

- Chapman 1937
- Jacobson and Jacobson 1989
- Niering and Warren 1980
- Roberts and Robertson 1986
- Teal 1986
- Calhoun et al. 1994
- Bryan et al. 1997

HGT3

State Rarity Rank: S3

Brackish Tidal Marsh

Brackish Tidal Marsh

Community Description

Brackish tidal marshes contain both freshwater and brackish water species, often in bands corresponding to tidal exposure. Tall rushes and bulrushes often predominate over extensive mid-elevation flats. At the lower elevations, rosette-forming herbs, such as *lilaeopsis* and tidal arrowhead, may be common on the mudflats. Near the high tide line, there may be a fairly narrow zone of muddy gravel or rock shore sparsely vegetated with low herbs, including some rare species such as Long's bitter-cress or water-pimpernel. Sweetgale and poison-ivy are often present at the upper fringes of the marsh, at or above the tidal reach.

These marshes occupy intertidal reaches in coastal impoundments, or are in larger tidal estuaries where freshwater and saltwater mix. Salinity ranges from 0.5 - 18 ppt, with gradients reflected in the species composition of particular sites. The substrate is usually mud rather than peat.

Diagnostics

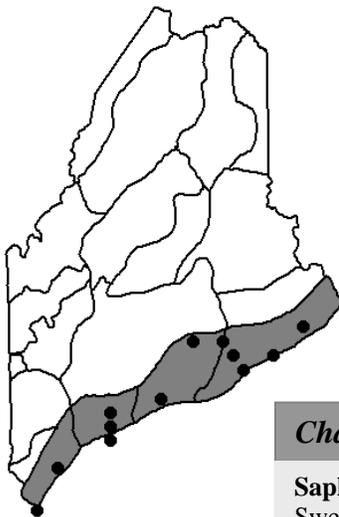
These marshes occur in a brackish tidal setting. The vegetation is a mix of tall graminoids and rosette-forming forbs. Freshwater cordgrass, common arrow-grass, or wire-rush are present; obligate freshwater species, such as pickerelweed and common arrowhead, are absent.

Similar Types

Freshwater Tidal Marshes are most similar and can grade into this type as one moves downriver; they usually feature wild rice and/or softstem bulrush as dominants, and contain species such as pickerelweed and common arrowhead that do not tolerate brackish water. Some marshes are intermediate in character between the two types. Mixed Graminoid-Forb Saltmarshes and *Spartina* Saltmarshes develop a peat substrate and contain obligate saltwater species such as saltmarsh cordgrasses, sea lavender, black-grass, or alkali bulrush.

Associated Rare Plants

Atlantic mudwort
 Eaton's bur-marigold
 Estuary bur-marigold
Lilaeopsis
 Long's bitter-cress
 Parker's pipewort
 Pygmyweed
 Stiff arrowhead
 Tidal arrowhead
 Water-pimpernel



Distribution: Coastwide, extending in both directions from Maine (Laurentian Mixed Forest and Eastern Broadleaf Forest Provinces).

Landscape Pattern: Large Patch

Characteristic Species

Sapling/Shrub:

Sweetgale (F,C)
 Western poison-ivy (F,C)

Herb:

Common arrow-grass (F)
 Chaffy sedge (F,C)
 Northern blue flag (F)
 Wire rush (F,C)
 Chair-maker's rush (F,C)
 Freshwater cordgrass (F,C)
 Smooth cordgrass (F)
 Narrow-leaved cattail (F)
 Softstem bulrush (F)

HGT3

State Rarity Rank: S3

Brackish Tidal Marsh

Brackish Tidal Marsh

Conservation, Wildlife and Management Considerations

Tidal marshes are valuable wildlife habitat and have received considerable conservation attention. Many occur on public lands or private conservation lands (only a few of which are listed). With development of the uplands that border these marshes, maintenance of appropriate wetland buffers can help reduce degradation that could result from adjacent land uses.

Brackish marshes are important nesting habitat for several sparrows: Nelson's sharp-tailed sparrow and two uncommon species, the saltmarsh sharp-tailed sparrow and the seaside sparrow. These wetlands also provide foraging habitat for a large number of wading birds including rare species such as the great egret and glossy ibis. The rare New England siltsnail inhabits coastal marshes and small tidal rivers where the water ranges from fresh to upper brackish. The *Spartina* borer moth whose historic range was along the immediate coast throughout New England likely inhabited tidal marshes with sizeable populations of freshwater cordgrass, its larval host plant.

Examples on Conservation Lands

Petit Manan National Wildlife Refuge	Washington Co.
Acadia National Park	Hancock Co.
Scarborough Marsh Wildlife Management Area	Cumberland Co.
Morse Mountain Preserve	Sagadahoc Co.
Mendall Wildlife Management Area	Waldo Co.
Hall Bay, Flying Point Preserve	Sagadahoc Co.
Rachel Carson National Wildlife Refuge	York Co.

Cross-reference to Other Classifications

New Hampshire

Brackish marsh S2S3

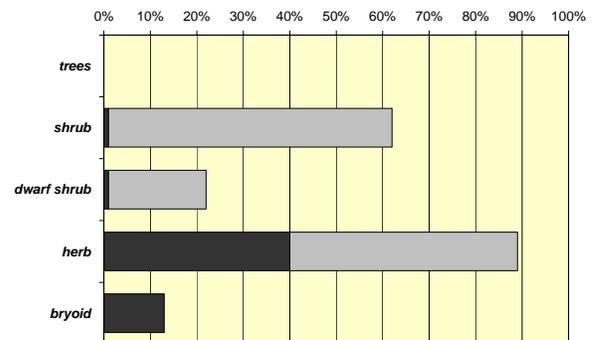
National Vegetation Classification

CEGL004201	<i>Typha angustifolia</i> - <i>Hibiscus moscheutos</i> Herbaceous Vegetation	G?
CEGL004473	<i>Sagittaria subulata</i> - <i>Limosella australis</i> Tidal Herbaceous Vegetation	G?
CEGL006398	<i>Schoenoplectus pungens</i> - <i>Eleocharis parvula</i> Herbaceous Vegetation	G?

SAF Type

N/A

Vegetation Structure (total cover by stratum)



Literature References

Fernald and Wiegand 1910
Calhoun et al. 1994

HGT4

State Rarity Rank: S2

Freshwater Tidal Marsh

Freshwater Tidal Marsh

Community Description

These tidal marshes are dominated by patchy stout herbs, typically a mixture of wild rice, softstem bulrush, and pickerelweed, often covering extensive areas. Mixed in with the tall herbs are lower forbs including several rare species. Some marshes may have mudflats dominated by forbs and low vegetation in patches among the graminoids; many have a very narrow band of low forbs near the high-tide-upland interface. Species found in brackish marshes, such as chair-maker's rush, may be in these marshes as well; but at least some obligate freshwater plants will also be present: pickerelweed, common arrowhead, sweet flag, and northern water-plantain, for example. Bryophytes are essentially absent.

Freshwater tidal marshes are associated with major rivers, in low-gradient areas of the upper tidal reaches. Freshwater inputs lower the salinity to < 0.5 ppt. Substrate is usually mud, or mud mixed with gravel. The tidal regime affects substrate and plant zonation.

Diagnostics

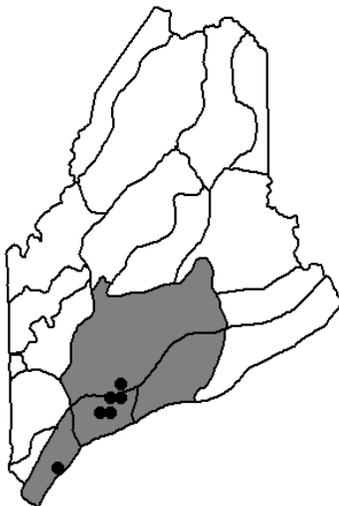
These graminoid-dominated marshes occur along tidal rivers, with patches of forbs locally abundant. Obligate freshwater species are present, such as sweetflag, yellow water-lily, large yellow pond-lily, or pickerelweed.

Similar Types

Brackish Tidal Marshes are most similar and grade into this type as salinity increases. Mixed Graminoid Shrub Marshes and Pickerelweed - Macrophyte Aquatic Bed types can contain several of the same species, but do not occur in tidal settings.

Associated Rare Plants

Atlantic mudwort
Beaked spikerush
Eaton's bur-marigold
Estuary bur-marigold
Lilaeopsis
Long's bitter-cress
Parker's pipewort
Pygmyweed
Stiff arrowhead
Tidal arrowhead
Water-pimpernel



Distribution: Upper tidal reaches of major rivers: most well known from the Kennebec and Penobscot Rivers (Laurentian Mixed Forest Province).

Landscape Pattern: Large Patch

Characteristic Species

Herb:

Northern water-plantain	(F)
Nodding beggar ticks	(F)
Eaton's bur-marigold	(F)
Parker's pipewort	(F)
Pickerelweed	(F,C)
Tidal arrowhead	(F)
Common arrowhead	(F)
Softstem bulrush	(F,C)
Wild rice	(F,C)
Chair-maker's rush	(F,C)

HGT4

State Rarity Rank: S2

Freshwater Tidal Marsh

Freshwater Tidal Marsh

Conservation, Wildlife and Management Considerations

Tidal marshes are valuable wildlife habitat and have received considerable conservation attention. Heavy metals, sewage overflows, and other pollutants have degraded many areas, but some have recovered as water quality has improved over the past decades. Many occur on public lands or private conservation lands. Some are managed for waterfowl production by planting wild rice. With development of the uplands that border these marshes, maintenance of appropriate wetland buffers can help reduce degradation that could result from adjacent land uses.

The tidal marshes of Maine's larger estuaries, especially Merrymeeting Bay, are important pre-migration staging habitat for thousands of waterfowl and wading birds. The rare New England siltsnail inhabits coastal marshes and small tidal rivers where the water ranges from fresh to upper brackish.

Examples on Conservation Lands

Muddy River Wildlife Management Area	Sagadahoc Co.
Swan Island Wildlife Management Area	Sagadahoc Co.
Merrymeeting Bay Wildlife Management Area	Sagadahoc Co.

Cross-reference to Other Classifications

New Hampshire

N/A

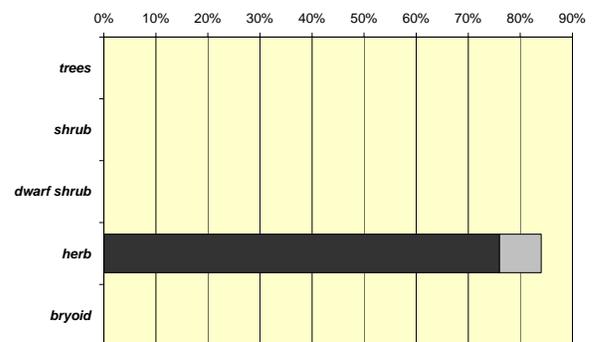
National Vegetation Classification

CEGL004202	Zizania aquatica Tidal Herbaceous Vegetation	G4?
CEGL004472	Nuphar lutea ssp. advena Tidal Herbaceous Vegetation	G?
CEGL006080	Amaranthus cannabinus Tidal Herbaceous Vegetation	G3G5
CEGL006352	Eriocaulon parkeri – Polygonum punctatum Herbaceous vegetation	G2

SAF Type

N/A

Vegetation Structure (total cover by stratum)



Literature References

- Odum et al. 1984
- Calhoun et al. 1994

HHP1

State Rarity Rank: S5

Water-lily - Macrophyte Aquatic Bed

Open-water Marsh

Community Description

Water-lilies or pondweeds are dominant in this floating aquatic vegetation type. It is currently broadly defined, and may be divisible into two or more types with additional data. The strict type has white water-lily, yellow water-lily, or more rarely water-shield as the most abundant species. Variants may lack the water-lily species altogether and be dominated by floating-leaved pondweed species such as bigleaf pondweed or others. Submerged aquatics are also common, and can include bladderworts and pipewort.

These aquatic beds occur in quiet waters at depths mostly between 0.5 and 2.5 m. The substrate is typically a mixture of silty-organic muck.

Diagnostics

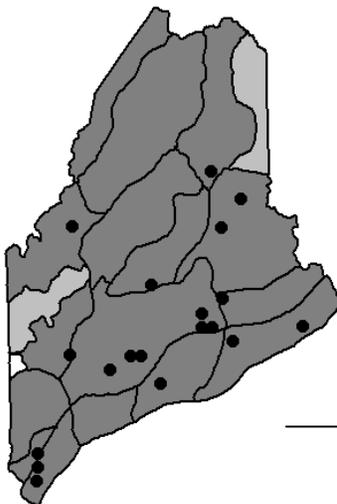
Water-lily species are prominent (or in variants, floating-leaved pondweed species prominent); pickerelweed is basically absent.

Similar Types

Pickerelweed - Macrophyte Aquatic Bed vegetation has greater dominance of emergent plants like pickerelweed. Pipewort - Water Lobelia Aquatic Bed vegetation has low cover of floating aquatics, dominated instead by plants with basal rosettes growing on the bottom. The pondweed variant can be similar to Circumneutral-Alkaline Water Macrophyte Suite, but lacks the alkaline water indicator species such as water-marigold, common waterweed, Robbins' pondweed, straight-leaved pondweed, etc.

Associated Rare Plants

Alga-like pondweed
Prickly hornwort
Pygmy water-lily
Spotted pondweed
Thread-like naiad



Distribution: Statewide; extending southward and westward from Maine, and presumably into Canada

Landscape Pattern: Small Patch

Characteristic Species

Herb:	
Water-shield	(F,C)
Bigleaf pondweed	(C)
Pipewort	(F,C)
Yellow water-lily	(F,C)
White water-lily	(F,C)
Spotted bladderwort	(F,C)
Bayonet rush	(C)

HHP1

State Rarity Rank: S5

Water-lily - Macrophyte Aquatic Bed

Open-water Marsh

Conservation, Wildlife and Management Considerations

This aquatic community type is widespread and abundant in Maine. It can be found in the quieter portions of streams and rivers as well as in lakes and ponds, and provides habitat for many water-dependent animals. Many examples occur on public and private conservation lands; however, because the type is so common it is often not documented. The major threats to this community are water quality degradation from excess nutrients in runoff and the spread of invasive aquatic plants, such as Eurasian water-milfoil and variable water-milfoil.

In southern and central parts of the state, this community type hosts a number of common reptiles such as northern water snakes, common snapping turtles, and Eastern painted turtles. Muskrats, bullfrogs and green frogs inhabit this community statewide and mink frogs may be found in occurrences from central Maine northward. Northern leopard frogs may utilize these wetlands as breeding grounds. These productive wetlands provide foraging habitat for a number of waterfowl including rare species such as the common moorhen and American coot. Dragonfly and damselfly diversity is typically high in these wetlands and may include rare species such as the turquoise bluet, little bluet, lilypad forktail, and spatterdock darner.

Examples on Conservation Lands

Tyler Pond Wildlife Management Area	Kennebec Co.
Acadia National Park	Hancock Co.

Cross-reference to Other Classifications**New Hampshire**

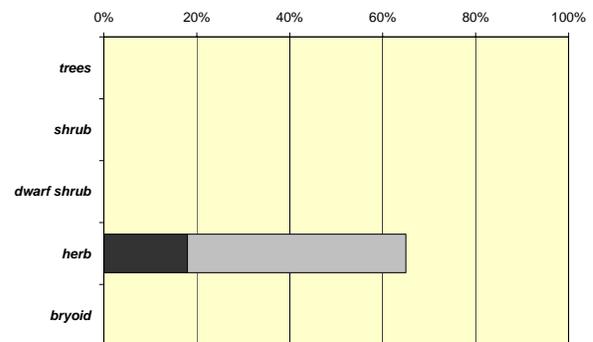
Yellow pond lily-pickerelweed-pondweed aquatic beds	S4S5
Oxbow pond	S3

National Vegetation Classification

CEGL006196	Vallisneria americana - Potamogeton perfoliatus Herbaceous Vegetation	G5
CEGL002386	Nuphar lutea ssp. Advena - Nymphaea odorata Herbaceous Vegetation	6465

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Cameron 2000

HHP2

State Rarity Rank: S5

Pipewort - Water Lobelia Aquatic Bed

Sandy Lake-bottom

Community Description

In this shallow-water aquatic vegetation type almost all of the plant growth is underwater, with only the flowering portions of the plants above water. The most typical species, pipewort and water lobelia, grow as rosettes on the substrate. Associated species may be rosette plants or submerged plants growing in the water column (e.g. leafless water-milfoil). Water-shield, a floating plant, may be abundant in patches. Water-lilies and pickerelweed may be present, but at low cover. Vegetation cover ranges from sparse to extensive.

This community type occupies quiet waters in lakes and ponds; sites are usually shallow (depths 0.2 - 1.1 m). The lake bottom substrate almost always has a predominant mineral soil component, rather than muck.

Diagnostics

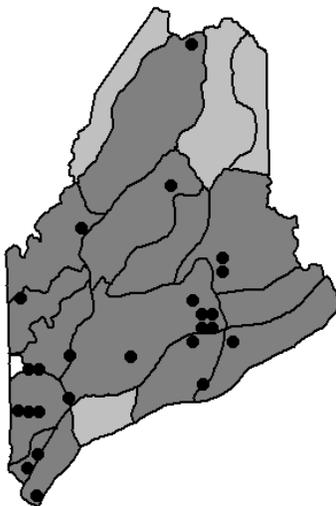
The most abundant species are those that grow as rosettes on the bottom, especially pipewort and water lobelia. Floating-leaved plants are absent or very low in cover.

Similar Types

Water-lily - Macrophyte Aquatic Bed vegetation and Pickerelweed - Macrophyte Aquatic Bed vegetation can share many species with this type, but these community types are dominated by floating leaved plants or emergent plants, respectively.

Associated Rare Plants

Acadian quillwort
Alga-like pondweed
American shore-grass
Prototype quillwort
Shore quillwort
Small purple bladderwort
Spotted pondweed
Thread-like naiad
Water awlwort
Water stargrass



Distribution: Statewide; extending southward and westward from Maine, and presumably into Canada.

Landscape Pattern: Small Patch

Characteristic Species**Herb:**

Pipewort	(F,C)
Water lobelia	(F,C)
Water-shield	(C)
Creeping spearwort	(F)

HHP2

State Rarity Rank: S5

Pipewort - Water Lobelia Aquatic Bed

Sandy Lake-bottom

Conservation, Wildlife and Management Considerations

This aquatic community type is widespread in Maine. It can be found in the quieter portions of streams and rivers as well as in lakes and ponds. It provides habitat for a variety of water-dependent animals. Many examples occur on public lands and private conservation lands; however, because the type is so common it is not always documented. The major threats to this community are water quality degradation from excess nutrients in runoff and the spread of invasive aquatic plants, such as Eurasian water-milfoil and variable water-milfoil.

These aquatic beds, especially where they contain floating-leaved plants like water-shield, may provide habitat for damselflies like the scarlet bluet, which seems to prefer acidic sandy-bottomed habitats with water-shield and rushes. Alkaline ponds with aquatic vegetation may support many of the same wildlife species found in more acidic aquatic communities such as Water-lily Macrophyte Aquatic Bed or Pickerelweed - Macrophyte Aquatic Bed. It is unclear whether any wildlife species prefer the more alkaline conditions that this community provides.

Examples on Conservation Lands

Chemo Pond, Penobscot Experimental Forest
Range Ponds State Park
Mt Agamenticus
Pepperpot Pond, Richardson Lake Public Lands
Kidney Pond, Baxter State Park

Penobscot Co.
Androscoggin Co.
York Co.
Oxford Co.
Piscataquis Co.

Cross-reference to Other Classifications

New Hampshire

Submerged aquatic/rosette stress tolerant sandy pond shore S1S2

National Vegetation Classification

CEGL006346 Eriocaulon aquaticum - Lobelia dortmanna Herbaceous Vegetation G?
CEGL006538 Eriocaulon aquaticum sparse vegetation

SAF Type

N/A

Vegetation Structure (total cover by stratum)



Literature References

Cameron 2000

HHP3

State Rarity Rank: S2

Circumneutral-Alkaline Water Macrophyte Suite

Circumneutral Pond

Community Description

The variable aquatic vegetation in this community type features floating-leaved and submerged plants restricted or preferential to higher-pH waters. Indicator species include tapegrass, common waterweed, water stargrass, white water crowfoot, Robbins' pondweed, alpine pondweed, Vasey's pondweed, and straight-leaved pondweed. Vegetation cover is usually 25-65%, occasionally higher. This type is broadly defined and heterogeneous; further sampling would be needed to discriminate subtypes.

This type occurs in alkaline lakes or ponds (conductivity usually > 50 uMHOS/cm), in quiet waters at 0.5 - 2 m depths.

Diagnostics

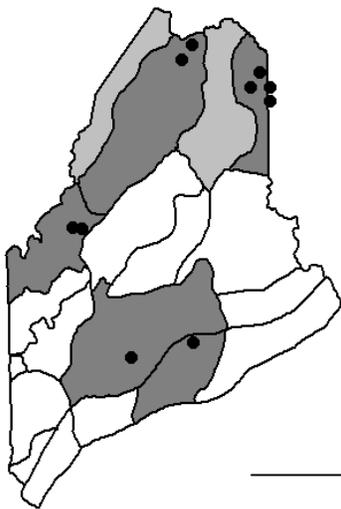
At least some of the indicator species listed above are present, and water-shield, pipewort, water lobelia, and pickerelweed are virtually absent. Yellow and white water-lilies, if present, are at low cover.

Similar Types

This broad type can show similarities to other aquatic types, especially to the Water-lily - Macrophyte Aquatic Bed type. That type has higher cover of yellow and white water-lilies or of bigleaf pondweed, but more sampling is needed of both types to better distinguish them.

Associated Rare Plants

Common mare's-tail
Fries' pondweed
Northern slender pondweed
Pygmy water-lily
Slender pondweed
Straight-leaved pondweed
Vasey's pondweed
Water stargrass



Distribution: Central Maine northward (Laurentian Mixed Forest and New England - Adirondack Forest Provinces); distribution includes upstate New York; otherwise not well matched in other state classification documents.

Landscape Pattern: Small Patch

Characteristic Species**Herb:**

Common waterweed (F,C)
Robbins' pondweed (F,C)
Water-marigold (C)
Slender water-milfoil (C)
Tapegrass (C)

Bryoid:

Chara algae (F)

HHP3

State Rarity Rank: S2

Circumneutral-Alkaline Water Macrophyte Suite

Circumneutral Pond

Conservation, Wildlife and Management Considerations

This aquatic community type is sporadic in Maine, and further work is needed to document its distribution and characteristics. A few examples occur on public lands and private conservation lands; many are in great ponds (> 10 acres), which are a public resource. The major threats to this community are water quality degradation from excess nutrients in runoff and the spread of invasive aquatic plants, such as Eurasian water-milfoil and variable water-milfoil.

Alkaline ponds with aquatic vegetation may support many of the same wildlife species found in more acidic aquatic communities such as Water-lily Macrophyte Aquatic Bed or Pickerelweed - Macrophyte Aquatic Bed. It is unclear whether any wildlife species prefer the more alkaline conditions that this community provides.

Examples on Conservation Lands

Number Five Bog Public Lands	Somerset
Caswell National Guard Site	Aroostook Co.

Cross-reference to Other Classifications**New Hampshire**

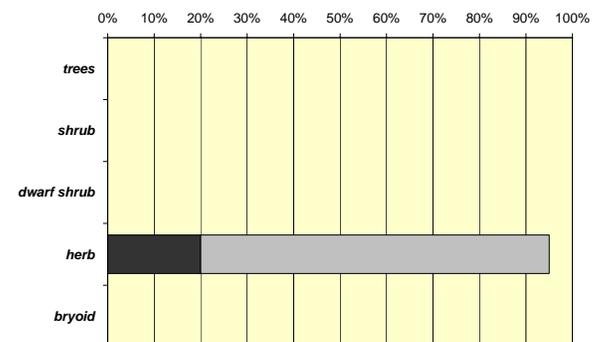
N/A

National Vegetation Classification

CEGL006340	Potamogeton spp. - Ceratophyllum demersum - Crassula aquatica Herbaceous Vegetation	G?
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SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Cameron 2000

VBS1

State Rarity Rank: S4

Bog Moss Lawn

Mossy Bog Mat

Community Description

The bryophyte layer is the most obvious component of this peatland type. A dense and usually very wet layer of *Sphagnum* mosses contributes most of the cover. Low herbs and stunted shrubs are often scattered across the moss lawn, but usually form < 25% cover overall. Characteristic vascular plant species include leatherleaf or bog rosemary (very dwarfed), horned bladderwort, small cranberry, and white beak-rush. The most typical bryophytes are *Sphagnum cuspidatum* and bog-mat liverwort.

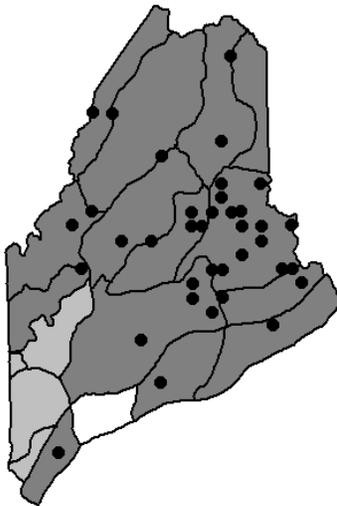
Bog moss lawns occur within raised bogs and fens, typically in the wettest areas such as bog pools, boggy pond margins, and water tracks. They may form extensive areas on the higher areas of raised bogs. The substrate is highly acidic, with a pH of ~ 4.0.

Diagnostics

A carpet of bryophytes, mostly *Sphagnum* mosses, is the main feature in a peatland setting. Vascular plants generally contribute < 25% cover.

Similar Types

This is the only vegetation type in which bryophytes form the major continuous vegetation layer. Sedge - Leatherleaf Fen Lawns, Low Sedge - Buckbean Fen Lawns, and Leatherleaf Boggy Fens can all have similar vascular plant species, but will have the vascular plants more strongly dominant (typically > 50% cover).



Distribution: Statewide, mostly from central Maine northward (New England - Adirondack and Laurentian Mixed Forest Provinces). Presumably extends westward, northward, and eastward from Maine.

Landscape Pattern: Small Patch

Characteristic Species**Dwarf Shrub:**

Black crowberry	(F)
Dwarf huckleberry	(F)
Pale laurel	(F)
Small cranberry	(F)
Leatherleaf	(C)

Herb:

Round-leaved sundew	(F)
Tawny cotton-grass	(F)
White beak-rush	(F)
Pitcher plant	(F)
Horned bladderwort	(F)

Bryoid:

<i>Sphagnum</i> mosses	(F,C)
Bog-mat liverwort	(F)
<i>Mylia</i> liverwort	(F)

VBS1

State Rarity Rank: S4

Bog Moss Lawn

Mossy Bog Mat

Conservation, Wildlife and Management Considerations

This community type is well-represented in Maine and has been subject to few threats to date. Several examples occur on public lands and private conservation lands. Impoundment or draining would have negative impacts on bog hydrology and consequently on the vegetation. Slow vegetation growth rates, due to the nutrient-poor environment, result in slow recovery from physical disturbances, such as recreational trail use. If disturbance, such as foot traffic, is a necessity, traversing during frozen conditions or using boardwalks can minimize impacts.

Several rare dragonflies may be found in this community. Very wet locations with abundant inundated sphagnum may host the ebony boghaunter and the Quebec emerald (northern Maine only). Species that may be found where bog pools occur include the zigzag darner, subarctic darner, and incurvate emerald. The delicate emerald, a dragonfly that inhabits bogs and fens covered with a carpet of low sedges, is also a potential associate. Sites in northwestern Maine may include the bog fritillary butterfly, which uses small cranberry as its larval host plant.

Examples on Conservation Lands

Crystal Bog Preserve

Great Heath Public Lands

Wiggins Brook, Squaw Mountain Public Lands

Number Five Bog Public Lands

Aroostook Co.

Washington Co.

Piscataquis Co.

Somerset Co.

Cross-reference to Other Classifications**New Hampshire**

Liverwort/horned bladderwort mud-bottom

S3

Sphagnum rubellum/small cranberry dwarf heath moss lawn

S3

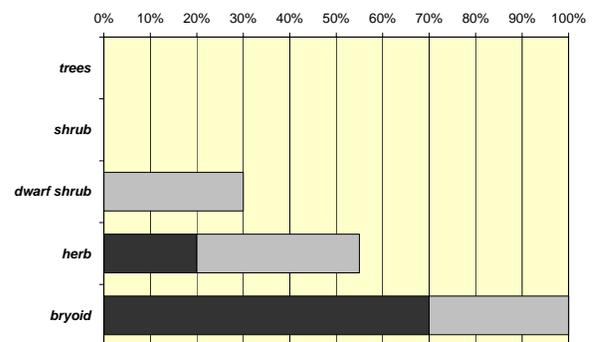
National Vegetation Classification

CEGL006394 Sphagnum cuspidatum - Cladopodiella fluitans Nonvascular Vegetation

G?

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Cameron 2000

Community Description

These types consist of sparsely vegetated upper beaches, where plants adapted to withstand the effects of salt spray and drying winds are typical. These include annuals such as sea-beach sandwort, sea-kale, beach-pea, and others. On downeast gravel/cobble beaches, oysterleaf may be characteristic. This linear community is usually bordered landward by either sand dunes or upland forest vegetation. Floristic variations with different substrate types probably exist, but data is inadequate.

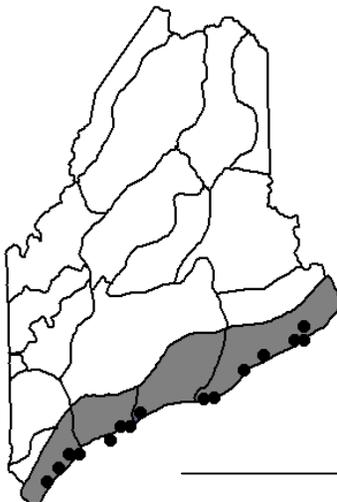
Beach strands occur above the usual high-tide line on sand or gravel coastal beaches. They are occasionally flooded at very high tides.

Diagnostics

Located just above the high-tide line, beach strands are distinguished by the presence of beach-pea and sea-kale; forbs are more abundant than grasses.

Similar Types

Dune Grasslands may be adjacent, and species overlap between the two; but dune grasslands will be strongly dominated by graminoids rather than by forbs.



Distribution: Coastwide, extending both south along the Atlantic seaboard and eastward into the Canadian Maritimes (Eastern Broadleaf Forest and Laurentian Mixed Forest Provinces).

Landscape Pattern: Small Patch

Characteristic Species**Herb:**

Sea-kale	(F)
Sea-beach sandwort	(F)
Sea milkwort	(F)
Beach-pea	(F)
Witch grass	(F)
Spearscale	(F)
American shore-grass	(F)
White sea-blite	(F)
Common saltwort	(F)

VSU1

State Rarity Rank: S4

Beach Strand

Coastal Beach

Conservation, Wildlife and Management Considerations

This narrow band of vegetation usually lies landward of the most heavily walked portions of beaches; but virtually no survey work has been done to document any potential effects from recreational impacts. Examples exist on several public lands and private conservation lands. Raking seaweed from the beach to the dune fronts can affect the composition of this community.

Upper beaches and adjacent dune grasslands are critical breeding habitat for two species of endangered shorebirds, least terns and piping plovers. Nesting habitat for these birds has been reduced by human use of beaches and the known nesting sites in Maine are carefully monitored. Beach strand communities also provide breeding habitat for common terns, though this species also breeds on inland lakeshore beaches. Roseate terns breed on sandy or gravelly beaches, especially those that occur on offshore islands. American oystercatchers are extremely rare breeders on coastal beaches of southern Maine. Beaches are also major roosting sites for migratory shorebirds.

Examples on Conservation Lands

Roque Bluffs State Park	Washington Co.
Petit Manan National Wildlife Refuge	Hancock Co.
Reid State Park	Sagadahoc Co.
Popham Beach State Park	Sagadahoc Co.
Howard's Cove, Machiasport	Washington Co.
Seawall Beach, Morse Mountain Preserve	Sagadahoc Co.
Scarborough Beach State Park	Cumberland Co.

Cross-reference to Other Classifications**New Hampshire**

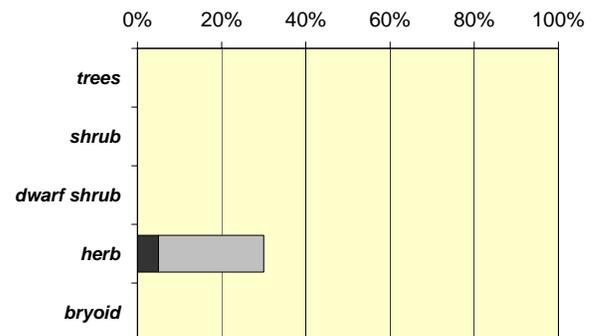
Coastal shoreline strand/swale	S2
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National Vegetation Classification

CEGL004400	Cakile edentula ssp. edentula Chamaesyce polygonifolia Sparse vegetation	G3G4
CEGL006106	Cakile edentula ssp. edentula – Mertensia maritime Sparse Vegetation	G?

SAF Type

N/A

Vegetation Structure (total cover by stratum)***Literature References***

Nelson and Fink 1980
 Mulligan 1980
 Dunlop and Crow 1985

Literature Cited

- Allen, B. 1999. Checklist of Maine mosses. *Evansia* 16:28-43.
- Anderson, M. G., M. D. Merrill, and F. B. Biasi. 1998. Connecticut River Watershed Analysis: ecological communities and neotropical migratory birds. Final Report Summary. The Nature Conservancy, Eastern Conservation Science. Boston, Massachusetts. 56 pp.
- Anderson, M. G. 1999. Viability and Spatial Assessment of Ecological Communities in the Northern Appalachian Ecoregion. Ph.D. Dissertation, Univ. of New Hampshire. 224 pp.
- Anderson, D. S. and R. B. Davis. 1997. The vegetation and its environment in Maine peatlands. *Can. J. Bot.* 75:1785-1805.
- Association for Biodiversity Information. 2001. International Classification of Ecological Communities: Terrestrial Vegetation. Natural Heritage Central Databases (data current as of 2 July 2001). The Association for Biodiversity Information, Arlington, Virginia.
- Baldwin, H.I. . 1979. The distribution of *Pinus banksiana* Lamb. in New England and New York. *Rhodora* 81:549-565.
- Bard, G. E. 1967. The woody vegetation of the mature forest of the Mianus River Gorge Preserve. *Bull. Torr. Bot. Club* 94:336-344.
- Beatty, S. W. 1984. Influence of microtopography and canopy species on spatial patterns of forest understory plants. *Ecology* 65:1406-1419.
- Bliss, L. C. 1963. Alpine plant communities of the Presidential Range, New Hampshire. *Ecology* 44:678-697.
- Bormann, F. H. and M. F. Buell. 1964. Old-age stand of hemlock-northern hardwood forest in central Vermont. *Bull. Torr. Bot. Club* 91:451-465.
- Bromley, S. W. 1935. The original forest types of southern New England. *Ecol. Monographs* 5:61-89.
- Brown, J. H. Jr., C. A. Castaneda and R. J. Hindle. 1982. Floristic relationships and dynamics of hemlock (*Tsuga canadensis*) communities in Rhode Island. *Bull. Torr. Bot. Club* 109:385-391.
- Bryan, R. R., M. Dionne, R. A. Cook, J. Jones, and A Goodspeed. 1997. Maine Citizen's Guide to Evaluating, Restoring, and Managing Tidal Marshes. Maine Audubon Society. 87 pp.
- Buell, M. F. and J. E. Cantlon. 1950. A study of two communities of the New Jersey pine barrens and a comparison of methods. *Ecology* 31:567-586.
- Burke, I. 1982. The Mahoosuc Mountains, Oxford County, Maine: A natural areas inventory and management statement. Dept. of Conservation and Maine Critical Areas Program, State Planning Office, Augusta, ME.
- Calhoun, A. J. K., J. E. Cormier, R. B. Owen, Jr., A. F. O'Connell Jr, C. T. Roman, and R. W. Tiner, Jr. 1994. The wetlands of Acadia National Park and Vicinity. Maine Agricultural and Forest Experiment Station Miscellaneous Publication 721. 108 pp.

- Caljouw, C. and S. Roeske. 1981. A natural resource inventory and Critical Areas Survey of Bigelow Preserve. Dept. of Conservation, Bureau of Public Lands. Maine State Planning Office, Augusta, ME. 104 pp.
- Cameron, D. C. 2000. Aquatic Vegetation Survey for Selected Maine Lakes. Maine Natural Areas Program, Department of Conservation, Augusta, Maine. 113 pp.
- Chapman, V. J. 1937. A note on the salt marshes of Nova Scotia. *Rhodora* 39:53-57.
- Chokkalingam, U. 1998. Spatial and Temporal Patterns and Dynamics in Old-growth Northern Hardwood and Mixed Forests of Northern Maine. Ph.D. Dissertation, University of Maine. 227 pp.
- Clayden, S. and A. Bouchard. 1983. Structure and dynamics of conifer-lichen stands on rock outcrops south of Lake Abitibi, Quebec. *Can. J. Bot.* 61:850-871.
- Coffman, M. S. & G. L. Willis. 1977. The use of indicator species to classify climax sugar maple and eastern hemlock forests in Upper Michigan. *Forest Ecology and Management* 1:149-168.
- Cogbill, C. V. 1985. Evaluation of the Forest History & Old- Growth Nature of the Big Reed Pond Preserve, T8R10 & T8R11 WELS, Maine. Report to The Nature Conservancy, Brunswick, Maine.
- Cogbill, C. V. and W. D. Hudson, Jr. 1990. Final Report to the Appalachian Mountain Club Murphy Fund committee on "The baseline characterization of the alpine area of Katahdin." Unpublished report. 13 pp. + appendices.
- Cowardin, L. M., V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS 79/31. 103 pp.
- Critical Areas Program. 1983. Jack pine (*Pinus banksiana* Lamb.) in Maine and its relevance to the Critical Areas Program. Planning Report number 77, State Planning Office, Augusta, Maine. 79 pp.
- Crum, H. 1991. Liverworts and Hornworts of Southern Michigan. Univ. of Michigan Herbarium, Ann Arbor. 233 pp.
- Damman, A. W. H. 1977. Geographical changes in the vegetation patterns of raised bogs in the Bay of Fundy region of Maine and New Brunswick. *Vegetatio* 35:137-151.
- Damman, A. W. H. and T. W. French. 1987. The ecology of peat bogs of the glaciated northeastern United States: a community profile. U.S. Fish and Wildlife Service Biological Report 85(7.16). 100 pp.
- Davis, R. B. 1964. Bryophytes and lichens of the spruce-fir forests of the coast of Maine. I. The ground cover. *The Bryologist* 76:190-194.
- Davis, R. B. 1966. Spruce-fir forests of the coast of Maine. *Ecol. Monogr.* 36:79-94.
- Davis, R. B. and D. S. Anderson. 1991. The Eccentric Bogs of Maine: a Rare Wetland Type in the United States. Maine Agricultural Experiment Station Technical Bulletin #146. University of Maine, Orono. 144 pp.
- Davis, R. B. and D. S. Anderson. 1999. A Numerical Method and Supporting Database for Evaluation of Maine Peatlands as Candidate Natural Areas. Maine Agricultural and Experiment Station Technical Bulletin #175. University of Maine, Orono. 166 pp.

- Davis, R. B. and D. S. Anderson. 2001. Classification and distribution of freshwater peatlands in Maine. *Northeastern Naturalist* 8:1-50.
- Dieffenbacher-Krall, A. 1994. Paleo- and historical-ecology of the Cutler Grasslands, Cutler, Maine. M.S. Thesis, University of Maine. Orono, Maine. 58 pp. + illus.
- Doyle, K. M., T. J. Fahey, and R. D. Paratley. 1987. Subalpine heathlands of the Mahoosuc range, Maine. *Bull. Torr. Bot. Club* 114:429-436.
- Dunlop, D. A. and G. E. Crow. 1985. The vegetation and flora of the Seabrook dunes with special reference to rare plants. *Rhodora* 87:471-486.
- Eastman, L. M. 1976. Chestnut oak, *Quercus prinus* L., in Maine and its relevance to the Critical Areas Program. Planning Report #14, State Planning Office, Augusta, Maine. 11 pp.
- Engstrom, B.E. 1997. Inventory and classification of natural communities along the Upper Saco River, New Hampshire. New Hampshire Natural Heritage Inventory, Department of Resources and Economic Development, Concord, NH.
- Esslinger, T. L. 1997. A cumulative checklist for the lichen-forming, lichenicolous and allied fungi of the continental United States and Canada. North Dakota State University: <http://www.ndsu.nodak.edu/instruct/esslinge/chcklst/chcklst7.htm> (First Posted 1 December 1997, Most Recent Update 27 August 2001), Fargo, North Dakota.
- Fahey, T. J. 1976. The vegetation of a heath bald in Maine. *Bull. Torr. Bot. Club* 103:23-29.
- Fahey, T. J. and W. A. Reiners. 1981. Fire in the forests of Maine and New Hampshire. *Bull. Torr. Bot. Club* 108:362-373.
- Famous, N. C. 1998. Township 40 MD Landscape Analysis, Hancock County, Maine. Prepared for the Maine Bureau of Parks and Lands. Department of Conservation, Augusta.
- Famous, N. C. and M. Spencer. 1992. An Evaluation of the Maine Bureau of Public Lands Cutler Management Unit Using Landscape Analysis and Field Verification. Final Report. Spencer/Famous Environmental Consulting
- Fernald, M. L. and K. M. Wiegand. 1910. A summer's botanizing in eastern Maine and western New Brunswick. *Rhodora* 12:101-146.
- Flaccus, E. 1959. Revegetation of landslides in the White Mountains of New Hampshire. *Ecology* 40:692-703.
- Foster, J. R. and W. A. Reiners. 1983. Vegetation patterns in a virgin subalpine forest at Crawford Notch, New Hampshire. *Bull. Torrey Bot. Club* 110:141-153.
- Frye, R. F., and J. A. Quinn. 1979. Forest development in relation to topography and soils on a floodplain of the Raritan River, New Jersey. *Bull. Torrey Bot. Club* 106:334- 345.
- Gawler, S. C. 1988. Disturbance-mediated Population Dynamics of *Pedicularis furbishiae* S. Wats., a rare riparian endemic. Ph.D. Dissertation, Univ. of Wisconsin - Madison. 195 pp.
- Gawler, S. C. 1991. Natural Landscapes of Maine: A Classification of Ecosystems and Natural Communities. Maine Natural Areas Program, Dept. of Conservation, Augusta, Maine. 77 pp.

- Gawler, S. C. 1998. Priorities and Tools for Protecting Peatlands in Maine - a report submitted to the US EPA. Natural Areas Division, Department of Conservation.
- Gawler, S. C. 2000. Vegetation Mapping of Acadia National Park: Classification, Keys, and Vegetation Types. a report from the Maine Natural Areas Program to The Nature Conservancy, Arlington, Virginia. 156 pp.
- Gawler, S. C. 2001. Natural Landscapes of Maine: A Classification of Vegetated Natural Communities and Ecosystems. Maine Natural Areas Program, Augusta. 70 pp.
- Gawler, S. C. and C. Jessee. 1997. Conservation plan for the Hollis Training Site, Maine Army National Guard. Department of Conservation, Augusta, ME.
- Gawler, S. C., J. J. Albright, P. D. Vickery, and F. C. Smith. 1996. Biological Diversity in Maine: an Assessment of Status and Trends in the Terrestrial and Freshwater Landscape. Maine Natural Areas Program, 93 State House Station, Augusta, Maine. 79 pp. + appendices.
- Golet, F. C., A. J. K. Calhoun, W. R. DeRagon, D. J. Lowry, and A. J. Gold. 1993. Ecology of Red Maple Swamps in the Glaciated Northeast: A Community Profile. U. S. Fish and Wildlife Service, National Wetlands Research Center. Lafayette, LA. 151 pp.
- Grossman, D. H., D. Faber-Langendoen, A. S. Weakley, M. Anderson, P. Bourgeron, R. Crawford, K. Goodin, S. Landaal, K. Metzler, K. D. Patterson, M. Pyne, M. Reid, and L. Sneddon. 1998. International Classification of Ecological Communities: Terrestrial Vegetation of the United States, Volume I. The National Vegetation Classification System: development, status and applications. The Nature Conservancy, Arlington, Virginia, USA. 126 pp.
- Grossman, D. H., K. L. Goodin, and C. L. Reuss, eds. 1994. Rare Plant Communities of the Conterminous United States: An Initial Survey. The Nature Conservancy and The Association of Natural Heritage Programs and Conservation Data Centers, Arlington, Virginia. 620 pp.
- Haines, A. and T. F. Vining. 1998. Flora of Maine: a manual for identification of native and naturalized vascular plants of Maine. V. F. Thomas Co., Bar Harbor, Maine. 847 pp.
- Harris, P. 1991. Waterboro Barrens Report. Unpublished report, The Nature Conservancy, Brunswick, Maine.
- Heinselman, M. L. 1981. Fire intensity and frequency as factors in the distribution and structure of northern ecosystems. pp. 7-57 in Mooney, H. A., T. M. Bonnicksen, N. L. Christensen, J. E. Lotan, and W. A. Reiners (technical coordinators). Fire regimes and ecosystem properties. Proceedings of the conference, December 1978, Honolulu, Hawaii. U. S. D. A. Forest Service General Technical Report WO-26.
- Henault, R. L. 1995. The Establishment of a Permanent Plot in a Pitch Pine Dune Woodland at Morse Mountain Conservation Area. Unpublished report, Bates College - Sharon Kinsman's Research Course.
- Hill, A. F. 1923. The vegetation of the Penobscot Bay region, Maine. Proc. Portland Soc. Nat. Hist. Vol. 3. Pt. 3:305-438.
- Hinds, J. W. and P. L. Hinds. 1998. An annotated checklist of Maine macrolichens. pp. 345-376 in Glenn, M. G., R. C. Harris, R. Dirig, and M. S. Cole, eds.,

- Lichenographia Thomsoniana: North American Lichenology in Honor of John W. Thomson. Mycotaxon Ltd., Ithaca, NY. 445 pp.
- Hoffman, C. 1995. Vegetation Patterns in the Saco River Floodplain Forest in Relation to Elevation and Flooding. M.S. Thesis, Antioch New England Graduate School, Keene, NH. 82 pp.
- Holland, M. M. and C. J. Burk. 1984. The herb strata of three Connecticut River oxbow swamp forests. *Rhodora* 86:397-415.
- Jacobson, G. L. Jr. and H. A. Jacobson. 1989. An Inventory of Distribution and Variation in Salt Marshes from Different Settings along the Maine Coast. Maine Geological Survey. Neotectonics of Maine.
- Jones, J. J. 1989. Inland Beach and Shoreline Character Evaluation within the Unorganized Towns in Maine. Maine Department of Conservation and Maine State Planning Office, Augusta. 28 pp.
- Keddy, P. A. 1983. Shoreline vegetation in Axe Lake, Ontario: effects of exposure on zonation patterns. *Ecology* 64:331-344.
- Keddy, P. A. and I. C. Wisheu. 1989. Ecology, biogeography, and conservation of coastal plain plants: some general principles for the study of Nova Scotia wetlands. *Rhodora* 91(865):72-94.
- Kern, M.J. 1985. T15R9 Aroostook County. A natural resources inventory. Bureau of Public Lands, Department of Conservation. State Planning Office, Augusta, Maine. 169 pp.
- Keys, J., Jr., C. Carpenter, G. Hooks, F. Koenig, W. H. McKlab, W. Russell, and M. L. Smith. 1995. Ecological Units of the Eastern United States - first approximation (map and booklet of map unit tables). U.S. Department of Agriculture, Forest Service, Atlanta, Georgia.
- Laderman, A. D. 1989. The Ecology of Atlantic White Cedar Wetlands: A Community Profile. U.S.F.W.S. Biol. Rept. 85(7.21). 114 pp.
- Langdon, R., J. Andrews, K. Cox, S. Fiske, N. Kamman and S. Warren. 1998. A Classification of the Aquatic Communities of Vermont. Vermont Office of The Nature Conservancy and Vermont Biodiversity Project.
- Leak, W. B. 1987. Characteristics of five climax stands in New Hampshire. Research note NE-336. USDA Forest Service. Northeast Forest Experiment Station. Broomall, PA. 5 pp.
- Lorimer, C. G. 1977. The presettlement forest and natural disturbance cycle of northeastern Maine. *Ecology* 58:139-148.
- MacDougall, A. 2001. Conservation status of Saint John River Valley hardwood forest in western New Brunswick. *Rhodora* 103:47-70.
- Marchand, P. J. 1977. Subalpine bogs of the Mahoosuc Range, Maine: Physical characteristics and vegetation development. Contribution No. 11, The Center for Northern Studies, Wolcott, VT. 19 pp.
- May, D. E. and R. B. Davis. 1978. Alpine tundra vegetation on Maine mountains and its relevance to the Critical Areas Program. Planning Report #36. State Planning Office. Augusta, Maine. 66 pp.
- Maycock, P. F. 1961. The spruce-fir forests of the Keweenaw peninsula, Northern Michigan. *Ecology* 42:357-365.

- McCune, B. and M. J. Mefford. 1999. Multivariate Analysis of Ecological Data, version 4.0. MjM Software, Gleneden Beach, Oregon, USA.
- McIntosh, R. P. 1959. Presence and cover in pine-oak stands in the Shawangunk Mountains, New York. *Ecology* 40:482-485.
- McMahon, J. S. 1993. Saving All the Pieces - An Ecological Reserves Proposal from Maine. *Maine Naturalist* 1(4): 213-222.
- McMahon, J. 1998. An Ecological Reserves System Inventory: Potential Ecological Reserves on Maine's Existing Public Lands and Private Conservation Lands. Maine Forest Biodiversity Project and Maine State Planning Office. 122 pp.
- McMahon, J. S. 1990. The biophysical regions of Maine: patterns in the landscape and vegetation. M.S. Thesis, University of Maine, Orono. 120 pp.
- McPhedran, J. 1998. Natural Community Mapping within a Proposed Ecological Reserve in Central Maine. M. S. Thesis, Dept. of Botany, Field Naturalist Program. University of Vermont, Burlington, VT. 84 pp.
- Metzler, K. J. and A. W. H. Damman. 1985. Vegetation patterns in the Connecticut River flood plain in relation to frequency and duration of flooding. *Naturaliste Can. (Rev. Ecol. Syst.)* 112:535-547.
- Mittlehauser, G. H., J. H. Connery, and J. Jacobs. 1996. Inventories of selected flora and fauna on 10 islands of Acadia National Park, Maine. U.S. Department of the Interior, National Park Service. Natural Resources Technical Report NPS/NESO-RNR/NRTR/96-01. 118 pp.
- Moloney, K. A. 1986. Wave and nonwave regeneration processes in a subalpine *Abies balsamea* forest. *Can. J. Bot.* 64:341-349.
- Motzkin, G. 1991. Atlantic White Cedar Wetlands of Massachusetts. Research Bulletin No. 731, Massachusetts Agricultural Expt. Sta. 53 pp.
- Mulligan, A. D. 1980. The flora, vegetation, and phytogeographic relationships of Whaleboat Island, Casco Bay, Maine. *Rhodora* 82:441-459.
- Nelson, B. W. and L. K. Fink. 1980. Geological and Botanical Features of Sand Beach Systems in Maine. Bulletin No. 14, Maine Sea Grant Publications. 163 pp.
- Newcomb, L. 1977. Newcomb's Wildflower Guide. illus. by Gordon Morrison. Little, Brown and Co., Boston. 490 pp.
- Nichols, G. E. 1935. The hemlock-white pine-northern hardwood region of eastern North America. *Ecology* 16:403-422.
- Nichols, W. F., J. M. Hoy, and D. D. Sperduto. 2001. Open Riparian Communities and Riparian Complexes in New Hampshire. New Hampshire Natural Heritage Inventory, Department of Economic and Community Development, Concord, NH.
- Niering, W. A. and R. S. Warren. 1980. Vegetation patterns and processes in New England salt marshes. *Bioscience* 30:301- 307.
- Nixon, S. W. 1982. The ecology of New England high salt marshes: a community profile. U.S. Fish and Wildlife Service Office of Biological Services, Washington D.C. FWS/OBS-81/5570 pp.
- Norton, A.H. 1927. Botanical notes from the Millbridge region. *Maine Naturalist* 7:148-151.

- Odum, W. T., T. J. Smith III, J. K. Hoover, and C. C. McIvor. 1984. The ecology of tidal freshwater marshes of the United States east coast: a community profile. U.S. Fish Wildl. Serv. FWS/OBS-83/17. 177 pp.
- Olday, F. C., S. C. Gawler, and B. St. John Vickery. 1982. Seven unusual sub-Arctic plants of the Maine coast. Planning Report #78, Critical Areas Program, State Planning Office, Augusta, ME.
- Olmsted, C. E. 1937. Vegetation of certain sand plains of Connecticut. Bot. Gaz. 99:209-300.
- Oosting, H. J. and J. F. Reed. 1944. Ecological composition of pulpwood forests in northwestern Maine. Am. Midl. Nat. 31:182-210.
- Poiani, K. and B. Richter. 1999. Functional Landscapes and the Conservation of Biodiversity. Working Papers in Conservation Science No. 1. The Nature Conservancy, Conservation Science Division. Arlington, Virginia. 8 pp.
- Rappaport, N. R. and F. R. Wesley. 1985. A Vegetation Study of Nine Bird Islands Off the Coast of Maine. Unpub. report prepared for the National Audubon Society. 63 pp.
- Reiners, W.A. and G. E. Lang. 1979. Vegetational patterns and processes in the balsam fir zone, White Mountains, New Hampshire. Ecology 60:403-417.
- Roberts, B. A. and A. Robertson. 1986. Salt marshes of Atlantic Canada: their ecology and distribution. Can. J. Bot. 64 455-467.
- Rogers, R. S. 1978. Forests dominated by hemlock (*Tsuga canadensis*): distribution as related to site and postsettlement history. Can. J. Bot. 56:843-854.
- Rogers, R. S. 1980. Hemlock stands from Wisconsin to Nova Scotia: transitions in understory composition. Ecology 61:178-193.
- Russell, E. W. B. 1983. Indian-set fires in the forests of Northeastern United States. Ecology 64:78-88.
- St. John, H. 1929. Plants of the headwaters of the St. John River, Maine. Research Studies of the State College of Washington. Vol 1:28-58.
- Siccama, T. G., F. H. Bormann, and G. E. Likens. 1970. The Hubbard Brook ecosystem study: Productivity, nutrients, and phytosociology of the herbaceous layer. Ecol. Monogr. 40:389-402.
- Singleton, J., J. Loo and J. Foley. 2000. Conservation guidelines for ecologically sensitive forested sites on private woodlots within the Fundy Model Forest. Information Report M-X-207E. Canadian Forest Service - Atlantic Forestry Centre. Fredericton, NB, Canada. 57 pp.
- Society of American Foresters. 1980. Forest Cover Types of the United States and Canada. Society of American Foresters, Bethesda, Maryland. 148 pp.
- Sorenson, E. R. 1986. The ecology and distribution of ribbed fens in Maine and their relevance to the Critical Areas Program. Planning Report no. 81. State Planning Office. Augusta, ME. 171 pp.
- Sorenson E. R., B. Engstrom, M. Lapin, R. Popp and S. Parren. 1998a. Northern white cedar swamps and red maple - northern white cedar swamps of Vermont: Some sites of ecological significance. Nongame and Natural Heritage Program, Vermont Fish and Wildlife Department, Waterbury, VT. 45 pp.

- Sorenson, E., M. Lapin, B. Engstrom, and R. Popp. 1998b. Floodplain forests of Vermont: some sites of ecological significance. Nongame and Natural Heritage Program, Vermont Fish and Wildlife Department. 18 pp.
- Sperduto, D. D. 1994. Coastal Plain Pondshores and Basin Marshes in New Hampshire. Report submitted to the Environmental Protection Agency, Wetlands Protection Division, Region 1. New Hampshire Natural Heritage Program, Department of Economic and Community Development, Concord, NH. 97 pp.
- Sperduto, D. D. 2000. A classification of wetland natural communities in New Hampshire. New Hampshire Natural Heritage Inventory, Department of Economic and Community Development, Concord, NH. 156 pp.
- Sperduto, D. D. and N. Ritter. 1994. Atlantic White Cedar Wetlands of New Hampshire. Report submitted to the Environmental Protection Agency Wetlands Protection Section, Region 1. New Hampshire Natural Heritage Program, Dept. of Resources and Economic Development, Concord, NH. 97 pp.
- Sperduto, D. D. and C. V. Cogbill. 1999. Alpine and Subalpine Vegetation of the White Mountains, New Hampshire. A report prepared for the USDA Forest Service, Laconia, NH. New Hampshire Natural Heritage Inventory, Department of Economic and Community Development, Concord, NH. 25 pp. + appendices.
- Sperduto, D. D. and K. F. Crowley. 2001. Key to Upland Forest Communities in New Hampshire. New Hampshire Natural Heritage Inventory, Department of Economic and Community Development, Concord, NH.
- Sprugel, D. G. 1976. Dynamic structure of wave-regenerated *Abies balsamea* forests in the northeastern United States. *J. Ecol.* 64:889-911.
- Stern, R. J. 1979a. Old growth white oak (*Quercus alba*) stands and their relevance to the Critical Areas Program. Planning Report #65, State Planning Office, Augusta, ME. 35 pp.
- Stern, R. J. 1979b. Old growth shagbark hickory (*Carya ovata*) stands in Maine and their relevance to the Critical Areas Program. Planning Report #66, State Planning Office, Augusta, Maine. 26 pp.
- Teal, J. M. 1986. The ecology of regularly flooded salt marshes of New England: a community profile. U.S. Fish and Wildlife Service, Biol. Rep. 85(7.4). 61 pp.
- The Nature Conservancy and the Environmental Systems Research Institute. 1994. NBS/NPS Vegetation Mapping Program: Standardized National Vegetation Classification System. Prepared for the U.S. Department of the Interior, National Biological Survey and National Park Service.
- Therres, G.D. 1999 Wildlife species of regional conservation concern in the northeastern United States. *Northeast Wildlife* 54:93-100.
- Thompson, E. H. 1980. The role of fire in the Great Wass Island jack pine stand. Unpublished report submitted to The Nature Conservancy, Maine Chapter. 19 pp.
- Tyler, H. R. Jr., and C. V. Davis. 1982. Evaluation of No. 5 Bog and jack pine stand, Somerset, Maine, as a potential National Natural Landmark. Report prepared for the National Park Service, U.S. Department of the Interior. Maine Critical Areas Program, State Planning Office, Augusta, ME. 41 pp.

- Vaux, P. 2001. Maine Aquatics: Maine Aquatic Biodiversity Project Newsletter. MABP, Room 215, 650 State Street, Bangor, Maine. 5 pp.
- Vickery, P. D. 1990. Report on grassland habitats in relation to the presence of Grasshopper Sparrows (*Ammodramus savannarum*) and other rare vertebrates in Maine. A report prepared for the Maine Natural Heritage Program, Augusta, Maine. 29 pp.
- Vogelmann, H. W. 1976. An unusual Black Gum Swamp in Maine. *Rhodora* 78:326-327.
- Wheeler, A. G. 1991. Plant bugs of *Quercus ilicifolia*: myriads of mirids (Heteroptera) in pitch pine-scrub oak barrens. *J. New York Entomol. Soc.* 99:405-440.
- Widoff, L. 1987. Pitch pine/scrub oak barrens in Maine. 1988. Planning Report no. 86. Critical Areas Program, Maine State Planning Office, Augusta, ME and Maine Natural Heritage Program, TNC. Topsham, ME. 104 pp.
- Widoff, L. 1988. Ecologically significant peatlands in Maine: Recommendations for protection. Unpublished report to the Natural Resources Council of Maine.