Natural Landscapes of Maine

A Guide to Natural Communities and Ecosystems

by Susan Gawler and Andrew Cutko
Revised and updated edition 2018

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Foreword

Of fir and fen: exploring ecological patterns

You may not want to read this book. Are you a person who sees trees and flowers rather than hemlocks and trilliums? Do you call all the birds you see swimming in a pond 'ducks'? Do you think of those slimy plants growing in the intertidal zone as just 'seaweed'? If you answered 'yes' to one or more of these questions you may not be a good candidate to read this book. Perhaps you are one of those people who say things like "I love nature, but I just don't want my enjoyment of it cluttered up with a lot of names that I can't bother to remember" or perhaps you picked up this book thinking that it was a compilation of landscape paintings.

On the other hand, if you answered 'no' to those questions there is a good chance that you are a naturalist with enough sophistication, depth, and curiosity to appreciate what this book has to offer. You are probably ready to take the next step toward fully savoring the myriad species that share our planet, ready to understand a critical aspect of their ecology, the patterns by which they are organized into natural communities.

These patterns are driven by the processes through which organisms interact with their physical environment (for example soil, water, and climate) and one another (for example, as predators or competitors). At a very basic level you already know these patterns-you certainly would be shocked to see a hemlock growing in a stand of cattails because you understand that a forest community is profoundly different from a marsh community.

At a much higher level of complexity these patterns and processes are so complex that no one can fully understand them, not even professional ecologists who devote their lives to studying a single ecosystem. As Frank Egler wrote, "Ecosystems are not just more complicated than we think they are; they are more complicated that we can think." We can get a feel for this complexity with a simple math exercise. Imagine a community with a typical number of species (1000 would be a rough ballpark estimate that will make the math easy). Next multiply that number times all the other species in the community with which each species interacts (999 in our example because indirect interactions count too). You also have to account for a few dozen environmental attributes by multiplying them by your number of species; let's say 50. So, for our example $1000 \times (999 + 50) = 1,049,000$. Think about the critical role of innumerable microorganisms that are too small to see readily, many of which have not even been identified by scientists, and the task of sorting out all this complexity is truly overwhelming.

The good news is that this book operates at a level that is readily accessible and practical. It does this first of all by operating at a spatial scale that is easy to grasp, one in which natural communities correspond to those patches of vegetation easily discerned from any overlook, patches that we would typically measure in acres. Conceptually, natural communities can exist at any scale; the invertebrates and microbes inhabiting a single acorn decomposing on the forest floor have been described as a community and all life on Earth constitutes the biggest community, the biosphere. The scale used in this book fits most human enterprises for it corresponds reasonably well to the scales at which we divide up the land for different uses and ownerships.

This book is also a convenient introduction to understanding ecological patterns because it is largely based on the conspicuous plant species that dominate and usually define natural communities. You will not have to discriminate among dozens of different sedges or measure soil pH or net butterflies to identify the natural communities defined here. Knowing a few dozen plants, many of them trees and other well known species, will take you a long way down the path of natural community classification.

The practical nature of this natural community classification also makes it an important tool for conservationists. Beginning in the 1980s conservationists started to look beyond the habitat needs of some rare birds, mammals, and a few plants to think about conserving all species. This idea was conceptualized under the banner of biological diversity, soon truncated to 'biodiversity.' Now every species, even fungi and worms yet to be described by science, is recognized as having value and meriting action to assure that it does not become extinct. But how do you undertake conservation action for huge numbers of species ... actually millions of species on a global scale?

One efficient approach is to protect entire communities on the assumption that this process will capture most of the species that constitute the community. Conserve a wetland and you protect habitat for hundreds of species, the majority of which are insects and other small creatures that you know almost nothing about. This is often called 'coarse filter' conservation, 'coarse' because the pores in this filter are large enough that some species will fall through and require individual attention. For example, conserving a wetland would not be sufficient to protect the peregrine falcons that occasionally fly by looking for an injured duck because peregrines have huge home ranges and, at least in Maine, are probably more limited by pesticide contamination than by a scarcity of wetlands. Thus peregrine conservation requires a fine-filter approach.

Employing a coarse-filter strategy depends on understanding how species are organized into predictable patterns and expressing that understanding in a community classification scheme. Such classifications are never perfect: some species are such habitat generalists that they seem almost ubiquitous across the landscape; some are so rare that they are seldom present even in their characteristic community. Nevertheless, if conservationists start with a good classification and protect a representative array of communities across the landscape this will go a very long way toward conserving a region's biodiversity.

So if you are a naturalist seeking to understand ecological patterns or a conservationist trying to use those patterns to undertake efficient conservation then this book has much to offer. And chances are, if you have read this far, you are just such a person.

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Introduction

Conservation of natural areas, or particularly of the vegetated habitats that comprise them, requires information on community composition, structure, distribution, and conservation status. This classification names and describes the 104 terrestrial natural communities of Maine and describes how different communities occur together as 24 larger-scale ecosystems over the Maine landscape. Common names for each natural community type are on the top of the profile page for that type and are used throughout the book. The more technical name for each type is down the side of the profile page.

Identifying and mapping natural communities on the landscape provides important baseline data for current and future conservation efforts. These efforts may include setting priorities for conservation action, developing management plans for specific areas, and local land use planning, among others. Consequently, the purpose of this classification is to provide a framework by which the Maine Natural Areas Program (MNAP) and others in applied conservation can identify natural communities and ecosystems, as these are important components of the state's ecological diversity. The classification is intended for a variety of users, ranging from professional ecologists to foresters, natural resource planners, land trust members, educators, and interested citizens.

Natural Community Concepts

Natural Communities and Ecosystems: What Are They?

A natural community is an assemblage of interacting plants and animals and their common environment, recurring across the landscape, in which the effects of human intervention are minimal. A natural community includes all of the organisms (plant, animal, etc.) in a particular physical setting, as well as the physical setting itself. Careful study of natural communities allows us to generalize and group similar habitats into natural community types that repeat across the landscape where similar environmental conditions occur. For example, Oak - Pine Forests on rocky hillsides in York County and Androscoggin County should be recognizable as the same community type. A 'natural community type' is thus a conceptual pigeonhole used to organize and make some sense of natural community variation.

Natural communities are the primary 'coarse filter' for capturing and protecting biological diversity; that is, protecting a natural community conserves all of its component species, even ones we may not know are there. Recognizing that conservation often involves landscape processes, this classification also addresses how natural communities occur together on the landscape at broader scales. Aggregations of natural communities on the landscape that share similar environmental settings or ecological processes can be thought of as ecological systems (Poiani and Richter 1999) and are here termed ecosystems . This classification adopts the convention that an ecosystem is a group of communities and their environment, occurring together over a particular portion of the landscape and held together by some common physical or biotic feature.

The different scales (natural communities and ecosystems) incorporated into this classification acknowledge different levels of ecological complexity. Just as species are integrated into natural communities, so are communities aggregated into ecosystems, and ecosystems aggregated into landscapes. In conservation work, the appropriate ecological scale depends on the conservation goal; in many cases it may be more instructive to consider the ecosystem scale unit, rather than an individual natural community or species. Conservation of a large peatland, for example, is

¹ The concept of a community as used here differs from the definition found in most ecology textbooks. A 'community', in the ecological sense, is usually described as a particular group of organisms which interact and share a common environment, but the physical environment is not part of the community itself. One can refer to a 'plant community', a 'bird community', a 'soil fauna community', etc.

² In the world of biology and ecology, 'ecosystem' can actually have many different meanings. Ecosystems are defined at different scales, from 'the ecosystem' of a rotting log in a forest to 'the ecosystem' of the entire biosphere, depending on the context for the definition. Whatever the scale, an ecosystem includes all of the biotic (living) components, the abiotic (non-living) components, and their interactions.

better served by considering the entire ecosystem (e.g., a Domed Bog Ecosystem) rather than the individual natural communities (e.g., Dwarf Shrub Bog, Sedge – Heath Fen, Black Spruce Bog, and others) embedded within it. We hope that including both scales will make this classification more useful to those working to understand and conserve Maine's biodiversity.

Ecological Variation

Ecological systems and natural communities are both temporally and spatially variable. A Spruce – Pine Woodland on a rocky hilltop is likely to have patches of very open areas, where lichens and a few vascular plants dominate, and patches that are more heavily wooded: this is spatial variability. The small open patches do not have the 25 – 60% tree cover characteristic of that community type, but the area overall does, and the spatial variability can be integrated into an overall view of the community.

When do patches represent variability within a community type, and when might they be natural communities on their own? That depends both on the level of detail in the classification and on how the patches occur within the landscape. In this classification, small patches that occur (often repeatedly) within a larger community type and that obviously bear a similarity to the general community type are treated as spatial variation or smaller scale inclusions (as in the example above). Conversely, a distinct area that occurs under different environmental conditions and has different flora than the surrounding or adjacent community could be considered its own type. For example, the bald summit of a coastal hill may only be a few acres, but is clearly more open than the adjacent Pitch Pine Woodland on the upper slopes. The open bald is also environmentally distinct (summit vs. slope), and is characterized by different species in the herb layer (smooth sandwort and three-toothed cinquefoil are abundant on the bald and do not occur in the woodland). Therefore, the open bald could be called a Low-elevation Bald. Field experience and familiarity with this classification will bring a sense of when an area should be considered a distinct community and when it is part of the larger overall community.

Succession and natural disturbance introduce temporal variability. A Riverside Seep will be dominated by herbaceous plants or very low shrubs for a few years following heavy ice scour, but it can become densely shrubby if several years elapse without much ice. Spruce – Fir forests in the portions of Acadia National Park that burned in 1947 are now recognizable as either Maritime Spruce – Fir Forests or Lower-elevation Spruce - Fir Forests even though they may have a sizeable component of aspen and paper birch remaining from the early successional years. This classification describes mid- to late- successional forests, and stands with a more recent harvesting or disturbance history may differ in overstory dominants

from those described here. In these cases, the forest type can often be inferred from the later-successional trees present and by the understory and site characters. One early successional forest type is included, the Early Successional Forest, to account for typical early successional forests originating after wildfire.

Patterns of Formation

The landscape pattern of a natural community describes the scale of a typical occurrence of this community in Maine. Some communities tend to extend over large areas, while others are characteristically confined to only a small acreage. We use the three categories developed by The Nature Conservancy, referred to as 'small patch', 'large patch', and 'matrix-forming' (Anderson 1999).

- Small patch communities are the smallest landscape elements and occur under particular environmental conditions (e.g., Mid-elevation Bald). Up to about 50 acres in size, they collectively occupy only a very small portion (less than 1%) of the total landscape. They are often strongly influenced by the ecological dynamics in the surrounding large patch and matrix communities. Many of the rare community types in Maine are small patch types.
- Large patch communities are associated with more particular environmental
 conditions than are matrix-forming communities (e.g., Northern White
 Cedar Swamp), and cover fairly large but discretely defined areas of the
 landscape. Natural occurrences are typically in the 50 1000 acre size
 range, occasionally larger, and collectively occupy an estimated 10% of the
 landscape.
- Matrix-forming communities are those that cover the majority of the natural
 landscape of the region. In Maine, these are forest communities, such as a
 Northern Hardwoods Forest. Individual occurrences typically range from
 hundreds to several thousand acres. Together, the matrix-forming types
 form more or less contiguous cover over millions of acres, or roughly 90%
 of the landscape. Large patch and small patch communities are embedded
 within the matrix-forming types.

Rarity

To reflect the varying abundance of natural communities across the state, this classification assigns a rarity rank to each natural community type. Rarity ranks range from S1, the rarest, to S5, the most common (Appendix A). These same ranks are applied to plant species and animal species tracked by the state. In applying the rank criteria to each natural community, the absolute number of occurrences may be secondary to other factors like a limited geographic distribution or threats from competing uses. Readers may wonder why many common forest types (for example, Sugar Maple Forests) are given a rank of S4 even though the type may be abundant statewide. MNAP interprets the criterion for an S5 rank of 'demonstrably secure' to mean that high-quality examples are secure and sufficiently distributed throughout the state. Common types that are in working forestland and not set aside as reserved lands are not considered secure high-quality examples for ranking purposes.

MNAP tracks the location and status of each occurrence of a natural community that is considered to be:

- 1. any occurrence of a community type that is rare statewide (i.e., ranked S1, S2, or S3), or
- 2. an exemplary occurrence of a more common community type (ranked S4 or S5). Exemplary occurrences with EO rank A or B are those that have representative composition for the type, lack or only have minimal evidence of past anthropogenic disturbances, are maturing to mature in relative age (for forest types), are significantly large in comparision to other intact patches, and are primarily driven by natural disturbances and processes.

Beyond our statewide view, it is also important to consider global rarity. Several natural community types are not only rare in Maine but also rare throughout North America. Other types that are rare statewide are more extensive elsewhere, such as White Oak – Red Oak Forests that are more common south of Maine. Assessing the global rarity of a community type is more complicated than developing state ranks, but continuing efforts (e.g., Grossman et al. 1994 and NatureServe 2001) are highlighting those community types especially in need of conservation attention wherever they occur. Appendix B lists the National Vegetation Classification types (defined by NatureServe) that correspond to the Maine types. Note that Maine's natural communities may be more broadly defined than the global types.

Globally Rare Natural Community Types in Maine	2
Alpine Snowbank	G2G3
Freshwater Tidal Marsh, in part	G2
Heath Alpine Ridge, in part	G2G3
Outwash Plain Pondshore	G2G3
Pitch Pine – Scrub Oak Barren	G2
Pitch Pine Dune Woodland	G2
Pitch Pine Woodland	G2
Rivershore Outcrop	G3
Riverwash Sand Barren	G1
Windswept Alpine Ridge	G2G3

Natural Communities and Climate Change

How should natural community concepts be considered in the context of a changing climate? Historic pollen data indicate that Maine's natural communities have been dynamic rather than static, responding to continuous climate shifts for thousands of years. Following the retreat of the last glaciers, for example, the northeastern U.S. became as much as 2°C (4°F) warmer and the air considerably drier than it is today. White pine was widespread and abundant from frequent fires, spruce was scarce, and both white pine and hemlock grew at higher elevations than they do now (Davis et al. 1980).

Looking forward, a changing climate will ensure that transitions in natural community distribution and composition continue. Recent projections suggest that Maine will experience warmer year round temperatures, increases in precipitation and storm intensity, and rising sea levels (University of Maine 2009). In light of these projections, the University of Maine recently suggested that "climate change will almost certainly lead to significant changes in Maine's overall assemblage of plants and animals." Among other changes, within the next few centuries red spruce and balsam fir are expected to be replaced by red oak, red maple, and white pine (US Forest Service 2009 http://www.nrs.fs.fed. us/atlas/. Moreover, if historic patterns foreshadow future trends, entire natural communities will not just pack up and shift north as a unit. Rather, the ranges of individual species will change in different and unpredictable ways, potentially resulting in combinations of species that do not occur together today.

Do seemingly inevitable changes diminish the importance of conserving natural communities that now exist on the landscape? On the contrary, a key adaptive

strategy for climate change should be to maintain functional, resilient natural systems and viable landscape scale connections between them. As Maine's Beginning with Habitat program noted, "One thing we can control is how permeable our built landscape will be. By planning for undeveloped 'green belts', or habitat corridors that connect conserved habitat blocks, we can better support gradual species range shifts through and around developed areas" (Walker 2009). Habitat conservation may also help give plants and animals that are already rare the best chance to remain viable as the climate changes. Last and perhaps most importantly, habitat conservation offers a way to ensure that an adequate and representative sample of Maine's underlying physical features (including geology, soils, landform, and elevation) are safeguarded for the long term. These underlying features, together with climatic factors, will ultimately influence what species will occur where. With sufficient natural communities and physical features conserved, Maine's landscape will be most favorably positioned to accommodate whatever vegetation changes a shifting climate will impose.

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About This Classification

How This Classification Was Developed

This classification is a comprehensive revision of MNAP's Natural Landscapes of Maine: a Classification of Ecosystems and Natural Communities (Gawler 1991). Additional information and field survey data amassed since that time provide the basis for refining the community types to better represent the diversity of Maine's vegetated habitats.

A draft set of revised types was derived based on previous analyses (McMahon 1998, Anderson and Davis 1997, Gawler 2000), the author's personal experience, comments from other users, and discussions with natural heritage program ecologists in New Hampshire, Vermont, Massachusetts, and New York. These draft types were cross-referenced to the existing types and to the National Vegetation Classification (NVC) developed by The Nature Conservancy (TNC) and the NatureServe. Quantitative analyses of over 1,000 natural community plot samples were conducted as the first approach to evaluating the proposed types. Additional details on the quantitative analysis used are in Appendix E.

The quantitative analyses were augmented with qualitative information from MNAP files. Hundreds of field forms with notes describing specific examples of natural communities in Maine, as well as journal articles and reports in the primary scientific literature, were reviewed as supplementary materials for the community type delineation.

Relationships to Other Classifications

A classification is a tool designed for specific purposes. While a forest classification for timber management would be different from an ecological classification, both are legitimate tools to serve their need. This natural community classification is designed to aid conservation of natural diversity in Maine and does not have a one-to-one relationship with other vegetation or ecosystem classifications. Refer to Appendix B for a comparison of Maine's natural community types to other classification systems.

SAF types: This vegetation classification, limited to forests, was developed by the Society of American Foresters and most recently revised in 1980. Types are described based almost entirely on overstory tree species. Some SAF types apply to more than one natural community type (e.g., SAF type 37, Northern White Cedar, is applied to four Maine types).

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Other Natural Heritage and Conservation Data Centre (CDC) Classifications: The New Hampshire Natural Heritage Inventory has identified over 200 types

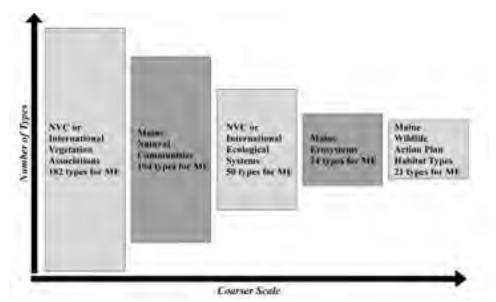
The New Hampshire Natural Heritage Inventory has identified over 200 types for that state, so New Hampshire types are more finely split than Maine types.³ Natural community classifications in the Maritimes and Quebec are currently under development but are also more finely split. All natural heritage and CDC classifications are cross-referenced to the National Vegetation Classification.

NVC types: The National Vegetation Classification (NVC) system was developed by NatureServe, including its constituent natural heritage programs in the United States. This system, also called International Vegetation Associations, is a comprehensive classification of vegetation types arranged in a physiognomic hierarchy. The basic unit of classification in the NVC is the association, which is roughly analogous to the present classification's natural community. Twothirds of the natural community types in the Maine classification relate 1:1 with NVC associations; the remaining third of the Maine types are broader than the NVC types, i.e., more than one NVC type corresponds to a single Maine type. There is a difference in concept between Maine's natural communities and NVC associations. Maine natural community types are somewhat broader units that include a particular environmental setting and may include patches of different vegetation types. Some associations are more finely split – they are strictly vegetation-based and are theoretically more homogeneous in their structure and dominant species. For example, Maine's Outwash Plain Pondshore natural community type includes several NVC plant associations in concentrically banded zones. While the individual associations differ in their dominant plants, the collection of associations is bound together by the basin hydrology, responds to the same environmental factors and from a practical standpoint makes up one conservation entity. It matters less what the unit(s) are called than that the appropriate target area is chosen for conservation actions.

International Ecological Systems: Recognizing the limitations of the fine-scaled NVC classification for landscape-scale mapping and conservation planning, NatureServe worked with a number of federal partners to develop an international classification of coarser-scaled ecological systems. Ecological systems are currently being mapped at regional, national, and international levels through federal projects such as the Landfire Project GAP project. Each ecological system typically encompasses a few to more than 10 NVC types. The ecosystem types in Maine's classification are closely related to the national ecological systems and may someday be replaced by them as a classification unit.

 $^{^3}$ For more information on New Hampshire community types, contact the New Hampshire Natural Heritage Inventory at 603-271-3623 or on the web at http://www.nhdfl.org/about-forests-and-lands/bureaus/natural-heritage-bureau/

The scaled relationships of the various classification types, ranging from fine scale (NVC) to coarse scale (ME Wildlife Action Plan Habitat Types) are shown below:



NWI types: The National Wetlands Inventory (NWI) classifies wetland vegetation according to physiognomy (structure) and hydrology. In almost all cases, the NWI types are broader than the natural community types. For example, the 'PEM1' (Palustrine Emergent Marsh - Persistent) NWI type applies to 13 different natural community types. NWI types may indicate certain ecological functions relevant for regulatory purposes, but they are poor predictors of biodiversity. Also, the NWI mapping tends to be less accurate for forested wetlands than for open ones because of the difficulty of distinguishing some wetland forest types on aerial photos.

Ecoregions: Ecoregional classifications are fundamentally different from but complementary to vegetation classifications. Rather than focusing on particular vegetation or landform types, ecoregional classifications delineate broad geographic patterns incorporating major vegetation types, climate, and geology. Ecoregional classifications provide a useful way of stratifying large landscapes into discrete units for Georgia A Wegineri Mountain conservation planning efforts. The ecoregional classification used in this publication is the 'section' level (intermediate between coarserscaled 'provinces' and finer-scaled 'subsections') and draws from various national and state classification efforts including Bailey (1995), Keys et al. (1995), and McMahon (1990). The

seven sections are used in the natural community profiles to depict the geographic distribution or range of communities throughout the state.

Ecological Land Types: Another commonly used approach to categorizing landscape-scale diversity is the use of Ecological Land Types (ELTs), also known as Ecological Land Units (ELUs). This is a GIS-based remote classification approach in which different combinations of physical landscape variables are arranged into groupings and the groupings mapped. Mapping ELUs gives some representation of the physical diversity of an area, which can be useful in stratifying areas or in selecting areas with particular characteristics for inventory. For example, using GIS layers of bedrock geology and landscape position (elevation, slope and aspect), Anderson et al. (1998) developed ELUs for the Connecticut River watershed. These ELUs were then used as a predictive model to identify natural communities on the landscape and select a set of priority areas (each >8000 acres) that together would encompass the major ecological features present in the watershed. However, using ELUs to select specific conservation targets has two major drawbacks. First, geographic information is not always available at the level of resolution at which it is needed. For example, soil surveys are available for southern Maine, but not for much of northern Maine; similarly, the bedrock of Maine is mapped at a decent resolution for part of the state, but the northern and especially northwestern portions are only generally mapped. The second drawback is that the relationship between ELUs and natural communities is not necessarily straightforward, so ELUs cannot be thought of as a surrogate for natural communities. ELUs have considerable promise for informing conservation efforts and our understanding of landscape diversity, but at this point the applications are not sufficiently developed to be a substitute for on-the-ground natural community inventories.

Associated Rare and Common Plant and Wildlife Species

Common names for plants and animals are used in this classification. See Appendix C for a cross reference to scientific names for plants and Appendix D for a cross reference for rare animals.

The list of associated rare plants notes species that are documented from that community type within the state. For space reasons, not all rare plants that occur in a type are necessarily listed. Rarely, plants not currently known from Maine but documented in that community type from an adjacent state/province are included (e.g., wild lupine in Pitch Pine – Scrub Oak Barrens). The Maine Natural Areas Program can provide lists and additional information on plants considered rare in Maine.

The list of associated rare animals includes those that are listed as endangered, threatened, or rare in Maine. The list of associated rare animals represents

a systematic attempt to match rare animal species with natural community types based on the known habitat uses and preferences of the animals and the particular compositional, structural, and hydrological characteristics of the community. Animal species' geographic ranges and expected distributions of natural community types were also considered. The process involved a careful examination of the literature and review by wildlife biologists with expertise in specific taxonomic groups.

Because of the broad ecological amplitude and mobility of many animal species, their allegiance to particular substrate or compositional characteristic is not as strong as that for many plant species. Therefore, a conservative approach was taken in assigning animal species to natural community types and focused on species that showed a strong preference for one or a few community types (especially those communities that play a critical role in one of the life stages of the animal—i.e., breeding, feeding or overwintering). This approach was intended to avoid including habitat generalists or species that use habitats heavily influenced by human disturbance. The species list is intended as a guidepost and is not exhaustive.

Limitations

An important limitation of this classification is that it applies primarily to vegetated communities in a relatively natural condition. Aquatic communities that are not characterized by vascular plants are not covered, including the non-vegetated Lacustrine, Riverine, Estuarine, and Marine types in Maine's 1991 natural community classification. State and regional efforts to develop classifications of aquatic systems by The Nature Conservancy and others have more recently focused on the physical characteristics of ponds, lakes, streams, and rivers. Even in the vegetated realm, some gaps remain, for instance in the coverage of submerged aquatic vegetation.

Communities initiated and maintained by human activities (agricultural fields, lawns, roadsides, forest planta-tions, etc.) are not considered natural communities and are not included in this classification.

Furthermore, it is important to realize that while conserving natural community diversity is an essential component of biological conservation, it will not protect all of the biological diversity in any given area. Additional attention must be provided to certain 'fine filter' species (e.g., rare species found in small populations or in very particular habitats) as well as to wide-ranging animal species, two groups that are not adequately addressed by the coarse filter approach. A combination of coarse-filter and fine-filter approaches is most likely to be successful in conserving

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biological diversity in any given area.

This classification is dynamic and intended to be periodically updated. Our concepts of plant associations and natural communities can shift as we learn more about Maine's flora and fauna. We lack good descriptions of some communities, and, as inventory work continues, our understanding of the relative rarity of the different community types may change. The MNAP welcomes information about natural communities and ecosystems from field biologists and ecologists.

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List of Natural Community Types

Natural community types are arranged by class, sub-class, and group within each of four major divisions: wooded uplands, wooded wetlands, open uplands, and open wetlands. Natural community types ranked S1, S2, or S3 are considered rare in Maine.

Wooded Uplands

Class	Sub-class	Natural Community Type	State Rank	Page
		Hemlock Forest	S4	76
		Jack Pine Forest	S1	78
		Lower-elevation Spruce – Fir Forest	S5	82
	Conifer	Maritime Spruce – Fir Forest	S4	84
	Conne	Montane Spruce – Fir Forest	S5	86
		Red and White Pine Forest	S3	108
		Subalpine Fir Forest	S3	118
Forests		White Pine Forest	S5	126
Fore		Enriched Northern Hardwoods Forest	S3	74
		Northern Hardwoods Forest	S5	88
	Deciduous	Oak – Hickory Forest	S1	92
		Sugar Maple Forest	S4	120
		White Oak – Red Oak Forest	S3	124
		Oak – Northern Hardwoods Forest	S5	94
	Mixed	Oak – Pine Forest	S5	96
		Spruce – Northern Hardwoods Forest	S5	112
	Conifer	Black Spruce Barren	S2	66
		Black Spruce Woodland	S3	68
		Jack Pine Woodland	S3	80
		Pitch Pine Dune Woodland	S1	100
		Pitch Pine – Heath Barren	S1	102
		Pitch Pine – Scrub Oak Barren	S2	104
S		Pitch Pine Woodland	S3	106
lland		Red Pine Woodland	S3	110
Woodlands		Spruce – Pine Woodland	S4	114
>		Spruce Rocky Woodland	S4	116
		White Cedar Woodland	S2	122
		Birch – Oak Rocky Woodland	S3	64
	Deciduous	Chestnut Oak Woodland	S1	70
	Deciduons	Early Successional Forest	S5	72
		Oak – Ash Woodland	S3	90
	Mixed	Oak – Pine Woodland	S4	98

Wooded Wetlands

Class	Sub-class	Natural Community Type	State Rank	Page
	0 15	Atlantic White Cedar Swamp	S2	132
		Evergreen Seepage Forest	S4	140
	Conifer	Northern White Cedar Swamp	S4	144
		Spruce – Fir Wet Flat	S4	158
Forests		Balsam Poplar Floodplain Forest	S2	134
Fore	Deciduous	Silver Maple Floodplain Forest	S3	156
		Upper Floodplain Hardwood Forest	S3	160
	Mixed	Black Ash Swamp	S4	136
		Hardwood Seepage Forest	S3	142
		Pocket Swamp	S2	150
		Atlantic White Cedar Bog	S1	130
(0	Conifor	Black Spruce Bog	S4	138
Woodlands	Conifer	Open Cedar Fen	S4	146
Nood		Pitch Pine Bog	S2	148
>	Dooldyous	Red Maple Fen	S4	152
	Deciduous	Red Maple Swamp	S5	154

Open Uplands

Class	Sub-class	Natural Community Type	State Rank	Page
spi	Conifer	Spruce – Fir Krummholz	S3	196
Shrublands	Deciduous	Subalpine Meadow	S1	198
Shr	Deciduous	Rose Maritime Shrubland	S4	192
		Blueberry Barren	S2	170
	Deciduous	Heath Alpine Ridge	S2	180
and		Mid-elevation Bald	S3	184
Dwarf Shrubland		Alpine Snowbank	S1	168
arf Sł		Cold-air Talus Slope	S2	174
Dwa	Evergreen	Downeast Maritime Shrubland	S2	176
		Rocky Summit Heath	S4	190
		Windswept Alpine Ridge	S1	200
		Alpine Cliff	S1	166
	Forb	Circumneutral Outcrop	S2	172
S		Low-elevation Bald	S3	182
Herbaceous	Graminoid	Dune Grassland	S2	178
erba	Graminoid	Sandplain Grassland	S1	194
エ	Consolidated Rock	Acidic Cliff	S4	164
		Open Headland	S4	186
		Rivershore Outcrop	S2	188

Open Wetlands

Class	Sub-class	Natural Community Type	State Rank	Page
		Alder Floodplain	S4	204
spu		Alder Thicket	S5	206
Shrublands	Deciduous	Rivershore Thicket	S2	254
Shr		Sweetgale Fen	S4	268
		Tall Shrub Fen	S4	276
		Dwarf Shrub Bog	S5	226
ands		Leatherleaf Bog	S4	236
rubk	Evergroop	Maritime Huckleberry Bog	S3	240
Dwarf Shrublands	Evergreen	Maritime Slope Bog	S2	242
Dwa		Riverwash Sand Barren	S1	258
		Subalpine Hanging Bog	S1	270
		Cobble Rivershore	S4	224
		Lakeshore Beach	S4	232
	Forb	Laurentian River Beach	S2	234
	FOID	Outwash Plain Pondshore	S1	250
		Pickerelweed Marsh	S5	252
		Riverside Seep	S2	256
		Alpine Bog	S1	208
		Brackish Tidal Marsh	S3	210
		Bulrush Marsh	S4	212
	Graminoid	Cattail Marsh	S5	214
S		Circumneutral Fen	S2	216
Herbaceous		Coastal Sedge Bog	S2	222
erba		Freshwater Tidal Marsh	S2	228
工		Grassy Shrub Marsh	S5	230
		Low Sedge Fen	S3	238
		Mixed Saltmarsh	S3	244
		Salt-hay Saltmarsh	S3	260
		Sedge – Heath Fen	S4	264
		Sedge Meadow	S4	266
		Tall Grass Meadow	S4	272
		Tall Sedge Fen	S4	274
		Circumneutral Pond	S2	218
	Hydro-Morphic	Open-water Marsh	S5	248
		Sandy Lake-bottom	S5	262
Cnoros	Bryophyte	Mossy Bog Mat	S4	246
Sparse	Sand	Coastal Beach	S4	220

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Ecosystems

An ecosystem, as the term is used in this classification, is a group of communities and their environment, occurring together over a particular portion of the landscape, and held together by some common physical or biotic feature. Ecosystem types for Maine, with the natural communities that occur in each type, are listed and described below. The natural communities listed for each ecosystem will not all occur in one particular location of the ecosystem; rather, each ecosystem will be made up of some assortment of the communities listed. As noted previously, a number of federal agencies and conservation groups have recently developed a national ecological systems classification (Comer et al. 2003). The ecosystem types in Maine's classification are closely related to the national ecological systems and may eventually be replaced by them.

Group	Ecosystem Type	State Rank
	Appalachian – Acadian Basin Swamp Ecosystem	S4
	Central Hardwoods Oak Forest Ecosystem	S3
Forests	Coastal Plain Basin Swamp Ecosystem	S3
Fore	Maritime Forest Ecosystem	S4
	Spruce – Fir – Northern Hardwood Forest Ecosystem	S5
	White Pine – Mixed Hardwood Ecosystem	S4
n ds	Alpine Ecosystem	S2
Open Jplands	Pine Barrens Ecosystem	S1
N	Rock Outcrop Ecosystem	S4
	Coastal Plateau Bog Ecosystem	S3
	Domed Bog Ecosystem	S3
spı	Eccentric Bog Ecosystem	S3
>eatlands	Kettlehole Bog Pond Ecosystem	S4
Pe	Patterned Fen Ecosystem	S3
	Raised Level Bog Ecosystem	S4
	Unpatterned Fen Ecosystem	S5
	Appalachian – Acadian Rivershore Ecosystem	S4
ater nes	Coastal Plain Pondshore Ecosystem	S1
Freshwater Shorelines	Coastal Plain Rivershore Ecosystem	S2
Fre Sh	Lakeshore Ecosystem	S5
	Streamshore Ecosystem	S4
	Coastal Dune – Marsh Ecosystem	S3
Tidal	Coastal Headlands Ecosystem	S3
	Tidal Marsh Estuary Ecosystem	S3

Forested Ecosystems

The forested ecosystems are defined by macroclimate and the dominant types of trees. Maine's diversity of forest types stems from its position in the transition zone between the Eastern Deciduous Forest to our south and the Boreal Forest to our north. With at least 90% of its land tree-covered, Maine's history and economy are largely based on its forests.

Appalachian – Acadian Basin Swamp Ecosystem S4

These are topographic basins with only a small to mid-sized stream as an outlet, mostly to entirely forested, and with minimal peat accumulation. Swamps that occur immediately associated with a lake or larger stream are included under lakeshore and streamshore ecosystems; forested basins with closed drainage and peat accumulation are included under peatland ecosystems. Distributed statewide except for extreme southern Maine, where basin swamps are distinguished as a separate type (see following) characterized by assemblages with more southerly affinities. First-order or second-order streams may drain the swamp. Soils are hydric and usually saturated. Pockets without trees (shrub swamp or short graminoid marsh) may occur within the basin swamp.

Alder Thicket
Black Ash Swamp
Evergreen Seepage Forest
Grassy Shrub Marsh
Northern White Cedar Swamp
Red Maple Swamp
Sedge Meadow
Spruce - Fir Wet Flat
Tall Grass Meadow

The Appalachian – Acadian Basin Swamp Ecosystem in Maine corresponds to the following national Ecological Systems: Acadian – Appalachian Conifer Seepage Forest, Boreal – Laurentian Conifer Acidic Swamp, Laurentian – Acadian Alkaline Conifer – Hardwood Swamp, and Northern Appalachian – Acadian Conifer – Hardwood Acidic Swamp.

Central Hardwoods Oak Forest Ecosystem S3

These are forested areas in extreme southern Maine (York County), an area also known as the 'Central Hardwoods – Hemlock – White Pine zone'. These forests are typified by so-called 'central hardwoods' (black oak, white oak, shagbark hickory, bitternut hickory) and associated species, species common to our south but with a restricted distribution in Maine. The particular community(ies) in any area will

depend upon microclimate, aspect, slope position, soil type, etc. More exposed habitats may have woodlands dominated by oaks mixed with other species; more protected habitats will have continuous forest cover. This ecosystem is almost entirely limited to terrestrial communities, although it may include vernal pools and intermittent streams.

Chestnut Oak Woodland

Oak - Ash Woodland

Oak - Hickory Forest

Oak - Pine Forest

Oak - Pine Woodland

Pocket Swamp

White Oak - Red Oak Forest

The Central Hardwoods Oak Forest Ecosystem in Maine corresponds to the following national Ecological Systems: Appalachian (Hemlock) – Northern Hardwood Forest, Central Appalachian Dry Oak – Pine Forest, Central Appalachian Pine – Oak Rocky Woodland, and Northern Atlantic Coastal Plain Hardwood Forest.

Coastal Plain Basin Swamp Ecosystem S3

This ecosystem is similar to the Appalachian – Acadian Basin Swamp Ecosystem type, but restricted to extreme southern Maine, where climatic influences and species affinities are allied with areas southward along the Atlantic coastal plain. These are topographic basins with only a small to mid-sized stream as an outlet, mostly to entirely forested, and with minimal peat accumulation. First-order or second-order streams may drain the swamp. Soils are hydric and usually saturated. Pockets without trees (shrub swamp or short graminoid marsh) may occur within the basin swamp.

Alder Thicket
Atlantic White Cedar Swamp
Grassy Shrub Marsh
Pitch Pine Bog
Pocket Swamp
Red Maple Swamp
Sedge Meadow
Spruce - Fir Wet Flat

The Coastal Plain Basin Swamp Ecosystem in Maine corresponds to the Northern Appalachian – Acadian Conifer – Hardwood Acidic Swamp national Ecological System.

Maritime Forest Ecosystem S4

This ecosystem is the narrow belt of coniferous forest along the immediate coastline. The salt spray, frequent fogs, and temperate influence of the ocean make the maritime forests distinct from those only a few miles inland. Soils are generally thin, and trees often wind-flagged due to exposure. Where bedrock is at the surface, the typical spruce-fir forest may be replaced by a more open canopy woodland.

Black Spruce Woodland Early Successional Forest Jack Pine Woodland Maritime Spruce - Fir Forest Pitch Pine Woodland White Cedar Woodland

The Maritime Forest Ecosystem in Maine corresponds to the Acadian Low - Elevation Spruce - Fir - Hardwood Forest national Ecological System.

Spruce - Fir - Northern Hardwoods Forest Ecosystem S5

This broadly encompassing forest ecosystem can be found over most of the northern half of the state, and is often referred to by foresters as the 'Spruce – Fir – Northern Hardwoods' zone. Red spruce and balsam fir are the most widespread conifers. Conifer-dominated and hardwood-dominated forests intergrade with one another: conifers are typically found in the lowlands or at the highest elevations, while northern hardwood forests are found at mid-elevation hillsides or along mid-elevation ridgelines. This ecosystem is almost entirely limited to terrestrial communities, although it may include vernal pools and intermittent streams.

Black Spruce Barren
Cold-air Talus Slope
Early Successional Forest
Enriched Northern Hardwoods Forest
Evergreen Seepage Forest
Hemlock Forest
Jack Pine Forest
Jack Pine Woodland
Lower-elevation Spruce - Fir Forest
Montane Spruce - Fir Forest
Northern Hardwoods Forest
Red and White Pine Forest
Red Pine Woodland
Spruce - Fir Wet Flat
Spruce - Northern Hardwoods Forest

Spruce – Pine Woodland Spruce Rocky Woodland Subalpine Fir Forest Sugar Maple Forest White Pine Forest

The Spruce – Fir – Northern Hardwoods Forest Ecosystem in Maine corresponds to the following national Ecological Systems: Acadian Low – Elevation Spruce – Fir – Hardwood Forest, Acadian Near – Boreal Spruce Barrens, Acadian Near – Boreal Spruce Flat, Acadian – Appalachian Montane Spruce – Fir Forest, Appalachian (Hemlock) – Northern Hardwood Forest, Boreal Jack Pine – Black Spruce Forest, Laurentian – Acadian Northern Hardwoods Forest, Laurentian – Acadian Northern Pine – (Oak) Forest, and Laurentian – Acadian Pine – Hemlock – Hardwood Forest.

White Pine - Mixed Hardwoods Forest Ecosystem S4

This ecosystem lies between the deciduous-dominated forests of southern Maine and the spruce-fir or northern hardwood forests of northern Maine, a belt often referred to as 'Transitional Forest'. It is characterized by white pine and hemlock as the most widespread conifers; important hardwood species include red oak, beech, sugar maple, and red maple. This ecosystem is almost entirely limited to terrestrial communities, although it may include vernal pools and intermittent streams.

Early Successional Forest
Hardwood Seepage Forest
Hemlock Forest
Oak - Northern Hardwoods Forest
Oak - Pine Forest
Oak - Pine Woodland
Pitch Pine Woodland
Pocket Swamp
Red and White Pine Forest
Red Pine Woodland
White Pine Forest

The White Pine - Mixed Hardwoods Forest Ecosystem in Maine corresponds to the Appalachian (Hemlock) - Northern Hardwood Forest national Ecological System.

Open Upland Ecosystems

Include upland areas where tree cover is sparse or absent. Most communities in these ecosystems are terrestrial, but the ecosystems may include small pockets of palustrine communities.

Alpine Ecosystem S2

Alpine Ecosystems occur above treeline where elevation and exposure create extremely harsh conditions; restricted in Maine to mountains above 3500', although not all mountains above 3500' have alpine vegetation. Alpine ecosystems have low and often sparse vegetation due to the harsh environment. Certain tree species may be present, but grow only as krummholz, not erect.

Alpine Cliff Alpine Bog Mid-elevation Bald Windswept Alpine Ridge Heath Alpine Ridge Subalpine Hanging Bog Subalpine Meadow Spruce - Fir Krummholz

The Alpine Ecosystem in Maine corresponds to the following national Ecological Systems: Acadian – Appalachian Alpine Tundra and Acadian – Appalachian Subalpine Woodland and Heath – Krummholz.

Pine Barrens Ecosystem S1

Pine Barrens Ecosystems are sandy glacial outwash or till areas with nutrient-poor, excessively well-drained soils, flat to undulating topography, and a patchy canopy dominated by pine (generally a single species, either pitch pine, jack pine, or red pine), or, in more boreal settings, spruce (usually black spruce). Historically, at least, pine barrens burned frequently due to the dry conditions and flammability of the vegetation; species able to withstand fire or regenerate quickly after a fire (as well as being tolerant of low nutrient conditions and dry soil) are therefore typical. More recently, many pine barrens have been maintained in an early successional stage (represented below by the Sandplain Grassland and Blueberry Barren communities) through biennial burning for blueberry production. The actual vegetation of a barren depends on how recently or frequently it burned. Many pine barrens have a layer of heath shrubs (< 0.5 m tall) below the canopy, with occasional grassy openings among the shrubs. The overstory dominants of Maine barrens range from pitch pine in the southwestern Maine barrens, to red or white pine in the eastern Maine blueberry barrens, to spruce in far northwestern Maine.

Black Spruce Barren Blueberry Barren Pitch Pine – Heath Barren Pitch Pine – Scrub Oak Barren Sandplain Grassland

The Pine Barrens Ecosystem in Maine corresponds to the Northeastern Interior Pine Barrens national Ecological System.

Rock Outcrop Ecosystem S4

Rock Outcrop Ecosystems are areas (not including alpine areas) where bedrock, with thin soil pockets in places, makes up the ground surface and vegetation is consequently sparse, with few if any trees. Vegetation is dominated by low shrubs and herbs which can tolerate the exposed, usually dry, and low nutrient conditions. Scattered trees (i.e., canopy cover totaling less than 30%) may be present, but will often be stunted or wind-flagged. Species composition will vary depending on the nature of the bedrock; the distinction made here is between circumneutral to calcareous rock versus acidic rock. Rock outcrop ecosystems generally grade into woodlands (rocky areas with tree canopies of 30 - 60%) or forests (tree canopies covering > 60%). This is a geographically broad type, and some of the communities listed are unlikely to be found together (e.g., Birch – Oak Rocky Woodland and Rocky Summit Heath). Which communities make up any occurrence of this ecosystem will depend on geographic location, substrate pH, and probably other factors.

Acidic Cliff
Birch - Oak Rocky Woodland
Circumneutral Outcrop
Low-elevation Bald
Mid-elevation Bald
Rocky Summit Heath
Spruce Rocky Woodland

The Rock Outcrop Ecosystem in Maine corresponds to the following national Ecological Systems: Laurentian – Acadian Acidic Cliff and Talus, Laurentian – Acadian Calcareous Cliff and Talus, Laurentian – Acadian Calcareous Rocky Outcrop, and Northern Appalachian – Acadian Rocky Heath Outcrop.

Peatland Ecosystems

Peatland ecosystems occur in closed or open basins, where conditions allow accumulation of a well-developed layer of Sphagnum and/or sedge peat (most commonly the former). Different researchers have classified Maine peatlands in different ways: by basin morphology, by vegetation, by hydrology, or by a combination of those factors. No classification is 'right' or 'wrong'; their utility depends on their purpose. A classification developed to evaluate peatlands for mining potential would clearly use different criteria than one used to evaluate peatland biota or to elucidate developmental processes in peatlands. The classification used here is derived from Davis and Anderson's work (Davis and Anderson 1991, 1999, 2001), which includes both morphological and vegetational criteria. This approach recognizes that peatland conservation should address both whole systems and individual collections of species. Thus, while a kettlehole bog and a domed bog may have nearly identical species complements, they are very different landscape units. Likewise, patterned fens and unpatterned fens are floristically almost identical, but the patterning is an interesting morphological character that separates that ecosystem type. Peatland complexes containing more than one of the above ecosystems also exist. These are treated in this classification as a collection of ecosystem units.

Coastal Plateau Bog Ecosystem S3

Coastal Plateau Bog Ecosystems are peatlands in east coastal Maine in which the surface is raised above the surrounding terrain, with the bog perimeter sloping sharply to mineral soil. The raised surface is flat or undulating, generally with few to no trees, and usually features extensive lawns of deer-hair sedge. Black crowberry and baked-apple berry are also characteristic. Some coastal plateau bogs support the rare crowberry blue butterfly.

Black Spruce Bog Coastal Sedge Bog Dwarf Shrub Bog Maritime Huckleberry Bog Mossy Bog Mat Tall Shrub Fen

The Coastal Plateau Bog Ecosystem in Maine corresponds to the Acadian Maritime Bog national Ecological System.

Domed Bog Ecosystem S3

Domed Bog Ecosystems are a type of raised bog; these are large inland peatlands, usually more than 500 meters in diameter, with convex surfaces that rise several meters above the surrounding terrain and that display concentric patterning.

At least in the center, peat accumulation is sufficient to maintain a perched water table. Consequently, most water available for plant growth comes from precipitation and is nutrient poor. Most domed bogs show a vegetation zonation reflecting the nutrient gradient, where more nutrient-demanding (minerotrophic) vegetation occurs around the perimeter of the peatland (where water from surrounding uplands or draining from the center of the peatland flows) and low-nutrient vegetation occupies the raised portions of the bog. The peatland surface is characterized by hummocks and hollows. Patterned domed bogs have small, usually crescent-shaped pools near the highest point; unpatterned domed bogs lack pools.

Black Spruce Bog Circumneutral Fen Dwarf Shrub Bog Leatherleaf Bog Low Sedge Fen Maritime Huckleberry Bog Mossy Bog Mat Open Cedar Fen Red Maple Fen Sedge – Heath Fen Sweetgale Fen Tall Sedge Fen Tall Shrub Fen

The Domed Bog Ecosystem in Maine corresponds to the Boreal – Laurentian Bog national Ecological System.

Eccentric Bog Ecosystem S3

Eccentric Bog Ecosystems are gently sloping raised bogs on the sides of shallow valleys. The slope of the bog is patterned, with ridges of dwarf shrub bog (sometimes semi-forested) alternating with troughs containing bog pools and/or moss lawns. Ridges and troughs run perpendicular to the direction of water flow. The upslope end is typically dryish for a bog and dominated by ombrotrophic vegetation; moisture and mineral availability increase downslope, and consequently the lowest areas have fen vegetation. In Maine, eccentric bogs appear to be restricted to the east central region, roughly from Lincoln north to Ashland and east to the Canadian border. See Davis and Anderson (1991) for a thorough discussion of these peatlands.

Black Spruce Bog Circumneutral Fen Dwarf Shrub Bog Leatherleaf Bog Low Sedge Fen Maritime Huckleberry Bog Mossy Bog Mat Open Cedar Fen Red Maple Fen Sedge – Heath Fen Sweetgale Fen Tall Sedge Fen Tall Shrub Fen

The Eccentric Bog Ecosystem in Maine corresponds to the Boreal – Laurentian Bog national Ecological System.

Kettlehole Bog-Pond Ecosystem S4

Kettlehole bogs are flat peatlands in 'kettles,' circular or elliptical depressions, usually deeper than they are wide, formed in morainal, glaciofluvial, or coastal plain deposits by the melting of buried ice blocks. The centers of these bowl-shaped basins may be a floating peatland mat or open water ringed by peatland. Where the surface of the floating mat is sufficiently elevated by peat accumulation to be free from contact with the mineral-enriched pond water, vegetation typical of nutrient-poor conditions develops. In the southernmost part of the state, kettlehole vegetation may include species of more southern affinity such as Atlantic white cedar, sweet pepperbush, and arrow-arum.

Black Spruce Bog Leatherleaf Bog Low Sedge Fen Mossy Bog Mat Open Cedar Fen Red Maple Fen Sedge – Heath Fen Sweetgale Fen Tall Sedge Fen Tall Shrub Fen

The Kettlehole Bog Ecosystem in Maine corresponds to the Boreal – Laurentian Bog national Ecological System.

Patterned Fen Ecosystem S3

Patterned fens are floristically similar to unpatterned fens, but are typically found on gentle slopes and feature low, parallel to anastomosing, peat ridges (strings) alternating with wet hollows or shallow pools (flarks). The strings and flarks are

oriented across the major slope of the peatland and at right angles to the direction of water movement. Groundwater chemistry will determine whether acidic fen communities or circumneutral fen communities predominate. The ribbing may occupy only a portion of the peatland area; other portions may support dwarf shrub or forested bog vegetation. Ribbed fens are restricted to the northwestern portion of the state.

Black Spruce Bog Circumneutral Fen Dwarf Shrub Bog Leatherleaf Bog Low Sedge Fen Mossy Bog Mat Open Cedar Fen Red Maple Fen Sedge – Heath Fen Sweetgale Fen Tall Sedge Fen Tall Shrub Fen

The Patterned Fen Ecosystem in Maine corresponds to the following national Ecological Systems: Boreal – Laurentian – Acadian Acidic Basin Fen and Laurentian – Acadian Alkaline Fen.

Raised Level Bog Ecosystem S4

Raised Level Bog Ecosystems are flat peatlands in basins with mostly closed drainage, receiving water from precipitation and runoff from the immediate surroundings. Most parts of level bogs are somewhat raised (though not domed), in which case vegetation is almost entirely ombrotrophic (dwarf shrub heath or forested bog). Other parts of the bog are not raised; in this case, vegetation is transitional (in nutrient status) between that of ombrotrophic bogs and minerotrophic fens. In all cases, *Sphagnum* dominates the ground surface and is the main peat constituent. The surface of the bog is flat and featureless. These bogs are often at least partly treed with black spruce and larch.

Black Spruce Bog Circumneutral Fen Dwarf Shrub Bog Leatherleaf Bog Low Sedge Fen Maritime Huckleberry Bog Mossy Bog Mat Open Cedar Fen Pitch Pine Bog Red Maple Fen Sedge – Heath Fen Sweetgale Fen Tall Sedge Fen Tall Shrub Fen

The Raised Level Bog Ecosystem in Maine corresponds to the following national Ecological Systems: Boreal – Laurentian – Acadian Acidic Basin Fen and Laurentian – Acadian Alkaline Fen.

Unpatterned Fen Ecosystem S5

Unpatterned Fen Ecosystems are peatlands in which groundwater or water from adjacent uplands moves through the area. As a result, plants are exposed to more nutrients, and the vegetation is typically different and more diverse than that of bogs. Peat is moderately- to well-decomposed and of variable thickness. The vegetation consists predominantly of sedges, grasses, reeds, and *Sphagnum*. Bog communities, dominated by heath shrubs, may be present; but though fen and bog vegetation may co-occur, in a fen ecosystem the former is more extensive. This type is broadly defined geographically: in very few locations in southern Maine one may find an Atlantic White Cedar Bog community as a constituent, but far more common statewide would be the Open Cedar Fen community.

Atlantic White Cedar Bog
Black Spruce Bog
Circumneutral Fen
Dwarf Shrub Bog
Leatherleaf Bog
Low Sedge Fen
Maritime Huckleberry Bog
Mossy Bog Mat
Open Cedar Fen
Red Maple Fen
Sedge – Heath Fen
Sweetgale Fen
Tall Sedge Fen
Tall Shrub Fen

The Unpatterned Fen Ecosystem in Maine corresponds to the following national Ecological Systems: Boreal – Laurentian – Acadian Acidic Basin Fen, Boreal – Laurentian Bog, Laurentian – Acadian Alkaline Fen, and North – Central Interior and Appalachian Acidic Peatland.

Freshwater Shoreline Ecosystems

Includes the nearshore and shoreline portions of lakes, ponds, streams, and rivers, excluding areas where peat development is sufficient (generally more than about 1 m deep) to classify as peatlands. These ecosystems include areas where vascular plants are the primary producer, but do not include open-water ecosystems. Additional work beyond the scope of this classification needs to be done to classify open-water communities in a way useful to biodiversity conservation (Gawler et al. 1996, Vaux 2001).

Appalachian – Acadian Rivershore Ecosystem S4

Appalachian – Acadian Rivershore Ecosystems are the group of communities bordering and directly influenced by the open-water portions of a river (fourth-order or higher). It is distributed statewide except for extreme southern Maine, where rivershore ecosystems are distinguished as a separate type (Coastal Plain Rivershore Ecosystem) characterized by assemblages with more southerly affinities. It includes palustrine communities such as riverside seeps or floodplain forests, as well as communities (such as the river beach community) where the soils are not saturated over most of the growing season but which are disturbed by ice-scour or flooding. Upland forests bordering rivers are included under forested upland ecosystems.

Alder Floodplain
Bulrush Marsh
Cobble Rivershore
Grassy Shrub Marsh
Laurentian River Beach
Open-water Marsh
Pickerelweed Marsh
Rivershore Outcrop
Rivershore Shrub Thicket
Riverside Seep
Riverwash Sand Barren
Silver Maple Floodplain Forest
Tall Grass Meadow
Upper Floodplain Hardwood Forest

The Appalachian – Acadian Rivershore Ecosystem in Maine corresponds to the following national Ecological Systems: Laurentian – Acadian Freshwater Marsh, Laurentian – Acadian Wet Meadow – Shrub Swamp.

Coastal Plain Pondshore Ecosystem S1

This group of natural communities occurs on the shoreline or the near-shore vegetated waters of a lake or pond; specifically, ponds in southern Maine where climatic influences and species affinities are allied with areas southward along the Atlantic coastal plain. It includes palustrine communities such as pondshore marshes and fens, as well as communities where the soils are not saturated over most of the growing season but which are disturbed by ice-scour, flooding, or waves. Terrestrial forests bordering lakes are included under forested upland ecosystems.

Alder Thicket
Bulrush Marsh
Cattail Marsh
Grassy Shrub Marsh
Lakeshore Beach
Open-water Marsh
Outwash Plain Pondshore
Pickerelweed Marsh
Sandy Lake-bottom
Sweetgale Fen
Tall Sedge Fen

The Coastal Plain Pondshore Ecosystem in Maine corresponds to the following national Ecological Systems: Laurentian – Acadian Freshwater Marsh, Laurentian – Acadian Wet Meadow – Shrub Swamp, and Northern Atlantic Coastal Plain Pond. The Coastal Plain Pondshore Ecosystem.

Coastal Plain Rivershore Ecosystem S2

The Coastal Plain Rivershore Ecosystem is the group of natural communities bordering and directly influenced by the open-water portion of rivers in extreme southern Maine. It is superficially similar to the Appalachian - Acadian Rivershore Ecosystem, widespread rivershore ecosystem, but its climatic influences and species affinities are allied with areas southward along the Atlantic coastal plain. It includes palustrine communities such floodplain forests, as well as terrestrial communities (such as the river beach community) where the soils are not saturated over most of the growing season but which are disturbed by ice-scour or flooding. Terrestrial forests bordering rivers are included under forested upland ecosystems.

Alder Floodplain Bulrush Marsh Cobble Rivershore Grassy Shrub Marsh Open-water Marsh Pickerelweed Marsh Rivershore Shrub Thicket Riverwash Sand Barren Silver Maple Floodplain Forest Upper Floodplain Hardwood Forest

The Coastal Plain Rivershore Ecosystem in Maine corresponds to the following national Ecological Systems: Laurentian – Acadian Freshwater Marsh and Laurentian – Acadian Wet Meadow – Shrub Swamp.

Lakeshore Ecosystem S5

Lakeshore ecosystems consist of the group of communities on the shoreline or the near-shore vegetated waters surrounding the open-waters of a lake or pond. It is distributed statewide except for extreme southern Maine, where lakeshore/pondshore ecosystems are distinguished as a separate type (Coastal Plain Pondshore Ecosystem) which is characterized by assemblages with more southerly affinities. It includes wetland communities such as lakeside marshes and fens, as well as communities where the soils are not saturated over most of the growing season but which are disturbed by ice-scour, flooding, or waves. Terrestrial forests bordering lakes are included under forested upland ecosystems.

Alder Thicket
Bulrush Marsh
Cattail Marsh
Circumneutral Pond
Grassy Shrub Marsh
Lakeshore Beach
Northern White Cedar Swamp
Open-water Marsh
Pickerelweed Marsh
Red Maple Swamp
Sandy Lake-bottom
Sedge Meadow
Sweetgale Fen
Tall Grass Meadow
Tall Sedge Fen

The Lakeshore Ecosystem in Maine corresponds to the following national Ecological Systems: Laurentian – Acadian Freshwater Marsh, Laurential – Acadian Lakeshore Beach, Laurentian – Acadian Wet Meadow – Shrub Swamp, and Northern Atlantic Coastal Plain Pond.

Streamshore Ecosystem S4

The Streamshore Ecosystem is the group of communities bordering and directly influenced by the open-water portion of a stream (first-order through third or fourth-order). It includes vegetated aquatic communities as well as the emergent and bordering communities. Most communities are palustrine; streams are generally too small to exert many disturbance effects on adjacent terrestrial areas. Terrestrial forests bordering streams are included under forested upland ecosystems.

Alder Floodplain
Alder Thicket
Black Ash Swamp
Bulrush Marsh
Cattail Marsh
Grassy Shrub Marsh
Northern White Cedar Swamp
Open-water Marsh
Pickerelweed Marsh
Red Maple Swamp
Sedge Meadow
Silver Maple Floodplain Forest
Sweetgale Fen
Tall Grass Meadow
Tall sedge Fen

The Streamshore Ecosystem in Maine corresponds to the following national Ecological Systems: Boreal Ice – Scour Rivershore, Eastern Boreal Floodplain, Laurentian – Acadian Floodplain Forest, Laurentian – Acadian Freshwater Marsh, and Laurentian – Acadian Wet Meadow – Shrub Swamp.

Tidal Ecosystems

Includes all areas immediately associated with or affected by tidal waters, i.e., estuaries and coastal shores.

Coastal Dune - Marsh Ecosystem S3

Coastal Dune – Marsh Ecosystems are low-lying coastal areas with sand beaches, dunes, and salt marshes behind the dunes. This ecosystem is bounded landward by terrestrial ecosystems, either forests or cultural ecosystems, and seaward by the high tide line of the open shore. Coastal dune – marsh ecosystems are most common along the southwestern coast; they become uncommon east of Penobscot Bay.

Coastal Beach Dune Grassland Pitch Pine Dune Woodland Rose Maritime Shrubland Salt-hay Saltmarsh

The Coastal Dune – Marsh Ecosystem in Maine corresponds to the following national Ecological Systems: Acadian Coastal Salt Marsh, Northern Atlantic Coastal Plain Dune and Swale, Northern Atlantic Coastal Plain Sandy Beach, Northern Atlantic Coastal Plain Tidal Salt Marsh.

Coastal Headland Ecosystem S3

Coastal Headland Ecosystems are moderate- to high-relief coastlines of bedrock or consolidated marine sediments. This ecosystem is bounded landward by upland forests or cultural ecosystems and seaward by the high tide line. It includes communities which are directly affected by the proximity of the ocean through salt spray and storm tides; these are characterized by low vegetation that can withstand wind, sun, and salt. Constituent communities and species vary geographically.

Downeast Maritime Shrubland Maritime Slope Bog Mixed Saltmarsh Open Headland Rose Maritime Shrubland

The Coastal Headland Ecosystem in Maine corresponds to the following national Ecological Systems: Acadian – North Atlantic Rocky Coast, North Atlantic Cobble Shore, and North Atlantic Rocky Intertidal.

Tidal Marsh Estuary Ecosystem S3

Tidal Marsh Estuary Ecosystems are intertidal portions of bays and rivers, from the head of tide to the coastline. Salinity can vary greatly depending on season, weather, and other factors, but generally increases downriver, with portions near the head of tide almost completely freshwater. Saltmarshes are restricted to the higher salinity areas.

Brackish Tidal Marsh Freshwater Tidal Marsh Mixed Saltmarsh Salt-hay Saltmarsh

The Tidal Marsh Estuary Ecosystem in Maine corresponds to the following national Ecological Systems: Acadian Coastal Salt Marsh, Acadian Estuary Marsh, North Atlantic Intertidal Mudflat, North Atlantic Tidal Sand Flat, Northern Atlantic Coastal Plain Fresh and Oligohaline Tidal Marsh, and North Atlantic Coastal Plain Seagrass Bed.

Keys to Natural Community Types

The key is a standard dichotomous key that includes characteristics to progressively separate the natural community types. Refer to the Glossary (Appendix F) for unfamiliar terms, and bear in mind that percentages used in the key are guidelines and not absolute cutoffs.

For readers not familiar with using keys, this is a series of paired statements (couplets) representing mutually exclusive choices. Start with the first paired statement, read both choices, and decide which best describes your sample area. Each statement will direct you to another couplet number. Keep working through the couplets until your choice brings you to a particular community type. Because of ecological variation and the fact that this key is based on a limited number of samples, you may reach a point where neither choice seems right. Make a note of where you are, try one direction, and then come back and try the other direction to see which of the community types you arrive at seems more appropriate to your sample area. You will have better results in identifying natural communities if you avoid transition zones.

First, a Key to the Keys:

and often saturated; these are treated as uplands... OPEN UPLANDS KEY (p.

WOODED UPLANDS KEY

1.	Conifer forests and woodlands: broad-leaved trees < 25% cover
1.	Broad-leaved or mixed forests and woodlands: broad-leaved trees > 25% cover
	24
2.	Conifer forests: tree cover <u>usually</u> > 65%, lower layers generally more sparse than canopy (except for dense patches of tree regeneration in canopy openings); area lacks a well-developed low shrub layer of lowbush blueberry, velvet-leaf blueberry, black huckleberry, sheep laurel, or black chokeberry; substrate various, but often mineral soil, usually not a thin organic layer over bedrock
2.	Conifer woodlands: tree cover <u>usually</u> < 65%, as low as 20% (occasionally to ~80%), trees more-or-less open grown; low shrub layer of lowbush blueberry, huckleberry, sheep laurel, and/or black chokeberry prominent (>15% cover), or sometimes bracken fern prominent (>10% cover) instead; ground cover may feature fruticose lichens; substrate bedrock, with a thin layer of mostly organic soil typically < 15 cm deep
Co	nifer forests
3.	Hemlock and/or pines dominant (near the coast, northern white cedar occasionally co-dominant)
3.	Spruce and/or fir dominant8
4.	Hemlock dominant, red spruce, white pine, and/or cedar often present, sometimes co-dominant, stands may be either coniferous or mixed, strongly coniferous stands with very sparse herb and bryoid layers.
4.	Hemlock Forest (p. 76) Hemlock not dominant
5.	Northern white cedar dominant, rocky hillslopes (some very closed canopy examples of the type)
5.	Pines dominant 6
6.	Jack pine dominant, or co-dominant with black spruce; known only from western Maine
6.	Red pine or white pine dominant; more widespread

7.	White pine dominant (highest basal area); red spruce, hemlock, and/or northers white cedar often present and may be nearly co-dominant White Pine Forest (p. 126)
7.	Red pine dominant (highest basal area); red spruce, white pine, (or coastally northern white cedar) often present, may be nearly co-dominant Red and White Pine Forest (p. 120 Red and White Pine Forest (p. 120
8.	Balsam fir dominant, heart-leaved paper birch and/or mountain ash often common, subalpine or coastal
8.	Red and/or black spruce dominant
9. 9.	Coastal; white spruce often present
	Oubaipine In Tolest (p. 110
	Variable canopy closure; black spruce or red-black hybrids often present; red pine occasionally present; heath shrubs prominent in herb layer (often >25% cover, may be very dense); usually on level, well-drained to xeric glacial deposits sometimes with patches of saturated-soil and peat moss pockets in hummock topography
10.	More or less closed canopy with mixtures of red spruce, black spruce, or othe conifers; heath shrubs and herbs sparse (less than 20% cover), or if more, there with northern wood-sorrel, bluebead lily, tree regeneration may be dense in gaps
11.	Red spruce, black spruce, or hybrids on level, poorly drained soils; wetland plants and peat mosses may be frequent, bryoids abundant (>50% cover) Spruce – Fir Wet Flat (p. 158)
11.	Upland sites on till, bedrock, or talus, with red spruce or white spruce dominant yellow birch and balsam fir may be occasional; wetland plants absent except it small seeps and ravines
12.	Yellow birch often present and may form >25% cover. Herb layer with moderate to extensive cover of herbaceous species (often in patches), including northern wood-sorrel, bluebead lily, rose twisted-stalk, or mountain wood-fern; bryoid layer >20%, with feather-mosses prominent; northern/montane areas
12.	Yellow birch, if present, forms less than 25% cover. Herbs and dwarf shrub sparse (<10% cover each); herb layer may include dense regeneration patches

13. Coastal (within ¼ mi. of the coast); white spruce often present, especially near coastline; bryoid layer >15% cover and not dominated by broom-mosses	23. Scrub oak extensive and locally dominant, making foot-travel difficult
	23. Scrub oak absent or sparse, foot-travel easier
13. Widespread inland, may be near-coastal; both herb and bryoid layers very	Pitch Pine - Heath Barren (p. 102)
sparse; what bryoids are present include a large proportion of broom-mosses and pincushion mossLower-elevation Spruce – Fir Forest (p. 82)	Broad-leaved or mixed forests and woodlands
Conifer woodlands	24. Forest seasonally saturated and/or discharging groundwater for significant periods during the growing season
14. Northern white cedar the dominant tree species, usually twice as abundant as any other tree species	24. Forest not seasonally saturated or discharging groundwater
14. Other species dominate tree layer	25. Forest on gentle to moderate slope or flat bench within upland setting; discharging groundwater for significant periods during the growing season;
15. On talus, spruce dominantSpruce Rocky Woodland (p. 116)	dominant trees include ashes, sugar maple, red maple, yellow birch, or hemlock;
15. On bedrock (or, less commonly, sand or glacial till), various dominants 16	jewel-weed often present
16. Mixture of conifer species, each < 50% cover; or woodlands dominated by white	25. Forest may be saturated and flooded in the spring and adjacent to larger streams and rivers in a floodplain setting, or may be a somewhat elevated
pine or red pine	riverside terrace; ferns frequent
16. Pitch pine, jack pine, or spruce each $\geq 60\%$ cover	
1 /	26. Floodplain forests with silver maple dominant and conifers absent or very sparse;
17. Canopy dominated by red spruce or white pine (> 60% cover), or by a mixture	usually along medium to large rivers. Herb layer includes ostrich fern and other
of conifers with none dominant, red spruce usually present	ferns
Spruce - Pine Woodland (p. 114)	26. Other hardwoods dominant (not silver maple)
17. Red pine dominant in canopyRed Pine Woodland (p. 110)	
	27. High floodplain or terrace forests along medium to larger rivers in southern and
18. Jack pine dominates canopy	central Maine, most often with sugar maple or red oak dominant, sometimes
18. Other conifers dominate canopy; jack pine usually absent altogether 19	with yellow birch or ash dominant; on larger rivers this type is often found
10 DL 1	adjacent to but at slightly higher elevation than silver maple floodplain forests
19. Black spruce the most abundant canopy tree 20	
19. Pitch pine the most abundant canopy tree	27. Floodplain with balsam poplar dominant or co-dominant with American elm and ash; northern Maine
20. Woodlands on bedrock, often coastal or on upper summits inland	20.0. 1. 11. 1. 11. 17. ((50/) +11+1. 1. 1. 1. 1.
Black Spruce Woodland (p. 68)	28. Open broad-leaved woodlands (tree cover <65%) with birches, red oak, red maple,
20. Woodlands or forests on level or gently sloping till, occasionally with a thick organic layer	or ironwood dominant (Ironwood – Oak - Ash Woodlands may occasionally
organic rayer	have a forest canopy >65% but they will key here: check description in couplet 31 below)
21. Open woodlands on ledge; trees often stunted Pitch Pine Woodland (p. 106)	28. Broad-leaved or mixed closed-canopy forests (tree cover >65%) or mixed
21. Open woodlands or sometimes almost closed forest, on sandy soil22	woodlands
22. Dunes or backdune areas along the immediate coast; bayberry almost always present	
22. On glacial deposits, not dunes; inland or at least not at the immediate	
shoreline	

29.	Hillside or low summit woodlands dominated by red oak, without much ironwood or sugar maple, and with a heath shrub and bracken fern understory Oak – Pine Woodland (p. 98)
29.	Not as above
30.	Open to closed canopy woodlands on glacial till or outwash; early successional broad-leaved trees dominant (aspen, white/gray birches, red maple), red oak <40% cover (rarely up to 50%), conifers <30% cover
30.	Open woodlands on talus or thin-soiled hilltops rather than till or outwash
31.	Woodlands on talus or thin-soiled hilltops and upper slopes; ironwood and oaks dominant (the former as either canopy or subcanopy), sugar maple occasionally common, and basswood often present but not abundant; with enriched site indicators e.g. round-leaved dogwood, herb Robert, hepatica, columbine, bluestem goldenrod, and wide-leaved sedge
31.	Woodlands on talus; birches the most abundant tree; oaks and ironwood may be present but less abundant; enriched site indicators absent or very incidental Birch - Oak Rocky Woodland (p. 64)
	Broad-leaved component dominated by northern hardwood species (beech, yellow birch, sugar maple, red maple); red oak < 30% cover
	Mixed forests with conifers >25% cover
34.	Red spruce the dominant conifer
34.	Hemlock or white pine the dominant conifer
	Hemlock the dominant conifer
36.	One or more northern hardwood species (beech, yellow birch, sugar maple) mixed with red oak and conifers; northern hardwood cover > 15%
36.	Canopy almost entirely red oak and white pine (occasionally red spruce), sometimes mixed with red maple; northern hardwoods sparse Oak - Pine Forest (p. 96)
	\boldsymbol{u}

37.	Some combination of beech, sugar maple, red maple, and yellow birch dominates the canopy, with sugar maple always <50% cover; ash and basswood absent or
	very minor; herb layer rarely >40% cover except for tree seedlings; enriched site herbs absent
37.	Sugar maple dominant or co-dominant (≥50% cover); in southern or central Maine, white ash and/or basswood are usually present; herbs >40% cover38
38.	Several moderate rich site indicators are present, including doll's eyes, jack in the pulpit, grape fern, alternate-leaved dogwood, spikenard, and false Solomon's seal
38.	In addition to the species noted above, numerous uncommon rich site herbs such as leatherwood, Dutchman's breeches, maidenhair fern, and blue cohosh, and flat sedge are frequent. Sites are typically small acreages in sheltered sites (coves) or where calcium-enriched soils have accumulated
	Enriched Northern Hardwoods Forest (p. 74)
39.	Early successional broad-leaved trees dominant (aspen, white/gray birches, red maple), red oak <40% cover (rarely up to 50%), canopy closure variable from very open to almost closed; conifers <30% cover
39.	Oaks >50% cover, or if less, then canopy cover >35% coniferous
	White oak, chestnut oak, and/or hickories present; southern Maine
	Chestnut oak dominant or at least common; open-canopy woodlands (<65% canopy)
41.	Other oaks dominant
42.	White oak and red oak dominate canopy; hickory essentially absent
42.	White oak and red oak present and may be dominant, but shagbark hickory (and sometimes bitternut hickory) also present Oak - Hickory Forest (p. 92)
43.	Closed-canopy forests with northern hardwood species (usually beech or sugar maple) >20% cover, may be co-dominant with red oak Oak – Northern Hardwoods Forest (p. 94)
43.	Beech, sugar maple, and white ash <10% cover each

- **44.** Forest structure: canopy closure >70% and understory somewhat sparse, with dwarf shrubs much less than 15% cover; herbs include typical forest species such as Indian cucumber-root and wild-oats. Oak Pine Forest (p. 96)

WOODED WETLANDS KEY

Closed-canopy (or nearly so) forests, >60% tree cover; shrubs only page 15.	atchily
abundant in openings Atlantic White Cedar Swamp (p	o. 132)
More like an open bog, with trees patchy to sparse (<50% cover) and	mostly
stunted; abundant heath shrubsAtlantic White Cedar Bog (p	5. 130)

6.

6.

- 9. Sites are primarily well-drained/xeric but often undulate with both wetland and upland patches; tree cover is typically less than 60%
- 9. Sites are primarily poorly drained flats, tree cover is typically greater than 60%

 Spruce Fir Wet Flat (p. 158)

- 12. Red spruce or black spruce the most abundant conifer; red maple may be up to

14.	Silver maple, red maple, or balsam poplar are the most abundant hardwoods, black gum absent; wetlands on alluvial flats bordering rivers or permanent
	streams
14.	Other hardwoods (yellow birch, sugar maple, black gum, black or green ash,
	red oak) are more abundant than silver or red maple, or at least co-dominant;
	wetland setting various
15.	Floodplain forests with silver maple dominant, and conifers absent or very
	sparse; usually along third order or larger streams/rivers
	Silver Maple Floodplain Forest (p. 156)
15	Red maple, American elm, or balsam poplar dominant in floodplain or basin
15.	adjacent to smaller stream
	adjacent to smaller stream
16	
10.	Balsam poplar dominant or co-dominant with American elm and ash. Floodplain
	species such as ostrich fern and virgin's bower present; northern Maine
	Balsam Poplar Floodplain Forest (p. 134)
16.	Red maple, yellow birch, or hemlock dominant
17.	Red maple dominant, silver maple and musclewood more or less absent; conifers
	may be >25% of canopy; in various settings, such as low basins and along small
	to medium-sized rivers and streams
17	High floodplain or terrace forests along medium to large rivers, most often
11.	with sugar maple or red oak dominant, sometimes with yellow birch or ash
	dominant; herb layer includes ostrich fern and a mixture of wetland and upland
	species; often found adjacent to but at slightly higher elevation than silver maple
	floodplain forests
18.	Hardwood or hemlock-hardwood swamps in small (typically less than 3 acre),
	often isolated basins; shrub layer of highbush blueberry or winterberry; red
	maple common, black gum often present. Sites are in southern and coastal
	Maine
18.	Swamps or seepage forests in broader basins; highbush blueberry, winterberry,
201	and similar shrubs absent or very sparse; sites are statewide
	and similar strates absent of very sparse, siecs are statewide
10	Hardwood or hemlock-hardwood seepage forests on gentle slopes or discharge
19.	
	areas at level breaks in a slope; yellow birch, green ash, brown ash and/or white
	ash may also occur in the canopy and may be co-dominant with red maple;
	statewide
19.	Basin wetlands on mineral soils or shallow peat; black ash is dominant or
	co-dominant with northern white cedar and red maple; more common in
	northern and eastern Maine

OPEN UPLANDS KEY

1. 1.	Vegetation along rivershores, lakeshores, or the immediate Atlantic coast 2 Vegetation not associated with shores, most often on mountains, lower summits and rocky slopes
2.	Vegetation along the immediate Atlantic coast, subject to salt spray or occasional storm tides
2.	Inland vegetation
3. 3.	Sandy or gravelly beach vegetation, either sparse or grass-dominated
4.	Sparse forb-dominated vegetation on loose sand, gravel or cobble near and above the high tide line; sea-kale and beach-pea characteristic.
4.	Grass-dominated dune and tidal-edge vegetation on sand, dominated by beach grass or (Downeast) Virginia wild rye
5.	Sparse herb-dominated vegetation in bedrock crevices and depressions; seaside goldenrod and goosetongue typical
5.	Cover more extensive, with shrubs or dwarf shrubs >25% cover
6.	Mats of dwarf shrubs, such as crowberry, lowbush blueberry, velvet-leaf blueberry and cranberries punctuated by sparse taller shrubs and forbs; more common Downeast
6.	Mat-forming shrubs limited, most shrubs 1 m or so tall (or taller); bayberry and roses most characteristic; coastwide
7.	Lakeshore with broad bands of vegetation zones, sometimes associated with sandy or gravelly berms. Lakeshore Beach (p. 232)
7.	Shoreline rock outcrops, mostly along rivers, with sparse forb-dominated vegetation; bluebell, three-toothed cinquefoil, tufted hairgrass characteristic; substrate typically vertically fissured slaty or shaly rock (Note: for steep cliff faces, along streams and gorges, see couplet #22, these are usually on granitic rock as compared to vertically fissured slate) Rivershore Outcrop (p. 188)

8.	Open talus slopes (talus slopes with tree cover will key here, as well as in Wooded Uplands key)
8.	Substrate not talus13
9.	Vegetation dominated by carpets of heath shrubs, such as Labrador tea, sheep laurel, pale laurel, over <i>Sphagnum</i> mosses and/or reindeer lichens, with
	scattered conifers
9.	Vegetation sparse, conditions more xeric
10.	Vegetation cover nearly continuous over the talus, with <i>Sphagnum</i> dominating the bryoid layer; wetland vegetation in an upland subalpine setting, near treeline
10.	Vegetation very patchy, much exposed talus; bryoid layer has reindeer lichens more extensive than <i>Sphagnum</i> cover; usually at lower elevations, though in cool microsites (type may be partially forested, primarily with spruce, or open)
11.	Sparsely vegetated patches in partially forested talus, trees primarily coniferous Spruce Rocky Woodland (p. 116)
11.	Sparsely vegetated patches in partially forested talus, trees primarily broadleaved
12.	Ironwood, sugar maple, and/or basswood present in the tree layer; open spots with enriched site indicators e.g. round-leaved dogwood, herb Robert, hepatica, columbine, blue-stem goldenrod, wide-leaved sedge Oak – Ash Woodland (p. 90)
12.	Paper birch, yellow birch, and/or red oak are the major trees; enriched site indicators absent or very incidentalBirch - Oak Rocky Woodland (p. 64)
13.	Substrate sandy outwash; flat or rolling plains with lowbush blueberry and/or velvet-leaf blueberry among the dominant plants
13.	Substrate rocky; mountains or hills
14.	Blueberry (mostly lowbush blueberry) growing with little bluestem, other grasses, forbs, and occasional pitch pine; southern Maine Sandplain Grassland (p. 194)
14.	Blueberry (mostly lowbush blueberry) growing among extensive carpets of reindeer lichens; pitch pine absent; spruces, red pine, or white pine may be scattered; Downeast and extreme northwestern Maine Blueberry Barren (p. 170)
	· · · · · · · · · · · · · · · · · · ·

15.	Alpine areas: rocky summits and slopes near or above treeline, usually >3500' elevation; if tree species present, then less than 2 m tall; vegetation may be
15.	Open areas with patchy vegetation on hills or low mountains, below treeline; scattered trees often present
16.	Vegetation dense masses or patches of stunted conifers, mostly 1 – 2 meters tall, forming a band between treeline and more open summit areas
16.	Vegetation not krummholz
17.	Vegetation dominated by deciduous non-heath shrubs > 0.5 m tall; shrublands on subalpine tablelands or somewhat protected slopes between treeline and the dwarf – heath alpine zone, sometimes around subalpine pondshores; dominants include mountain alder, bush-honeysuckle and meadowsweet
17.	Vegetation mixed dwarf shrubs and herbs; shrubs mostly < 0.5 m tall, often < 0.2 m tall, forming low mats, and primarily heath shrub species subalpine to alpine elevations.
18.	Alpine bilberry and crowberry common, highland rush often present, strictly alpine species (see list in next half of couplet) absent; patches of vegetation over bare rock, usually below or near treeline, but may extend higher Mid-elevation Bald (p. 184)
18.	One or more strictly alpine species present (not necessarily dominant): diapensia, boreal bentgrass, Bigelow's sedge, alpine bearberry, Lapland rosebay, bearberry willow, tundra dwarf birch, moss plant, mountain heath, star saxifrage or alpine bistort
19.	Herb-dominated cliffs and narrow benches on steep slopes (typically cirque walls), with constant seepage; rare alpine/boreal plants such as star saxifrage, alpine bistort, hairy arnica, and/or northern painted cup typically present though not abundant
19.	Vegetation primarily dwarf shrubs; not on seepy cirque walls
	Protected areas where snow lingers, such as at summit edge, upper slopes, or base of cliffs; alpine bilberry typically dominant and mountain-heath, tundra dwarf birch, or moss-plant characteristic
20.	More exposed areas; alpine bilberry may be prominent but mountain-heath, tundra dwarf birch, and moss-plant absent

	Cushions of diapensia dominate vegetation (>30% cover, or >40% relative cover), with alpine bilberry; herbs <10% cover	2.	Saltma presen
			sedges,
ϵ	Diapensia if present is not dominant; vegetation a variable mixture of dwarf evergreen shrubs and herbs, with graminoid cover (especially Bigelow's sedge) ocally extensive	2.	Bracki cordgr
		3.	Saltma
22. 8	Sparsely vegetated, nearly vertical rock faces		>35%
	Summits or upper slopes, more extensive and not cliffs24		abund
			extensi
23. 8	Sparsely vegetated circumneutral rock faces, usually small in area; composition	3.	Saltma
V	rariable but includes some species indicative of higher pH, such as shrubby		vegetat
C	inquefoil, ebony sedge, rock whitlow-cress, lance-leaved draba, bird's-eye		presen
-	primrose, smooth woodsia, etc		
	Cliff faces with sparse vegetation and without circumneutral indicator species;	4.	Shrubs
g	granitic or other acidic bedrock	4.	Herba
24. \	Vegetation a mosaic of tree or tall shrub islands within the predominant heath	5.	Bracki
	hrub cover; tree cover 5-25%; tall shrub and stunted tree patches form 10%		forbs;
	70% cover and typically include mountain holly; at moderate elevations		freshw
	usually > 2000') inland, or at lower elevations near the coast		
		5.	Freshw
	Patches of heath shrubs and herbs over bare rock, almost all under 0.5 m tall,		domin
	vith shrub and tree cover (>1 m tall) <10%.		freshw
			presen
25. I	Bald summits or upper slopes of inland hills or mountains, > 1800', with		
Ţ	patchy vegetation dominated by crowberry and/or alpine bilberry; herbs, other	6.	Subme
t	han three-toothed cinquefoil, are subalpine species such as highland rush,		are mo
r	mountain sandwort or dwarf rattlesnake root	6.	Not as
25. I	Bald summits, mostly near the coast, without crowberry and bilberry (broom-		perma
C	crowberry may be present); a mixture of dwarf shrubs and herbs, including		remain
1	ower-elevation species such as common hairgrass, Rand's goldenrod, pinweed,		
C	orange-grass, or smooth sandwortLow-elevation Bald (p. 182)	7.	Plants
		7.	Plants
		8.	Pickere
OPI	EN WETLANDS KEY		
		8.	Grami
	Fidal wetlands	9.	Bulrus
1. 1	Non-tidal wetlands6	9.	Cattail
		,	Cattan

2.	Saltmarshes: vegetation varies, saltmeadow cordgrass and/or smooth cordgrass present and often a major component; dominants also may include black-grass, sedges, etc3
2.	Brackish to freshwater marshes; saltmeadow cordgrass and/or smooth cordgrass not prominent
3.	Saltmarshes with saltmeadow cordgrass and/or smooth cordgrass totaling >35% cover, or with black-grass >35% cover; most other species clearly less abundant (not including low-growing species like goosetongue that may be
3.	extensive beneath the graminoids)
4. 4.	Shrubs dominant
5.	Brackish tidal setting; vegetation a mix of tall graminoids and rosette-forming forbs; freshwater cordgrass and/or wire rush usually present; obligate freshwater species such as cardinal flower, sweet flag, and pickerelweed absent
5.	Freshwater, near the upstream end of the tidal reach; vegetation graminoid-dominated, with wild rice and/or softstem bulrush typical; some obligate freshwater plants such as pickerelweed, cardinal flower, and/or sweet flag present
6.	Submerged or floating-leaved aquatic vegetation; emergent plants, if present, are mostly those that die back below the water in autumn
6.	Not as above; lakeshores, rivershores, bogs, fens, marshes that are not permanently underwater or, if so, are vegetated with emergent vegetation that remains through the winter.
7. 7.	Plants with emergent leaves dominant
8.	Pickerelweed dominant among the emergent species
8.	Graminoids dominant among emergent species
9. 9.	Bulrushes and/or bayonet rush dominant

10.	Some plants indicative of higher pH waters present, e.g. tapegrass, common waterweed, water stargrass, white water crowfoot, Robbins' pondweed, alpine pondweed, Vasey's pondweed, and straight-leaved pondweed; water-shield, pipewort, water lobelia, and pickerelweed absent or virtually so Circumneutral Pond (p. 218)
10.	Alkaline indicators absent; vegetation usually includes pipewort, water lobelia, pondweed species other than those listed above, and/or water-lilies
	Vegetation mostly floating-leaved plants and/or submerged plants with aquatic stems floating in the water column; water-lilies and pondweeds typically dominant; depth varies
	leaves mostly on the substrate, often in rosettes; pipewort and water lobelia characteristic; water depth usually < 1 m
	Gently-sloping sandy or gravelly pondshores (usually of small ponds in outwash basins) of Southern Maine where natural water levels usually drop by late summer, exposing progressive bands of vegetation. From the upland edge, a band of shrubs is followed by three-way sedge, bayonet rush, and narrow-leaved goldenrod in the upper shore zone, then pipewort or other submerged aquatic species in the most flooded zone. Golden pert and meadow beauty are usually present as indicators (see couplet 22 for herbaceous lakeshore vegetation that is not in distinct bands
	Sphagnum and dwarf shrub dominated vegetation forming a thin layer over sloping bedrock (sometimes talus); only in subalpine or extreme maritime zones; peat may not remain saturated through the summer (may not be true wetlands)
14.	Bog-like vegetation forming a 'blanket' on slightly sloping bedrock at the immediate coast, from Washington County east
14.	Bog-like vegetation in subalpine setting, on steep slopes over bedrock or talus of mountain slopes (see couplet #24 for basin wetlands on summit plateaus) Subalpine Hanging Bog (p. 270)

	Vegetation of rivershores or lakeshores, with the substrate primarily mineral rather than organic; mostly in linear bands following the shoreline; may be flooded seasonally, but out of the water for most of growing season
	On rivershores. 17 On lakeshores or pondshores. 23
	Shrubs, mostly >1 m tall, predominate
18.	Alder is dominant or co-dominant; virgin's bower is present
18.	Dogwood and willows predominate Rivershore Shrub Thicket (p. 254)
19.	Mixed shrub-herb vegetation on sloping, eroding river shores where substrate is constantly saturated by groundwater seepage; calciphilic fen species present, e.g., grass-of-Parnassus, Kalm's lobelia, sticky false asphodel; bryophyte layer at least locally well developed, with species other than <i>Sphagnum</i> dominant
	is constantly saturated by groundwater seepage; calciphilic fen species present, e.g., grass-of-Parnassus, Kalm's lobelia, sticky false asphodel; bryophyte layer at
19.	is constantly saturated by groundwater seepage; calciphilic fen species present, e.g., grass-of-Parnassus, Kalm's lobelia, sticky false asphodel; bryophyte layer at least locally well developed, with species other than <i>Sphagnum</i> dominant

22.	Sand cherry and roses the dominant dwarf shrubs, Laurentian/Cordilleran plants such as Huron tansy, alpine sweet broom, and alpine milk-vetch often present; in Maine documented only on far northern rivers
22.	Laurentian River Beach (p. 234) Tufted hairgrass, twisted sedge, or other forbs and graminoids are dominant; statewide
23.	Sparse vegetation on lakeshore cobble or sand beaches; silverweed typical, beach heather, or golden heather may be present
23.	Patchy or sparse vegetation on subalpine gravelly pondshores Subalpine Meadow (p. 198)
24.	Bogs and fens: substrate is accumulated peat (undecayed to partially decayed), usually > 0.5 m deep and with extensive Sphagnum on the surface, sometimes floating over water; constantly saturated
24.	Marshes: substrate is mineral soil, often with a surface layer of well-decomposed organic matter (peat, typically sedge-derived, may be > 0.5 m thick but is generally less); <i>Sphagnum</i> may be present but does not form an extensive deposit; some remain saturated, but many dry out for at least part of the growing season
	Alpine or subalpine basin peatlands, near or above treeline
26.	Bryophyte-dominated, often in raised peatlands; substrate wet and unstable; vascular plants usually <25% cover and limited to low-growing species e.g. cranberries, horned bladderwort, and white beak-rush; very dwarfed leatherleaf or other ericads may be present
26.	Shrub and/or herb cover more extensive; vegetation not primarily bryophytes
	Shrub cover (including dwarf shrubs) exceeds graminoid cover
28.	Vegetation dominated by tall shrubs (mostly > 1.5 m); mountain holly, alder, and wild calla characteristic; standing water usually present among hummocks of <i>Sphagnum</i> ; in peatlands often at the upland/peatland interface Tall Shrub Fen (p. 276)
28.	Vegetation dominated by herbs or shrubs mostly under 1m tall, typically including abundant ericads; mountain holly and alder may be present but are not dominant

29.	Shrubby cinquefoil a prominent shrub, and other circumneutral indicators present, e.g. livid sedge, grass-of-Parnassus, and/or Kalm's lobelia
29.	Shrubby cinquefoil absent (or scarce) and other circumneutral indicators lacking.
30.	Shrubs relatively tall (often >1 m) with sweetgale, hardhack, and/or meadowsweet prominent; leatherleaf often present but other ericads not abundant; typically in standing shallow water without a continuous <i>Sphagnum</i>
30.	Vegetation dominated by ericads (though sweetgale often present), usually well under 1 m tall; bogs and fens on well developed <i>Sphagnum</i> carpets
31.	Low bog vegetation with dwarf huckleberry locally dominant (often patchy), >20% cover; black crowberry and/or deer-hair sedge also present though not necessarily at high cover; graminoid cover may be relatively high (often > 25%); coastal (up to 15 miles or so inland)
31.	Other shrubs dominant, or if dwarf huckleberry dominant then neither black crowberry nor deer-hair sedge present; both coastal and inland
	Weakly minerotrophic fen conditions (vegetation mostly in contact with the water table), with leatherleaf (or a combination of leatherleaf with bog rosemary and/or sweetgale) the dominant shrub; other shrubs and sedges mixed in; graminoid cover variableLeatherleaf Bog (p. 236) Ombrotrophic bog conditions (vegetation mostly raised above the water table), with sheep laurel, Labrador tea, and/or rhodora together more abundant than leatherleaf and sweetgale; graminoid cover rarely exceeds 15%
33.	Sedge-dominated lawns, deer-hair sedge and/or coast sedge characteristic; centrally located on raised (ombrotrophic) plateau bogs within about ten miles of the coast, Hancock County east
33.	Fen (minerotrophic) setting, areas sometimes transitional to bogs, but not the central lawn of a coastal plateau bog
	Fens with circumneutral indicators e.g. livid sedge, yellow sedge, grass-of-Parnassus, Kalm's lobelia, and/or shrubby cinquefoil, usually with more than one indicator species
⊅ T •	Circumicural indicator species absent of virtually so

<i>3</i> 5.	beaked sedge, and/or lake bank sedge; or rarely tussock sedge or inflated sedge
35.	Slender sedge, beaked sedge, lake bank sedge, and inflated sedge not the dominant sedges, vegetation mostly lower
36.	Carpets of low sedges over very wet <i>Sphagnum</i> substrate, with mud sedge, podgrass and white beak-rush characteristic; dwarf or creeping shrubs may be mixed with the sedges but are sparse (<20% cover). Low Sedge Fen (p. 238)
36.	Sedges mixed with dwarf shrubs, usually >20% shrub cover; white beak-rush often present, but mud sedge and podgrass not; dominant sedges include few-seeded sedge, coast sedge, Michaux's sedge white beak-rush, and/or narrow-leaved cotton-grass
	Tussock sedge is the dominant herbaceous species (>30% cover, and usually >50%); shrub cover usually <30%; standing water between hummocks for much of season
	Shrub cover exceeds herb cover. 39 Herb cover exceeds shrub cover. 41
39.	Mixture of herbs and shrubs; dominant shrubs are not alder, sweetgale, or ericads, but are more often buttonbush or bog willow
39.	Alder, sweetgale, and/or ericads are the dominant shrubs
40.	Alders strongly dominant, >20% cover; ericads absent or virtually so
40.	Sweetgale and/or heath shrubs dominant, alders clearly subordinate Sweetgale Fen (p. 268)
41.	Bluejoint dominates herb component, >50% cover; shrubs <25% cover Tall Grass Meadow (p. 272
41.	Mixture of herbs and shrubs (herbs 25-95%, shrubs 0-70% cover), without dominance of tussock sedge, bluejoint, or alder



Birch - Oak Rocky Woodland

State Rank S3

Community Description

These community types are partial canopy deciduous woodlands or patches of woodland among talus areas. Overall canopy closure may be <25% when the open areas are included. Paper birch, red oak, and/ or yellow birch are dominant. Sugar maple, if present, is not abundant. Marginal wood-fern, rock polypody, 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.

Soil and Site Characteristics

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

Diagnostics

Sites occur on talus substrate; conifer cover can be one-fourth of the canopy, ironwood is absent and birches are common.



Striped Maple

Similar Types

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.

Location Map



Paper Birch

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.

Distribution

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

Landscape Pattern: Small Patch

Characteristic Plants

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

Canopy

Big-toothed aspen Blue birch* Paper birch* Red maple Red oak* Striped maple Yellow birch*

Sapling/shrub

Mountain maple* Striped maple* Yellow birch*

Dwarf Shrub

Lowbush blueberry Poison-ivy

Herb

Big-leaved aster Common hairgrass Marginal woodfern Rock polypody Wild sarsaparilla

Bryoid

Dicranum moss Large hair-cap moss Pincushion moss

Associated Rare Plants

Purple clematis

Examples on Conservation Lands You Can Visit

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

Maine Natural Areas Program

Black Spruce Barren

State Rank S2

Community Description

Black spruce, sometimes mixed with red spruce (and hybrids between the two), 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. 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. Wetter sites may approach concepts of boreal 'muskeg', though they are not true peatlands.

Soil and Site Characteristics

Sites occur on flat to rolling terrain in cold lowlands (usually <1200' elevation) characteristic of nutrient-poor or highly acidic sites. The sandy to clayey 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. 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% cover each). Heath shrubs may form dense thickets. Sites are underlain by mineral soil sometimes overlain by a thin organic layer.

Similar Types

Lower-elevation Spruce - Fir Forests and Maritime Spruce - Fir Forests have far lower shrub and herb cover and generally lack black spruce. Black Spruce Woodlands and Spruce - Pine Woodlands share many species but are on bedrock rather than mineral soil. Black Spruce Woodlands in particular

Location Map



Community may occur in this Ecoregion



Black Spruce Branch

may co-occur with this type, and further work is needed to distinguish the two types. Spruce - Fir Wet Flats have more closed canopies with red spruce dominant and lack the abundant heath shrubs. Black Spruce Bogs are on deeper (>1 m) peat deposits.

Conservation, Wildlife, and Management Considerations

The extent of this type in Maine has not been well documented, nor have site and successional relationships. This type 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.

Distribution

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

Landscape Pattern: Large Patch

Characteristic Plants

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

Canopy

Balsam fir Big-toothed aspen* Black spruce* Red spruce* White spruce White pine

Sapling/shrub

Balsam fir*
Gray birch*
Mountain holly
Red spruce*
White pine*

Dwarf Shrub

Labrador tea* Lowbush blueberry* Rhodora* Sheep laurel*

Herb

Bracken fern
Bunchberry
Canada mayflower
Starflower
Wild sarsaparilla*

Bryoid

Reindeer lichen Sphagnum mosses* Wavy broom-moss

Examples on Conservation Lands You Can Visit

• St. John River Preserve – Aroostook Co.

66 Maine Natural Areas Program

Black Spruce Woodland

State Rank S3

Community Description

These are boreal, open canopy woodlands in which black spruce is strongly dominant, though it is sometimes mixed with red spruce or white pine. Trees are stunted and canopy closure is usually less than half, although occasionally a site may have a more closed canopy (~85%). The shrub layer often has smaller black spruce and a scattering of evergreen and deciduous shrubs. The herb layer is usually extensive (>50% cover) and strongly dominated by heath 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.

Soil and Site Characteristics

Sites are upland or transitional wetland-upland and are on flat or



Bunchberry in Fruit

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 or in northwest Maine at up to ~1200'.

Diagnostics

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

Location Map



Community is known from this Econogic
Community may occur in this Econogica
Balley's Econogica
County





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

Canopy

Black spruce*
Red spruce

Sapling/shrub

Black huckleberry* Black spruce* Gray birch* Wild-raisin*

Dwarf Shrub

Black huckleberry* Lowbush blueberry* Sheep laurel*

Bryoid

Dicranum moss Reindeer lichen

Associated Rare Animals

Purple lesser fritillary

Black Huckleberry and Black Crowberry Similar Types

Black Spruce Barrens have higher shrub cover and generally occur on deeper, poorly drained mineral soil rather than on bedrock, but the two types may co-occur, and further work is needed to distinguish the two. Black Spruce Bogs can have very similar species composition but grow on saturated peat moss, as part of a peatland. Cold-air Talus Slopes can have similar species but have <25% tree cover.

Conservation, Wildlife, and Management Considerations

Sites appear to receive little human impact other than some light recreational use. Some sites may be of fire origin.

A variety of conifer-nesting birds may use this habitat, including blackpoll warbler, bay-breasted warbler, and black-backed woodpecker. The only modern occurrence in Maine of the rare purple lesser fritillary butterfly is found within the northernmost example of this community type.

Distribution

Known sites occur on either Downeast islands or extreme northwest Maine. More broadly, this type occurs in the Laurentian Mixed Forest Province, extending northward and eastward.

Landscape Pattern: Small Patch

Chestnut Oak Woodland

State Rank S1

Community Description

This partial canopy woodland type is dominated by chestnut oak 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. Bryoids are virtually absent.

Soil and Site Characteristics

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 granitesyenite bedrock.



Red Oak Twig with Acorns

Diagnostics

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

Similar Types

Other hardwood forest types are dominated by trees other than chestnut oak.

Conservation, Wildlife, and Management Considerations

The single documented site in Maine is in public ownership, with attention given to conserving this rare type. In other parts of the range of this type, fire appears to have played a role in preventing the invasion of fire sensitive

Location Map





Chestnut Oak Woodland

hardwood trees and shrubs. The suppression of fire could therefore result in the gradual conversion of these woodlands to a more mesic oak-pine type. In Maine, chestnut oak does not seem to regenerate well under its own canopy.

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

Distribution

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

Landscape Pattern: Small to Large Patch in Maine; matrix-forming further south.

Examples on Conservation Lands You Can Visit

• Mt Agamenticus - York Co.

Characteristic Plants

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

Canopy

Black cherry

Chestnut oak*

Red maple

Red oak

White oak White pine

Sapling/shrub

Black huckleberry

Maple-leaved viburnum

Meadowsweet

Shadbush

Witch-hazel

Dwarf Shrub

Lowbush blueberry*

Velvet-leaf blueberry

Herb

Bracken fern*

Common hairgrass

Partridgeberry

Rough-leaved ricegrass

Wild-oats

Wintergreen

Woodland sedge

Bryoid

Hair cap moss

Associated Rare Plants

Chestnut oak

Flowering dogwood

Associated Rare Animals

Red-winged sallow

Whip-poor-will

Early Successional Forest

State Rank S5

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. Herb 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.

Soil and Site Characteristics

Occurring in various settings, nearly all sites are post-fire and/or or post-harvest and typically occur 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 pH 5.0-5.4. In time, most sites will transition to one of several matrixforming forest types such as northern hardwood forest or spruce - northern hardwood forest. The shrubland form



Yellow Warbler

occurs on exposed low elevation summits (900-1200') and is currently documented from Acadia National Park and a few other sites Downeast.

Diagnostics

The canopy is dominated by early successional deciduous trees (poplars, birches, red maple). Conifers and red oak may be present but are not dominant. 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 (Birch -Oak Rocky Woodland) or have northern hardwood species dominant (Northern Hardwoods Forest). Some Oak - Pine

Location Map



Community may occur in this Ecorogical

Woodlands can be strongly deciduous and can resemble this type, but red oak cover exceeds that of birches, aspen, and red maple combined.

Conservation, Wildlife, and Management



Aspen - birch stands originating after heavy harvesting are frequent in Maine. Naturally occurring examples are those that originate after fire or other natural disturbance and best reflect the composition and condition that develop without human influence. Natural succession dictates that the aspen birch dominance will not be long lived, and in time, most sites will transition to one of several matrix-forming forest types such as Northern Hardwoods Forest or Spruce -Northern Hardwoods 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 the rare olive-sided flycatcher.

Distribution

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

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

Characteristic Plants

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

Canopy

Big-toothed aspen* Paper birch* Ouaking aspen* Red maple* Red spruce*

Sapling/shrub

Balsam fir* Red maple* Striped maple* Wild-raisin*

Dwarf Shrub

Black huckleberry* Lowbush blueberry*

Herb

Bracken fern* Canada mayflower Sheep fescue*

Bryoid

Dicranum moss Large hair-cap moss Reindeer lichen

Associated Rare Animals

Olive-sided flycatcher

Examples on Conservation Lands You Can Visit

- Acadia National Park Hancock Co.
- Black Mountain, Donnell Pond Public Lands - Hancock Co.
- Deadwater Brook, Appalachian Trail - Piscataquis Co.

Enriched Northern Hardwoods Forest

State Rank S3

Community Description

Sometimes referred to as 'cove forests,' these closed canopy forests are dominated by sugar maple, with beech and/or yellow birch subordinate. Basswood and white ash are typical indicators but are not necessarily abundant, and they 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, grape fern, spring beauty, and silvery spleenwort. These and many rare species are characteristic of forests with relatively nutrient rich soils. Bryoids are virtually absent.

Soil and Site Characteristics

Sites occur on sheltered hillsides, ravines, stream drainages, 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 Forest).



Squirrel Corn

Diagnostics

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

Similar Types

The more typical and extensive Northern Hardwoods Forest is dominated by beech, birches, and sugar maple, occurs on less nutrient rich sites, and lacks substantial ash. Sugar Maple Forests contain some moderate rich site indicators, e.g., zig-zag goldenrod and Solomon's seal, but lack

Location Map



Community is known from this Ecorogic

Community may occur in this Ecorogical
Balley's Ecorogical
County





Enriched Northern Hardwoods Forest

the abundance and variety of true rich site indicators present in this type.

Conservation, Wildlife, and Management Considerations

There are many known mature occurrences of Enriched Northern Hardwoods Forests in the state, most with a history of harvesting. 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.

Distribution

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

Landscape Pattern: Small Patch, typically occur as 2-20 acres within a larger matrix of northern hardwood forests.

Examples on Conservation Lands You Can Visit

 Albany Notch, White Mountain National Forest - Oxford Co.

Characteristic Plants

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

Canopy

American beech Basswood* Ironwood Sugar maple* White ash

Sapling/shrub

Alternate-leaved dogwood* American beech Striped maple Sugar maple* White ash Yellow birch

Herb

Blue cohosh Christmas fern Doll's eyes Grape fern Maidenhair fern Round-leaved violet Silvery spleenwort* Wild sarsaparilla

Associated Rare Plants

American ginseng Broad beech fern Goldie's wood-fern Male fern Pale jewel-weed Squirrel-corn Wild ginger Wild leek

- Hastings Mountain, White Mountain National Forest Oxford Co.
- Miles Notch, White Mountain National Forest - Oxford Co.
- Peter Mountain, White Mountain National Forest - Oxford Co.
- Square Dock Mountain, White Mountain National - Oxford Co.

Hemlock Forest

State Rank S4

Community Description

This closed canopy forest type is dominated by hemlock (>50% cover) 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 may be co-dominant in stands that are transitional, with pine giving way to hemlock in time. 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 such as Canada mayflower, starflower, Indian cucumberroot, partridgeberry, wild sarsaparilla, and wintergreen. Graminoids are rarely very apparent. The ground layer is mostly conifer litter, with spotty bryophyte cover.

Soil and Site Characteristics

Hemlock forests are usually on slopes (typically 5-50%) and ravines, with well drained 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.



Pin Cushion Moss

Diagnostics

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

Similar Types

White Pine Forests have more white pine than hemlock. Mixed examples of this type can be transitional to Northern Hardwoods Forests, but hemlock will have >33% cover. Pocket Swamps have wetland soils and vegetation, red maple and/or black gum codominant with the hemlock, and more well developed shrub, herb, and bryoid layers.

Conservation, Wildlife, and Management Considerations

Demand in the 1700s -1800s for hemlock considerably reduced mature, undisturbed

Location Map









Hemlock Forest

examples of this type, 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 are in southern and central Maine and 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).

South of Maine, the hemlock woolly adelgid (an introduced insect pest) has decimated hemlock stands. It has recently been documented in York County, and efforts are underway to limit its impact.

This community type may be used as nesting habitat by a number of coniferous forest specialist bird species, such as the yellow-



Hemlock Branch with Cone

Characteristic Plants

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

Canopy

Eastern hemlock*

Paper birch

Red maple

Red oak*

Red spruce*

Sugar maple*

White pine* Yellow birch*

Sapling/shrub

American beech*

Herb

Canada mayflower

Bryoid

Dicranum moss

Three-lobed bazzania

bellied flycatcher, black-throated green warbler, Blackburnian warbler, red crossbill, and northern parula.

Distribution

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

Landscape Pattern: Small to Large Patch

Examples on Conservation Lands You Can Visit

- Cooper Brook, Appalachian Trail
 Piscataquis Co.
- Fourth Machias Lake, Duck Lake Public Lands - Washington Co.
- Little Concord Pond State Park Oxford Co.
- Magoon Pond Public Lands Penobscot Co.
- North Of Carlton Notch, White Mountain National - Oxford Co.
- Scraggly Lake Public Lands Penobscot Co
- Scopan Mountain, Scopan Public Lands Aroostook Co.

Jack Pine Forest

State Rank S1

Community Description

This closed canopy forest is dominated by jack pine. Black or red spruce and balsam fir are common associates (up to 20% cover and may be more common in the understory), and red pine may be mixed with 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, with an almost continuous carpet of feather-mosses in places. In these forests, jack pine requires natural or human-caused disturbance to stimulate seed germination, and hence to regenerate. In Maine, Jack Pine Forests would eventually succeed to spruce and fir without clearcuts or fire.

Soil and Site Characteristics

These forests are found on flat or rolling terrain at moderate elevations north of 45 degrees latitude. The coarse textured soils are acidic,



Canada Mayflower

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

Location Map



Community is known from this Ecoregion
Community may occur in this Ecoregion
Balley's Ecoregion
County



Red-stemmed Moss

inland lakes. Black Spruce 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.

Conservation, Wildlife, and Management Considerations

This is likely a disturbance dependant community, with fire the primary natural disturbance agent. 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 now growing back as young Jack Pine Forest. In areas where mature jack pine has not been cut, regeneration is primarily red or black spruce. Most of the known Jack Pine Forest is on commercial forest land, with a small proportion on conservation land.

Jack Pine Forests provide nesting habitat for coniferous forest specialists. They may also be inhabited by uncommon 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.

Characteristic Plants

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

Canopy

Balsam fir Black spruce Heart-leaved paper birch Jack pine* Red pine

Sapling/shrub

Black spruce Dwarf Shrub Lowbush blueberry Sheep laurel

Herb

Bracken fern Bunchberry Canada mayflower Creeping snowberry

Bryoid

Red-stemmed moss*

Distribution

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

Landscape Pattern: Large Patch

Examples on Conservation Lands You Can Visit

Holeb - Attean Pond Public Lands
 Somerset Co.

Jack Pine Woodland

State Rank S3

Community Description

These are open canopy woodlands (<60% closure) in which the dominant tree is always jack pine. Red spruce, black spruce, or white pine are common associates. The canopy trees are generally stunted and have poor growth form. 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.

Soil and Site Characteristics

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



Jack Pine Shoot

(pH ~5.0) and nutrient poor. Most sites contain evidence of past fire, which in most cases is required to open the serotinous cones of jack pine.

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.

Location Map



Community is known from this Econogics
Community may occur in this Econogics
Balley's Econogics
County





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 or other disturbance. Natural fires in these woodlands may increase the ability of jack pine to maintain its dominance over potentially invasive or fire sensitive tree species. Several sites are on public lands or private conservation lands.

Jack Pine Woodlands may be inhabited by uncommon 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.

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 Plants

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

Canopy

Black spruce*
Jack pine*
Red spruce*

Sapling/shrub

Black chokeberry Black spruce* Jack pine Mountain holly*

Dwarf Shrub

Black huckleberry* Lowbush blueberry Mountain cranberry Sheep laurel*

Herb

Bunchberry Starflower

Bryoid

Reindeer lichen*

Examples on Conservation Lands You Can Visit

- Cadillac Mountain, Acadia
 National Park Hancock Co.
- Great Wass Island Preserve
 Washington Co.
- Lake Umbagog National Wildlife Refuge - Oxford Co.
- Petit Manan National Wildlife Refuge - Washington Co.
- Schoodic Point, Acadia National Park - Hancock Co.

Lower-elevation Spruce - Fir Forest

State Rank S5

Community Description

These closed canopy (>75% closure) forests are dominated by red spruce (>60% cover), typically with few other tree species in any of the layers. Fir is often a minor canopy component (up to 20% cover), particularly in open gaps or in younger stands. Hemlock is occasionally mixed with the spruce in southern or central Maine. 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, and usually consist of scattered plants of Canada mayflower, starflower, and bunchberry. Most of the ground surface is bare conifer litter, although at some sites (particularly Downeast Maine), bryophytes may form patchy to full cover. Broom-mosses are the most frequent and abundant bryoids.

Soil and Site Characteristics

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 4.1-5.2), 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, and fir is usually present but much less abundant. Regeneration is dense in patches, and herbaceous species are almost absent

(< 2% cover, up to 10%). Bryoids are more abundant than herbs and are dominated by broom-moss species.

Similar Types

Maritime Spruce - Fir Forests may be very similar, but generally feature more balsam fir, white spruce, and mountain ash and bryoids other than broom-mosses (typically three-lobed bazzania or red-stemmed moss). Maritime Spruce - Fir Forests have more herbs and a bryoid layer dominated by feather-mosses. Black Spruce Barrens have patchier canopies and more extensive shrub and herb layers.

Location Map





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Lower-elevation Spruce - Fir Forest

Conservation, Wildlife, and Management Considerations

This is the dominant spruce - fir type in Maine and is therefore extensively harvested and managed. In addition, spruce-budworm and past harvesting have played significant roles in the age dynamics of this type; some studies suggest that many current stands are more even-aged than they would be in the absence of past harvesting. 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 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 such as the sharp-shinned hawk, yellow-bellied flycatcher, bay-breasted warbler, Cape May warbler, blackpoll warbler, northern parula, Blackburnian warbler, boreal chickadee, Swainson's thrush, red crossbill, and white-winged crossbill.

Characteristic Plants

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

Canopy

Balsam fir Eastern hemlock Red spruce* White pine

Sapling/shrub

Balsam fir* Red spruce*

Herb

Balsam fir* Red spruce*

Bryoid

Dicranum moss Red-stemmed moss Reindeer lichen Three-lobed bazzania

Distribution

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

Landscape Pattern: Matrix

Examples on Conservation Lands You Can Visit

- Little Moose Public Lands Piscataquis Co.
- Borestone Mountain Sanctuary
- Piscataquis Co.
- East Nubble, Bigelow Preserve
- Somerset Co
- Spruce Hill, White Mountain National Forest - Oxford Co.
- Scopan Mountain, Scopan Public Lands - Aroostook Co
- Tunk Mountain & Wizard Pond, Donnell Public Lands – Hancock Co.

Maritime Spruce - Fir Forest

State Rank S4

Community Description

Red spruce, white spruce, balsam fir, and/or larch are dominant in this Downeast coastal type. Composition is variable from the mid-coast to the Downeast coast. Red and white spruce are the most typical dominants; northern white cedar or hemlock are rarely codominant. The canopy may contain gaps with regenerating red maple, paper birch, mountain-ash, heart-leaved paper birch, and fir. Herbs and dwarf shrubs are typically <10% cover each, though in the canopy openings species such as raspberries, rough-stemmed goldenrod, whorled aster, and hay-scented fern may be locally abundant. The bryoid layer is >15% cover, dominated by mosses and liverworts rather than lichens.

Soil and Site Characteristics

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



Usnea Lichen

Diagnostics

White spruce, bayberry, hayscented fern, and mountain cranberry are indicators, though not always present. Sites contain relatively little or no bluebead lily,

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wood-ferns, or painted trillium. Broommosses do not dominate the bryoid layer, though they are often present.

Similar Types

Lower-elevation Spruce - Fir Forests are the most similar. They occur in more inland settings and, like this type, often have only sparse herbs, but unlike this type they are dominated by red spruce rather than white spruce and balsam fir, and their bryoid layer is dominated by broom-mosses. In poorly drained areas, Maritime Spruce - Fir Forests may grade into Spruce - Fir Wet Flats, which are distinguished by seasonally flooded or saturated soils and a more prominent cover of herbs and bryoids; along the coast, it usually occurs in small bedrock basins.

Location Map









White Spruce

Conservation, Wildlife, and Management Considerations

After centuries of intensive use, almost no original coastal 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. Maritime forests are subject to higher wind and weather stress than inland sites, and as a result the disturbances tend to be higher intensity and more frequent, and the trees do not grow as old.

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

Distribution

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

Landscape Pattern: Large Patch

Characteristic Plants

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

Canopy

Balsam fir*
Red spruce*
White spruce*
Eastern hemlock
Mountain ash*
Northern white cedar
Paper birch*

Sapling/shrub

Balsam fir*
Red spruce
White spruce*
Mountain ash*

Herb

Balsam fir
Bayberry*
Raspberries
Mountain cranberry*
Red spruce
Rough-stemmed goldenrod
Hay-scented fern

Bryoid

Dicranum moss Pincushion moss Three-lobed bazzania

Associated Rare Plants

Swarthy sedge White adder's-mouth

Examples on Conservation Lands You Can Visit

- Black Point Brook, Cutler Coast
 Public Lands Washington Co.
- Great Wass Island Preserve Washington Co.
- North Cutler Coast, Cutler Coast
 Public Lands Washington Co.
- Quoddy Head State Park -Washington Co.

Montane Spruce - Fir Forest

State Rank S5

Community Description

These closed canopy or sometimes patchy canopy forests are dominated by red spruce (50-95% cover); fir is a common associate (up to 35% cover) in younger stands and in canopy gaps, and yellow birch is the most common hardwood. Other conifers (northern white cedar, hemlock, or white pine) occasionally reduce the spruce dominance to as low as 40% cover. Striped maple is typical in the shrub layer, along with tree saplings. The herb layer is well developed (>15% cover, and often >30%), with tree regeneration and an assortment of herbs. Dwarf shrubs are conspicuously absent, except for a bit of velvet-leaf blueberry. Most of the ground surface is a lush mosaic of feather-mosses and leafy liverworts.

Soil and Site Characteristics

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

Diagnostics

Red spruce is dominant, and yellow birch is the most abundant hardwood. Herbaceous species exceed 15% cover, with montane/boreal herbs such as bluebead lily, northern wood-sorrel, creeping snowberry, mountain wood fern, and/or rose twisted stalk locally common. Bryoids exceed 40% cover, with a large proportion of feather-mosses.

Similar Types

Subalpine Fir 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. Lower-elevation Spruce - Fir Forests have similar canopies but much more depauperate herb and bryoid layers. They usually occur on somewhat drier sites and lack the assortment of montane/boreal herbs and the most common mosses will be broommosses rather than feather-mosses. Some Maritime Spruce - Fir Forests have a similar herb layer, but if so they have more canopy fir and occur along the immediate coast.

Location Map



Community may occur in this Ecorogical

Balley's Ecoregion



Montane Spruce - Fir Forest

Conservation, Wildlife, and Management Considerations

This is the characteristic spruce - fir type of mountain slopes just below the subalpine zone, and it is extensively harvested and managed. Spruce budworm has impacted many sites as well, creating patchy forest structure. Some areas of high ecological quality, in the hundreds of acres, are known but not necessarily designated as areas reserved from harvesting. Almost all are within a landscape of managed forest rather than 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, such as the sharp-shinned hawk, yellow-bellied flycatcher, bay-breasted warbler, Cape May warbler, blackpoll warbler, northern parula, Blackburnian warbler, boreal chickadee, Swainson's thrush, red crossbill, white-winged crossbill, gray jay, and spruce grouse.

Distribution

Western Maine westward (New England - Adirondack Province).

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

Characteristic Plants

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

Canopy

Balsam fir* Red spruce* Yellow birch*

Sapling/shrub

Balsam fir* Red maple Striped maple

Dwarf Shrub

Velvet-leaf blueberry

Herb

Bluebead lily*
Bunchberry
Canada mayflower
Creeping snowberry*
Goldthread
Northern wood-sorrel*
Painted trillium
Starflower

Bryoid

Common broom-moss* Mountain fern moss Red-stemmed moss Three-lobed bazzania

Associated Rare Plants

Boreal bedstraw Lesser wintergreen

Associated Rare Animals

Bicknell's thrush

Examples on Conservation Lands You Can Visit

- Deboullie Ponds Public Lands
 - Aroostook Co.
- Elephant Mountain, Appalachian Trail
 Franklin Co.
- Lower Horns Pond Trail, Bigelow Preserve - Franklin Co.
- Traveler Mountain, Baxter State Park
 Piscataguis Co.
- Whitecap Mountain, Appalachian Trail
 - Piscataquis Co.

Northern Hardwoods Forest

State Rank S5 Similar Types

Community Description

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

Soil and Site Characteristics

Sites are typically found on the lower to middle portion of hillslopes (slopes generally 10-50%). Soils are generally mesic and well drained, though not deep (typically 15-50 cm) silt loams to sandy loams to loamy sands formed over glacial till, with pH 5.0-5.6; some occur on stabilized talus. Elevations range up to 2.000'

Diagnostics

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



Diseased Beech Bark

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

Conservation, Wildlife, and **Management Considerations**

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

Location Map



immunity is known from this Ecorog Community may occur in this Ecoregion





Northern Hardwoods Forest

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

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

Distribution

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



Landscape Pattern: Matrix, typically hundreds of acres; highquality patches usually now smaller.

> American Beech with Beech Nuts

Characteristic Plants

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

Canopy

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

Sapling/shrub

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

Herb

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

Associated Rare Plants

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

Associated Rare Animals

Early hairstreak

Examples on Conservation Lands You Can Visit

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

- Oxford Co.

Oak - Ash Woodland

State Rank S3

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 codominant 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, and wild-licorice, among an often dense cover of graminoids. Marginal wood-fern is characteristic of the herb layer. Vegetation may be patchy, developing in pockets among the rocks, or more continuous along upper slopes and ridges.

Soil and Site Characteristics

Sites occur on upper hill slopes and ridges or on talus slopes, often with some southerly exposure. Soils are thin and very well drained. The exposure and thin soils create dry conditions. These



Ebony Spleenwort

90

woodlands usually develop over bedrock that is not strongly acidic.

Diagnostics

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 Rocky 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. Enriched Northern Hardwoods Forests share some rich woods species but typically contain less oak and ironwood and occur on deeper, more mesic soils.

Location Map





Oak - Ash Woodland

Conservation, Wildlife, and Management Considerations

These types are subject to fragmentation from development pressure in southern Maine. The hilltop setting of many makes them attractive as house sites, although the shallow soils generally will not support intensive residential use. Some sites were probably pastured at some time in the 1700s - 1800s but have regrown. Almost all known sites are on private land with individual ownership.

Sites that have eastern red cedar present may host the rare juniper hairstreak butterfly, which uses cedar as its larval host plant. The aureolaria seed borer moth may have historically inhabited this community type where it used the uncommon larval host plant false foxglove.

Distribution

Eastern Broadleaf Forest Province, extending southwestward from Maine.

Landscape Pattern: Small Patch

Characteristic Plants

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

Canopy

Basswood* Ironwood* Red oak Sugar maple White Ash

Sapling/shrub

Beaked hazelnut Ironwood*

Herb

Columbine
False spikenard
Fibrous-rooted sedge
Marginal woodfern
Rough-leaved ricegrass
Round-lobed hepatica
Woodland sedge*

Bryoid

Dicranum moss Large hair-cap moss Pincushion moss

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

Associated Rare Animals

Juniper hairstreak

Examples on Conservation Lands You Can Visit

 Derry Mountain, Camden Hills State Park - Knox Co.

Oak - Hickory Forest

State Rank S1 Diagnostics

Community Description

This dry forest type, characteristic of the Central Appalachian Mountains, occurs in small patches or as inclusions within broader expanses of oak-pine forest. It is dominated by a mixture of shagbark hickory and oaks (white, black, red, or chestnut) over park-like sedge lawn. Sugar maple, white pine, or white ash may be canopy associates, and hop-hornbeam is a characteristic sub-canopy species. Additional species in the subcanopy or tall-shrub layer may include witch hazel, shadbushes, striped maple, and maple-leaved viburnum. Low shrubs can include blueberries, and the herb layer is primarily a lawn of woodland sedge with some other grass and sedge species. Moderately enriched sites may support tick-trefoils, hepatica, and the rare bottlebrush grass.

Soil and Site Characteristics

Sites occur on low-elevation, south- or west-facing sideslopes with well-drained loams or sandy loams. Known sites are within 10 miles of the coast.



Shagbark Hickory Bud

Moderately open to closed canopy forests are dominated by a mixture of shagbark hickory (at least 30% cover) and oak species.

Similar Types

White Oak - Red Oak Forests and Oak -Pine Forests lack shagbark hickory.

Conservation, Wildlife, and **Management Considerations**

The few mature sites known in Maine were probably cleared in the past. Sites are small and subject to further fragmentation from development. Community dynamics are not well known, but there are some indications that shagbark hickory and white oak are

Location Map



adapted to disturbance

- likely fire - though there is no research on this topic in Maine. Most occurrences of this type are on private

lands.



Bitternut Hickory Bark

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 rare redwinged sallow moth uses red oak as one of its host plants and may be found in this community.

Distribution

Restricted to southern and coastal Maine, characteristic of the Eastern Broadleaf Forest Province. Extends south and west from Maine.

Landscape Pattern: Small patch (in Maine), generally 20 acres or less.



Bitternut Hickory Leaves

Characteristic Plants

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

Canopy

Black oak Red oak* Shagbark hickory* Sugar maple White oak

Sapling/Shrub

Low-bush blueberry Maple-leaved viburnum* Shadbushes Witch hazel*

Herb

Asters Canada mayflower Carex (Laxiflorae group) Panic grasses Sarsaparilla Silverrod Whorled loosestrife* Wild oats Woodland sedge*

Associated Rare Plants

Bitternut hickory Bottlebrush grass Chestnut oak Scarlet oak

Associated Rare Animals

Red-winged sallow Whip-poor-will

Oak - Northern Hardwoods Forest

State Rank S5

Community Description

This is a mixed 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, hemlock, or (especially along the coast) northern white cedar. Red oak comprises up to 25-85% cover; 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 (usually <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). Few bryoids are found on the leaf litter covered forest floor.

Soil and Site Characteristics

Sites occur on gently to somewhat steeply sloping (15-35%) mid- and lower slopes, 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 pH 5.0-5.4.

Diagnostics

These are closed canopy forests in



Hobblebush

which red oak and at least one northern hardwood species (beech, sugar maple, or, infrequently, yellow birch) dominate the canopy. In southern Maine, maple-leaved viburnum is an indicator shrub.

Similar Types

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

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 past. Several sites occur on public lands but are not necessarily designated as areas to be set aside from timber harvest. Small and

Location Map



Community is known from this Econogical
Community may occur in this Econogical
Balley's Econogical
County



Oak - Northern Hardwoods Forest

isolated protected stands (on the order of 25 acres or less) may not be viable in the long run; though larger stands, or naturally small stands protected within a managed forest matrix, could be viable.

The community 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 rare red-winged sallow moth 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.

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: Matrix-forming in southern Maine, though currently many occurrences exist as large patches due to fragmentation.

Examples on Conservation Lands You Can Visit

 Albany Mountain, White Mountain National Forest - Oxford Co.

Characteristic Plants

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

Canopy

American beech Paper birch Red maple Red oak* Striped maple

Sugar maple*

White pine

Sapling/shrub

American Beech Maple-leaved viburnum Striped maple Sugar maple White pine

Herb

Bracken fern Canada mayflower Starflower Wild sarsaparilla Wild-oats

Associated Rare Plants

American chestnut Mountain-laurel Nantucket shadbush Ram's-head lady's-slipper

Associated Rare Animals

Early hairstreak Red-winged sallow Whip-poor-will

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



Oak - Pine Forest

State Rank S5

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 or hemlock) dominate. Red maple (up to 30% cover) and paper birch (up to 15% cover) can be common in younger stands. Striped maple is a common subcanopy associate; several other shrubs may be frequent. 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.

Soil and Site Characteristics

Sites occur on lower to mid-slopes or occasionally upper slopes on low hills. Slopes are typically 10-25% and aspect varies. Sites are characterized by well drained mineral soils that are somewhat shallow (10-50 cm to obstruction), usually sandy loams or loamy sands, and acidic (pH $^{\sim}$ 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 or hemlock replace 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). Oak - Northern Hardwoods Forests occur on more mesic sites and feature at least 10% cover of other tolerant hardwoods (beech, sugar maple, white ash, or ironwood). White Oak - Red Oak Forests contain white oak in the canopy.

Conservation, Wildlife, and Management Considerations

Most 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.

Location Map







Oak - Pine Forest

The community provides nesting habitat for a large number of passerine bird species such as 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 moth uses red oak as one of its host plants and may be found in this community. This community type historically included chestnut as a canopy constituent and may include the chestnut clearwing moth, which uses chestnut as a host plant.

Distribution

Extending southward and southwestward from southern and central Maine; this is common, matrix-forming forest type in the Eastern Broadleaf Forest Province.

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



Small Whorled Pogonia

Characteristic Plants

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

Canopy

American beech*
Balsam fir*
Eastern hemlock
Paper birch
Red maple*
Red oak*
Red spruce
White pine*

Sapling/shrub

Beaked hazelnut* Black huckleberry* Witch-hazel*

Dwarf Shrub

Black huckleberry* Lowbush blueberry*

Herb

Big-leaved aster* Bracken fern* Canada mayflower Starflower

Bryoid

Dicranum moss Large hair-cap moss

Associated Rare Plants

American chestnut Mountain laurel Small whorled pogonia Variable sedge Wild indigo

Associated Rare Animals

Red-winged sallow Whip-poor-will

Examples on Conservation Lands You Can Visit

- Bald Mountain, Little Concord Pond State Park - Oxford Co.
- Sebago Lake State Park Cumberland Co.

Oak - Pir

Oak - Pine Woodland

State Rank S4

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 onethird to nearly all of the layer consisting of dwarf shrubs. Lowbush blueberry is the most abundant dwarf shrub; sheep laurel is also common. Herbs form up to 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.

Soil and Site Characteristics

Sites occupy upper hillsides and low ridgelines, with slopes up to 30% and elevations up to 1500'. South aspect is more likely than north. 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 were former pasture and/or have evidence of past fire.

Diagnostics

Canopy closure is less than 65% and red oak is dominant. Trees are short and spreading, or pines are dominant with lesser amounts 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.

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.

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

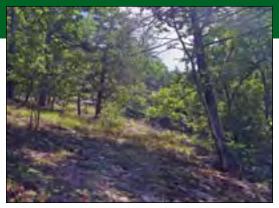
Location Map



immunity is known from this Econogic

Community may occur in this Ecoregion





Oak - Pine Woodland

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 or wind power towers have degraded some sites on mid-elevation summits.

This community type hosts several rare Lepidopteran species that feed on oaks, including red-winged sallow, barrens chaetaglaea, broad sallow, similar underwing, and oblique zale.

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

Examples on Conservation Lands You Can Visit

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

Characteristic Plants

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

Canopy

Red maple Red oak* Red pine Red spruce

Red spruce Shadbush*

White pine*

Sapling/shrub

Black huckleberry* Lowbush blueberry* Shadbush

Dwarf Shrub

Lowbush blueberry* Sheep laurel*

Herb

Bracken fern* Canada mayflower Sheep fescue* Starflower Wintergreen

Bryoid

Dicranum moss Large hair-cap moss Reindeer lichen

Associated Rare Plants

New Jersey tea Scarlet oak

Associated Rare Animals

Barrens chaetaglaea Broad sallow Edward's hairstreak Oblique zale Red-winged sallow Similar underwing Sleepy duskywing The buckmoth Whip-poor-will

Pitch Pine Dune Woodland

State Rank S1

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.

Soil and Site Characteristics

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.



Beach Plum in Bud

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.

Location Map



Conservation, Wildlife, and Management Considerations

This community appears to have been reduced in extent due to extensive beachfront development. Some of the remaining sites are ecologically intact, and while dynamic, are moderately well buffered from human impacts. They may, however, be vulnerable to ATV traffic, intensive recreational use, or over the longer term, sea level rise and severe storms. 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 southern 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.

Distribution

South-coastal Maine (Eastern Broadleaf Forest Province), extending south along the Atlantic coastal plain. This type achieves its greatest extent on Cape Cod.

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

Characteristic Plants

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

Canopy

Pitch pine*

Sapling/shrub

Bayberry Speckled alder Wild-raisin

Dwarf Shrub

Beach heather* Golden heather* Lowbush blueberry Sheep laurel*

Herb

Canada mayflower Common hairgrass* Indian pipe Starflower* Wild sarsaparilla Woodland sedge

Bryoid

Reindeer lichen*

Associated Rare Plants

Beach plum

Associated Rare Animals

Oblique zale Pine pinion Pine-devil moth Southern pine sphinx

Examples on Conservation Lands You Can Visit

- Crescent Beach State Park
 Cumberland Co.
- Popham Beach State Park Sagadahoc Co.
- Seawall Beach, Bates Morse Mountain Conservation Area – Sagadahoc Co.

Pitch Pine - Heath Barren

State Rank S1

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.

Soil and Site Characteristics

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.



Edwards' Hairstreak

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 and 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.

Location Map





Pitch Pine

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 habitat loss and fragmentation and a history of fire suppression, this forest type has become very rare. Most of the sites in the state have been degraded 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. Rare moths such as the pine pinion, oblique zale, and southern pine sphinx, which utilize pitch pine as a larval host plant, may be found in this community type. The pine-devil moth, a historical species for Maine, probably also inhabited this community type, where its larvae fed on pitch pine.

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 Plants

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

Canopy

Pitch pine*

Sapling/shrub

Scrub oak Sweetfern

Dwarf Shrub

Lowbush blueberry*

Herb

Sharp-pointed ricegrass Whorled loosestrife Woodland sedge*

Associated Rare Plants

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

Associated Rare Animals

Barrens itame
Eastern buckmoth
Edwards' hairstreak
Oblique zale
Pine barrens zanclognatha
Pine pinion
Pine-devil moth
Pink sallow
Similar underwing
Sleepy duskywing
Southern pine sphinx
Twilight moth
Whip-poor-will

Examples on Conservation Lands You Can Visit

- Brunswick Town Commons
 Cumberland Co.
- Jugtown Plains Cumberland Co.

Pitch Pine - Scrub Oak Barren

State Rank S2

Community Description

This woodland type ranges from very open to nearly closed canopy (25-75% closure) in which pitch pine is dominant (up to 50% cover). 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. Vegetation is typically very patchy, with some areas clearly pitch pine dominated and others areas extensive thickets of scrub oak. Nonforested openings with blueberry and lichens may occur within the barrens.

Soil and Site Characteristics

Sites occur on nutrient poor soils of glacial outwash plains or moraines south of 44 degrees 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.



Northern Blazing Star

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.

Conservation, Wildlife, and Management Considerations

This community type is dependent upon periodic fires to eliminate competing tree species and prevent succession to an Oak

Location Map





Pitch Pine - Scrub Oak Barren

- 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 butterflies and moths that use pitch pine or scrub oak as their larval host plant, including the southern pine sphinx, pine pinion, oblique zale, eastern buckmoth, Edwards' hairstreak, barrens itame, and sleepy duskywing.

Distribution

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

Landscape Pattern: Large Patch

Examples on Conservation Lands You Can Visit

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

Characteristic Plants

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

Canopy

Gray birch Pitch pine* Red maple

Sapling/shrub

Gray birch Pitch pine Scrub oak* Shadbush Sweetfern Wild-raisin

Dwarf Shrub

Lowbush blueberry* Sheep laurel Velvet-leaf blueberry

Herb

Bracken fern*
Canada mayflower
Mayflower
Sharp-pointed ricegrass
Wintergreen*
Woodland sedge

Bryoid

Large hair-cap moss

Associated Rare Plants

Butterfly weed Fern-leaved false foxglove Northern blazing star Wild chess Wild indigo Wild lupine

Associated Rare Animals

Barrens itame
Eastern buckmoth
Edwards' hairstreak
Oblique zale
Pine barrens zanclognatha
Pine pinion
Pine-devil moth
Pink sallow
Similar underwing
Sleepy duskywing
Southern pine sphinx
Twilight moth
Whip-poor-will

Maine Natural Areas Program

Balley's Ecoregion

Pitch Pine Woodland

State Rank S3

Community Description

These very open to semi open woodlands (25-65% canopy, occasionally to 75%) are dominated by pitch pine, 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, mostly heath, shrubs. 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.

Soil and Site Characteristics

Typical sites are ledges or rock outcrops in coastal areas. They may be flat to gently sloping, at elevations up to 1500'. Soils are usually very thin, consisting of a coarse mineral fraction or a layer of poorly decomposed duff over bedrock, with pH 4.6-5.4. Many sites have evidence of past fire.



Pitch Pine Cones

106

Diagnostics

These pitch pine dominated woodlands (25-65% 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.

Conservation, Wildlife, and Management Considerations

This community appears to be relatively stable in Maine, with little habitat conversion. Fire has apparently played

Location Map









Pitch Pine Woodland

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 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 pitch pines as a larval host plant such as the oblique zale, southern pine sphinx, and pine-devil moth, a historical species for Maine.

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 Plants

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

Canopy

Red spruce Pitch pine* Red oak* Red pine* White pine*

Sapling/shrub

Black huckleberry* Gray birch* Mountain holly* Pitch pine* Red spruce

Dwarf Shrub

Black huckleberry* Broom-crowberry* Lowbush blueberry* Rhodora* Sheep laurel*

Herb

Bracken fern

Bryoid

Reindeer lichen

Associated Rare Plants

Mountain sandwort Smooth sandwort

Associated Rare Animals

Pine-devil moth Southern pine sphinx

Examples on Conservation Lands You Can Visit

- Bald Head Preserve Sagadahoc Co.
- Champlain Mountain, Acadia National Park - Hancock Co.
- Dorr Mountain, Acadia National Park - Hancock Co.
- Reid State Park Sagadahoc Co.

Red and White Pine Forest

State Rank S3

Community Description

These are upland forests with red pine as the dominant tree; white pine, red spruce, or, near the coast, northern white cedar may be co-dominant. The canopy may be somewhat open but is more typically >70%. Especially in post-fire sites, the canopy may include deciduous trees such as paper birch, red maple, or big-toothed aspen. Lower layers are generally sparse (<25% cover) and contain few species; some sites may have scattered heath shrubs such as 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.

Soil and Site Characteristics

Sites are usually on flats, 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 4.8-5.2). Many sites have evidence of past fires.



Red Pine Needles and Cone

108

Diagnostics

The forest canopy typically exceeds 65%, with red pine dominant or co-dominant (at least 33% cover) with other conifers; the shrub layer is usually sparse (<15%).

Similar Types

Red Pine Woodlands have a more open canopy (usually <50%), 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 Forests may contain red pine, but white pine is more dominant.

Location Map





Red and White Pine Forest

Conservation, Wildlife, and Management Considerations

Red pine has been widely planted in the past, but natural occurrences of this type are fairly rare outside of eastern Maine. Under natural conditions, these forests apparently require fire for persistence or regeneration, but community dynamics are not well documented, and at some known sites clearcut harvesting has perpetuated the type. 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 southern pine sphinx, whose larvae feed on red pine.

Distribution

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

Landscape Pattern: Small to Large Patch

Characteristic Plants

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

Canopy

Big-toothed aspen* Eastern hemlock Red pine* Red spruce* White pine

Sapling/shrub

Balsam fir Red spruce

Dwarf Shrub

Black huckleberry*

Herb

Bracken fern Canada mayflower Round-leaved pyrola Starflower Wintergreen

Bryoid

Dicranum moss Red-stemmed moss

Associated Rare Animals

Oblique zale Southern pine sphinx Whip-poor-will

Examples on Conservation Lands You Can Visit

- Attean Pond at Moose River
 Somerset Co.
- East Machias River, Rocky Lake Public Lands – Washington Co.
- Fifth Lake Stream, Duck Lake Public Lands - Hancock Co.
- Gassabias Lake, Duck Lake Public Lands - Hancock Co.

Red Pine Woodland

State Rank S3

Community Description

These open canopy woodlands (30-75% closure) are dominated by red pine. 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 are virtually absent. Bryoids are patchy and usually consist of types associated with somewhat dry conditions such as reindeer lichens.

Soil and Site Characteristics

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

Diagnostics

Sites are distinguished by open canopy (<65%) woodlands, usually on bedrock; with red pine dominant and



Wintergreen (aka Teaberry)

oaks and northern hardwoods lacking; the herb layer is dominated by dwarf shrubs and few graminoids.

Similar Types

Red and White Pine Forests have more complete canopy (>75%), usually lack a well developed dwarf shrub layer, and occur on deeper sandy soils. Oak - Pine Woodlands may have red pine as a component species but will have red oak or northern hardwoods as dominant trees and usually possess a more extensive graminoid cover.

Conservation, Wildlife, and Management Considerations

These occur as small patches, usually on

Location Map





Red Pine Woodland

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-poorwills 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, southern pine sphinx, and pine pinion.

Distribution

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

Landscape Pattern: Small Patch

Examples on Conservation Lands You Can Visit

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

Characteristic Plants

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

Canopy

Paper birch Red maple Red pine* Red spruce White pine

Sapling/shrub

Black chokeberry Gray birch* Mountain holly Paper birch* Red maple Red spruce White pine

Dwarf Shrub

Black huckleberry Lowbush blueberry* Sheep laurel*

Herb

Bracken fern Bunchberry Canada mayflower Wintergreen

Bryoid

Grey reindeer-lichen Grimmia rock-moss

Associated Rare Plants

Canada mountain-ricegrass Swarthy sedge

Associated Rare Animals

Oblique zale Pine pinion Southern pine sphinx

Spruce - Northern Hardwoods Forest

State Rank S5

Community Description

This mixed forest type is characterized by red spruce and yellow birch, or less often another hardwood (sugar maple, red maple, or beech). Scattered large supercanopy white pine trees are occasional. Balsam fir and paper birch are common, typically as smaller trees, and hemlock may be an associate at some sites. The sapling/shrub layer may be fairly well developed (20-40% cover), with striped maple and saplings of canopy species; shrub species vary among sites. The herb layer ranges from sparse to dense but is usually >15% cover, 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.

Soil and Site Characteristics

These forests occur on cooler 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 5.0-5.4.



Balsam Fir

Diagnostics

Sites are distinguished by a mixture of red spruce and northern hardwoods (most often yellow birch) in the canopy; conifer and deciduous components exceed 25% cover each.

Similar Types

Northern Hardwoods Forests are more strongly deciduous. Spruce - fir forest types can be similar but have <25% cover of northern hardwood species. Both of these types can be contiguous with this type and may intergrade with it.

Conservation, Wildlife, and Management Considerations

Nearly all forests of this type have been harvested in the past, and at many sites the

Location Map



Community is known from this Econogical
Community may occur in this Econogical
Balley's Econogical
County





Three-lobed Bazzania

spruce has been selectively removed. As a result, the canopies of such sites are more often indicative of Northern Hardwoods Forests, with spruce and fir more common in the understory than in the canopy. Sites with relatively little human disturbance are rare but are moderately well represented on conservation lands.

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 early hairstreak butterfly uses beech as its larval host plant.

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. This type is intended to represent forests that are truly 'mixed' at a stand scale, rather than large blocks containing a mosaic of distinct conifer and hardwood stands. For the latter example, the 'Spruce – Northern Hardwood Forest Ecosysystem' is a more appropriate mapping unit.

Characteristic Plants

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

Canopy

Balsam fir Red spruce* White pine* Yellow birch*

Sapling/shrub

American beech Balsam fir* Hobblebush* Mountain maple* Red maple Red spruce* Striped maple* Yellow birch

Herb

Northern wood-sorrel Spinulose wood fern* Starflower

Bryoid

Dicranum moss Flat-tufted feather-moss Pincushion moss Three-lobed bazzania

Associated Rare Plants

Giant rattlesnake-plantain

Associated Rare Animals

Early hairstreak

Examples on Conservation Lands You Can Visit

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

Spruce - Pine Woodland

State Rank S4

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. Red spruce or white pine is strongly dominant at some sites; at others, the canopy is mixed, with no one tree species strongly dominant. White spruce may rarely replace red spruce at coastal sites. The shrub layer is typically very sparse (and variable in composition), and the herb layer has mostly 15-50% cover. Heath shrubs are the dominant feature of the herb layer; herb species rarely exceed 8% cover. 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.

Soil and Site Characteristics

Sites occur on mid to upper slopes (usually 10-20% slope) and low summits at elevations up to 2000'. 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



Wild Raisin

(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 cover. Red spruce is typically dominant, or occasionally co-dominant with white pine or red spruce.

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

Location Map





Spruce - Pine Woodland

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.

Conservation, Wildlife, and Management Considerations

Most sites have little pressure from development or timbering; the primary impacts are from recreational use. Communications towers or wind turbines 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, yellowbellied flycatcher, boreal chickadee, Blackburnian warbler, red crossbill, and northern parula.

Distribution

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

Landscape Pattern: Small Patch

Characteristic Plants

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

Canopy

Balsam fir*
Black spruce*
Northern white cedar*
Paper birch*
Red spruce*
White pine*
White spruce*

Sapling/shrub

Bayberry* Shadbush

Wild-raisin*

Dwarf Shrub

Black huckleberry* Lowbush blueberry* Sheep laurel*

Herb

Bracken fern

Bryoid

Dicranum moss
Red-stemmed moss
Reindeer lichen*

Examples on Conservation Lands You Can Visit

- Holbrook Island Sanctuary State Park
 Hancock Co.
- Mahoosuc Mountain, Mahoosuc Public Lands Oxford Co.
- Mansell Mountain, Acadia National Park - Hancock Co.
- Nahmakanta Public Lands Piscataquis Co.
- Petit Manan Point, Petit Manan National Wildlife - Washington Co.

Spruce Rocky Woodland

State Rank S4

Community Description

These partial canopy woodlands (usually less than 50% cover) 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 and may include large expanses with little to no vascular vegetation. 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.

Soil and Site Characteristics

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



Rock Tripe Lichen

Diagnostics

These are open canopy woodlands or barren talus slopes in which red spruce is dominant.

Similar Types

Spruce - Pine Woodlands have similar canopies but occur on bedrock versus talus and have more heaths and fewer ferns and rock tripe lichens. Other talus woodlands (Birch - Oak Rocky Woodlands and Oak - Ash Woodlands) are dominated by deciduous trees, not conifers. Large talus slopes at high elevations will likely be classified as one of the alpine or sub-alpine types.

Location Map





Spruce Rocky Woodland

Conservation, Wildlife, and Management Considerations

Most sites have little potential economic use. Sites are generally small and embedded within a coniferous or mixed forest hill slope.

The cool, moist crevices in these talus slopes provide excellent habitat for the rock vole and long-tailed shrew. This community may also host the Gaspé shrew, a species not currently known from Maine that occurs just to the north in Canada.



Spruce Rocky Woodland

Characteristic Plants

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

Canopy

Paper birch Red spruce*

Sapling/shrub

Mountain holly* Red raspberry* Red spruce

Dwarf Shrub

Black huckleberry Lowbush blueberry* Sheep laurel*

Herb

Common hairgrass Rock polypody

Bryoid

Dicranum moss
Fringed Ptilidium liverwort
Rock-tripe lichen
Tufted reindeer-lichen*

Distribution

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

Landscape Pattern: Small Patch

Examples on Conservation Lands You Can Visit

- Acadia National Park Hancock Co.
- Deboullie Ponds Public Lands
 Aroostook Co.

Subalpine Fir Forest

State Rank S3

Community Description

Balsam fir, or mixtures of fir and heartleaved 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.

Soil and Site Characteristics

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, fire, and spruce-budworm can exert lasting influences on community dynamics. Recurrent landslides can keep some areas in birch - mountain-ash dominance.



Fir Waves on Crocker Mountain

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 Downeast coast. Decreasing in elevation, this type can grade into Montane Spruce - Fir Forest or Lower-elevation Spruce - Fir Forest, which are distinguished by their higher proportion of spruce in the canopy and by less stunted trees.

Conservation, Wildlife, and Management Considerations

Although Subalpine Fir Forests are naturally dynamic as they cycle through

Location Map



Community is known from this Ecoregical
Community may occur in this Ecoregical
Balley's Ecoregical
County

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Subalpine Fir Forest

periods of weather and insect damage and regeneration, they appear to be relatively stable in overall extent and are extensive on Maine's higher mountains. Many major occurrences are well protected within public lands or private conservation lands. On the few remaining sites on private lands, timber harvesting, recreation, and windpower development could cause lasting impacts. At some sites, past harvesting has resulted in prolific growth of hay-scented and mountain wood fern, inhibiting tree regeneration.

This high-elevation forest community type may be used as nesting habitat by a number of high elevation and/or coniferous forest specialist bird species, such as the spruce grouse, dark-eyed junco, bay-breasted warbler, black-backed woodpecker, white-throated sparrow, and blackpoll warbler. The rare Bicknell's thrush inhabits structurally complex forests above 2500'. Rock vole and long-tailed shrew both inhabit cool moist crevices in rocky habitat at high elevations. Northern bog lemmings may inhabit wet Subalpine Fir Forests in which peat moss is present.

Distribution

Western and central Maine westward (New England - Adirondack Province); likely extends northeasterly to the Gaspé Peninsula.

Landscape Pattern: Large Patch

Characteristic Plants

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

Canopy

Balsam fir* Heart-leaved paper birch Paper birch* Red spruce

Sapling/shrub

Balsam fir*
Black spruce*
Heart-leaved paper birch*
Mountain ash*
Wild-raisin

Herb

Balsam fir*
Big-leaved aster*
Bluebead lily
Mountain wood fern*
Northern wood-sorrel
Spinulose wood fern*
Starflower

Bryoid

Common broom-moss Three-lobed bazzania

Associated Rare Plants

Northern comandra

Examples on Conservation Lands You Can Visit

- Baxter State Park Piscataguis Co.
- Little Moose Public Lands Piscataquis Co.
- Bigelow Preserve Public Lands
 - Somerset Co.
- Crocker Mountain, Appalachian Trail
 - Franklin Co.
- Mahoosuc Mountain, Mahoosuc Public Lands - Oxford Co.
- Sugarloaf Mountain, Appalachian Trail
 Franklin Co.

Sugar Maple Forest

State Rank: S4

Community Description

The canopy is dominated by sugar maple, with white ash a frequent associate in southern or central Maine. Other associated hardwood species include vellow birch and striped maple. Beech may be present but is less abundant than in Northern Hardwoods Forests. Conifers are usually sparse. The closedcanopy forest has little to moderate shrub cover, moderate to dense herb cover, and may have local carpets of sugar maple seedlings. Characteristic shrubs include alternate-leaved dogwood and red-elderberry. Typical herbs of this type, which are scarce or absent from beechbirch-maple forests, include jack-in-thepulpit, doll's eyes, round-leaved violet, grape fern, zig-zag goldenrod, spikenard, false Solomon's seal, and long-stalked sedge.

Soil and Site Characteristics

These northern hardwood forests occur at moderate elevations on slightly enriched, moderately drained soils ~ often silt loams derived from pelite or other subacidic bedrock. They may occur as inclusions within typical northern hardwood forests, or, in northern Maine, they may occur over larger areas (hundreds of acres) and be the locally dominant northern hardwood forest.

Diagnostics

Sugar maple is dominant or co-dominant (>50% cover) with yellow birch or white ash. Conifers and beech each form less than 25% cover. The herbaceous layer includes at least several species indicative of moderate soil enrichment,

as noted above, but lacks richer site species characteristic of Maple – Basswood – Ash Forest.

Similar Types

These forests are intermediate in nutrient regime and composition between Enriched Northern Hardwoods Forests and Northern Hardwoods Forests. Enriched Northern Hardwoods Forests are typically small-patch types in ravines or coves, with more restrictive rich-soil indicators such as basswood, maidenhair fern, blue cohosh, broad-leaved sedge, plantain-leaved sedge, and Braun's holly fern. Northern Hardwoods Forests typically contain as much if not more beech than sugar maple and lack the diversity and abundance of rich site indicators. Northern Hardwoods

Location Map





Sugar Maple Forest

Forests often occur on drier sites (e.g., ridgetops) and/or more acidic soils (e.g., granitic types in Downeast Maine).

Conservation, Wildlife, and Management Considerations

This forest type has been extensively harvested and managed in northern Maine. Most management techniques diverge from the natural gap pattern, which is at the scale of single trees or small groups of trees. Large (>100 acres) examples reflecting only natural disturbance are scarce statewide, and intact examples in central and southern Maine tend to be smaller and more isolated.

This type provides nesting habitat for a large number of passerine bird species, such as the black-throated green warbler, rose-breasted grosbeak, scarlet tanager, ovenbird, and a large proportion of the global population of black-throated blue warblers.

Distribution

New England - Adirondack Province and Laurentian Mixed Forest Province. Extends east, west, and north from Maine.

Landscape Pattern: Small to Large Patch

Characteristic Plants

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

Canopy

American beech Sugar maple* White Ash* Yellow birch

Sapling/shrub

Alternate-leaved dogwood Red Elderberry Striped maple* Sugar maple* Yellow birch

Herb

Christmas fern Doll's eyes* Jack in the pulpit Round-leaved violet Sarsaparilla Shining clubmoss* Spikenard* Striped maple

Associated Rare Plants

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

Associated Rare Animals

Early hairstreak

Examples on Conservation Lands You Can Visit

- Deboullie Ponds Public Lands
 - Aroostook Co.
- Scopan Public Lands Aroostook Co.
- White Mountain National Forest
 - Oxford Co.

White Cedar Woodland

State Rank S2

Community Description

This type is a partial canopy upland woodland (30-85% closure) in which northern white cedar is the dominant tree. Cedar may make up almost the entire canopy, or it may be mixed with lesser amounts of white pine, balsam fir, or other species. 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 such as 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.

Soil and Site Characteristics

Sites occur on rocky hillslopes with 10-70% 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



Lowbush Blueberry

rock. Sites with seepage moisture tend to have deeper 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 (>30% cover); heath shrubs are not prominent in the herb layer (<20% cover).

Similar Types

Some Spruce - Pine Woodlands may be co-dominated by northern white cedar, but they also have a heath shrub layer. Other northern white cedar dominated

Location Map



Community is known from this Econogic
Community may occur in this Econogic
Bailey's Econogicn
County



community types are wetlands or seepage forests on flatter, deeper, mineral or organic soils.

Conservation, Wildlife, and Management Considerations

Little is known about the distribution and landscape setting of these woodlands. Documented at sites either on the Downeast Coast (e.g., Acadia National Park) or at higher elevations inland. Sites are generally inoperable from a forestry standpoint, and recreational use may be the biggest conservation concern. There is evidence of fire at some sites, but the role of fire in creating or perpetuating this type is not clear.

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.

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 Plants

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

Canopy

Balsam fir Northern white cedar* Paper birch

Sapling/shrub

Balsam fir* Northern white cedar

Dwarf Shrub

Lowbush blueberry

Herb

Starflower

Bryoid

Dicranum moss

Associated Rare Plants

Fragrant wood fern Narrow-leaved reed grass

Examples on Conservation Lands You Can Visit

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

White Oak - Red Oak Forest

State Rank S3

Community Description

This deciduous forest type is 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 and ironwood. 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.

Soil and Site Characteristics

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 Oak - Red Oak Forest

white pine or hickory component. White oak forms at least 25% of the canopy.

Similar Types

Oak - Pine Forests lack white oak and may have white pine co-dominant with red oak. Oak - Northern Hardwoods - Forests lack white oak and have a larger component of beech or sugar maple. Shagbark hickory is dominant in Oak - Hickory forests.

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

Location Map



Community is known from this Ecoregion
Community may occur in this Ecoregion
Bailey's Ecoregion
County





Scarlet Oak Leaf held against Oak Bark

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. Fire may also play a role in natural regeneration. 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 rare red-



White Oak Leaf

Characteristic Plants

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

Canopy

Red oak* Sugar maple White oak*

Herb

Rough-leaved ricegrass Wild sarsaparilla Wild-oats Wintergreen Woodland sedge*

Associated Rare Plants

Bitternut hickory Chestnut oak Flowering dogwood Scarlet oak

Associated Rare Animals

Early hairstreak Red-winged sallow Whip-poor-will

winged sallow moth uses red oak as one of its host plants and may be found in this community.

Distribution

Restricted primarily to southern Maine, characteristic of the Eastern Broadleaf Forest Province.

Landscape Pattern: Small to Large Patch, generally 100 acres or less.

Examples on Conservation Lands You Can Visit

- Mt. Agamenticus York Co.
- Sebago Lake State Park Cumberland Co.

White Pine Forest

State Rank S5

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 such as lowbush blueberry, forbs, or ferns, but graminoids are very uncommon. Canada mayflower is frequent. The ground layer is mostly conifer litter, with bryoid cover <25%; large haircap moss and red-stemmed moss are common species.

Soil and Site Characteristics

This type occurs on sandy to loamy mesic soils (usually well drained, occasionally imperfectly drained or



White Pine

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 coarsetextured flats.

Diagnostics

White pine is dominant (>33% cover); red oak and northern hardwood species (beech, sugar maple, yellow birch) total <25% cover. The heath shrub and herbaceous layers are sparse.

Similar Types

Red and White Pine Forests have >33% cover of red pine. Hemlock Forests have

Location Map



Community is known from this Ecoregion
Community may occur in this Ecoregion
Balley's Ecoregion
County





White Pine Forest

more hemlock than white pine. Where red spruce is co-dominant, this type can grade into spruce - fir forest types. Oak - Pine Forests and Oak - Northern Hardwoods Forests have red oak at > 33% cover.

Conservation, Wildlife, and Management Considerations

Demand for white pine has considerably reduced mature, undisturbed examples of this type. 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.

Distribution

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

Landscape Pattern: Large Patch

Characteristic Plants

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

Canopy

Eastern hemlock* Northern white cedar Red maple Red spruce White pine*

Sapling/shrub

Balsam fir Beaked hazelnut* Eastern hemlock Red maple* Red spruce White pine* Wild-raisin*

Dwarf Shrub

Lowbush blueberry* Swamp dewberry*

Herb

Balsam fir Canada mayflower* Eastern hemlock Starflower White pine*

Bryoid

Dicranum moss*

Examples on Conservation Lands You Can Visit

- Bearce Lake, Moosehorn National Wildlife Refuge - Washington Co.
- Bigelow Preserve Public Lands
 Franklin Co.
- Chamberlain Lake Public Lands
 - Piscataquis Co.
- Gero Island Public Lands Piscataquis Co.
- Scientific Forest Management Area,
 Baxter State Piscataquis Co.



Atlantic White Cedar Bog

State Rank S1

Community Description

These peatlands are dominated by dwarf heath 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. Leatherleaf is a common shrub. Herbs are sparse. The bryoid layer is well developed with peat moss covering the ground and forming the substrate.

Soil and Site Characteristics

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 peatlands possess abundant low heath shrubs and peat moss and are only sparsely forested by Atlantic white cedar.



Atlantic White Cedar Branch

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, such as Dwarf Shrub Bog and Leatherleaf Bog, can have similar composition in the dwarf shrub, herb, and bryophyte layers, but lack Atlantic white cedar.

Conservation, Wildlife, and **Management Considerations**

These bogs occur as part of larger peatlands, and maintaining the hydrologic integrity of the entire

Location Map





Atlantic White Cedar Bog

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 on Atlantic white cedar in its larval stage.

Distribution

Eastern Broadleaf Forest Province, extending southward from Maine.

Landscape Pattern: Small Patch



Atlantic White Cedar Bark

Characteristic Plants

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

Canopy

Atlantic white cedar* Black spruce* White pine

Sapling/shrub

Atlantic white cedar* Black huckleberry Mountain holly

Dwarf Shrub

Dwarf huckleberry* Labrador tea* Large cranberry Leatherleaf* Sheep laurel*

Herb

Pitcher plant Tufted cotton-grass

Bryoid

Dicranum moss Reindeer lichen Sphagnum mosses*

Associated Rare Plants

Atlantic white cedar

Associated Rare Animals

Hessel's hairstreak

Examples on Conservation Lands You Can Visit

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

Atlantic White Cedar Swamp

State Rank S2

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 with occasional black spruce and red maple; in some sites, red maple may be codominant. 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.

Soil and Site Characteristics

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.



Atlantic White Cedar Branch with Fruit

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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).

Conservation, Wildlife, and Management Considerations

Most occurrences of this community

Location Map





Atlantic White Cedar Swamp

type occur in rapidly growing southern Maine. Because of this and because the timber is valuable, these occurrences are 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 or fire. 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 and for the rare Hessel's hairstreak butterfly, which feeds on Atlantic white cedar in its larval stage.

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: Small to Large Patch.

Characteristic Plants

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

Canopy

Atlantic white cedar* Black spruce* Red maple*

Sapling/shrub

Atlantic white cedar*
Mountain holly*

Dwarf Shrub

Labrador tea Sheep laurel

Herb

Canada mayflower Cinnamon fern* Creeping snowberry Goldthread* Pitcher plant Starflower Three-seeded sedge Wild sarsaparilla*

Bryoid

Dicranum moss Sphagnum mosses* Three-lobed bazzania

Associated Rare Plants

Atlantic white cedar Smooth winterberry

Associated Rare Animals

Hessel's hairstreak

Examples on Conservation Lands You Can Visit

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

Balsam Poplar Floodplain Forest

State Rank S2

Community Description

These partly open to closed canopy forests are dominated by balsam poplar and occur along medium-sized rivers. This type 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, bluejoint, red-osier dogwood, virgin's bower, speckled alder, dwarf raspberry, broad leaved goldenrod, inflated sedge, and wood nettle.

Soil and Site Characteristics

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



Balsam Poplar Floodplain Forest

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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 or codominant. The dense herb layer includes ferns, bluejoint, sedges, and shrubs such as red-osier dogwood and speckled alder.

Similar Types

Silver Maple Floodplain Forests and Upper Floodplain Hardwood Forests do

Location Map





Balsam Poplar Leaves

not have balsam poplar or black ash as a dominant or co-dominant.

Conservation, Wildlife, and Management Considerations

The few known examples of this type have been influenced by past disturbances, including harvesting, beaver damage, and potentially fire. As a result, long term successional trends are not clear. Exotic plant species, which may displace those native to our area, may be easily transported to sites by river waters and represent a threat to the integrity of these forests. The biggest threat may be hydrologic alteration. All known sites in Maine are on private land.

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 Upper Floodplain Hardwood Forests in central and northern Maine.

Landscape Pattern: Small Patch

Characteristic Plants

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

Canopy

American elm Balsam fir Balsam poplar* Black ash

Dwarf Shrub

Dwarf raspberry

Herb

Bluejoint
Ostrich fern*
Royal fern
Sensitive fern
Wood nettle



Sensitive Fern

Distribution

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

Black Ash Swamp

State Rank S4

Community Description

This northern forested wetland type is characterized by a hardwood or mixed overstory and lush understory on shallow peat or muck soils. While black ash is characteristic in these small-patch communities, Black Ash Swamps often occur within or adjacent to larger expanses of Northern White Cedar Swamps or Red Maple Swamps and may be transitional between the two. Tree cover ranges from 25-80%. Common plants of forested wetlands are often dominant in the understory, including sensitive fern, royal fern, marsh fern, tussock sedge, fowl mannagrass, and spotted touch-me-not, as well as a scattering of rich-site wetland herbs including purple avens, Robbins' ragwort, foamflower, small enchanter's nightshade, and white turtlehead. Mosses and liverworts are usually abundant and may form a continuous carpet.

Soil and Site Characteristics

Black Ash Swamps occupy broad basins or seepage sites on lower gentle slopes, often in association with larger



Showy Lady's-slipper

areas of cedar or red maple swamp. They typically occur in rolling to low terrain in central and northern regions of the state where higher pH soils or groundwater discharge occur. Saturated soils of well decomposed organic matter (peat or muck) are typical and surface rivulets and springs are occasional.

Diagnostics

Black ash is dominant or co-dominant (at least 40% cover) with northern white cedar or red maple in a wetland setting. Sensitive fern and royal fern each form more cover than cinnamon fern.

Similar Types

Northern White Cedar Swamps and

Location Map





Black Ash Leaves

Evergreen Seepage Forests each have more conifer than hardwood cover in the canopy. Red Maple Swamps have more red maple than black ash in the canopy.

Conservation, Wildlife, and Management Considerations

Wind is apparently the primary form of natural disturbance in these swamps, as black ash is shallow-rooted. Although black ash does not grow as fast as other species, its ability to stump sprout may be an important reproductive strategy in response to disturbance. Black ash is fairly long lived (>250 years). Beavers have altered many black ash swamps, converting them into open or shrubdominated wetlands.

Breeding birds found in black ash swamps may include great-crested flycatcher, brown creeper, veery, and northern waterthrush. Wood ducks may also breed in these swamps if there is open water available.

Characteristic Plants

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

Canopy

Black ash* Northern white cedar* Red maple Yellow birch

Sapling/shrub

Alderleaf buckthorn*
Black ash*
Mountain holly
Northern white cedar
Red maple
Speckled alder*
Winterberry
Witherod

Herb

Foamflower
Marsh fern
Purple avens
Robbins' ragwort
Royal fern
Sensitive fern*
Small enchanter's nightshade
Spotted touch-me-not

Associated Rare Plants

Bog bedstraw Showy lady's-slipper White adder's mouth

Distribution

New England - Adirondack Province and Laurentian Mixed Forest Province. Most common in northern and eastern Maine, and likely extends to the east, west, and north.

Landscape Pattern: Small patch.

Black Spruce Bog

State Rank S4

Community Description

This open canopy peatland type is characterized by black spruce and/or larch trees over typical bog vegetation of heath shrubs, graminoids, and peat mosses. It is the most common type of 'forested bog' in Maine. Canopy closure is usually 20-50% and occasionally ranges up to 85%. Black spruce is usually dominant, but in some cases larch (or rarely fir) may be more abundant. Red maple may be a component in somewhat more minerotrophic portions, and white pine may occur on hummocks. The shrub layer, including small trees, is usually well developed (>30% cover). Labrador tea and three-seeded sedge are characteristic species. The bryoid layer has close to 100% cover and is dominated by peat mosses; sparse reindeer lichens may occur.

Soil and Site Characteristics

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

Canopy closure is at least 20%, with black spruce and/or larch strongly dominant, though red maple can also be present. Heath shrubs occur in the ground layer. Sites occur in a peatland setting (peat generally >30 cm deep).

Similar Types

Dwarf Shrub Bogs and Leatherleaf Bogs, which are often adjacent on the ground, share many shrub and herb species but are considerably more open (<20%

canopy cover). More minerotrophic sites tend to have wooded fens (Red Maple Fen, Open Cedar Fen), with black spruce less dominant.

Conservation, Wildlife, and Management Considerations

Black Spruce Bogs 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 rare olive-sided flycatcher. Similarly, the three-toed woodpecker

Location Map



Bailey's Ecoregion

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Black Spruce Bog

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 uses black spruce as a larval host plant. The western pine elfin uses jack pine as its host plant in the Midwest but is associated with black spruce in Maine and may be found in this community in northwestern Maine. Thaxter's pinion moth uses larch as one of its larval hosts.

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: Small to Large Patch

Examples on Conservation Lands You Can Visit

- Gassabias Lake, Duck Lake Public Lands - Hancock Co.
- Moose River Somerset Co.
- Salmon Brook Lake Bog Public Lands
 Aroostook Co.

Characteristic Plants

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

Canopy

Balsam fir*
Black spruce*
Gray birch*
Red spruce*
White pine

Sapling/shrub

Balsam fir*
Black spruce*
Larch*
Mountain holly*
Rhodora*
Sheep laurel*

Dwarf Shrub

Black huckleberry* Labrador tea* Rhodora* Sheep laurel Velvet-leaf blueberry*

Herb

Balsam fir*
Black spruce*
Cinnamon fern*
Creeping snowberry
Lowbush blueberrry
Three-seeded sedge*

Bryoid

Dicranum moss Red-stemmed moss Reindeer lichen Sphagnum mosses*

Associated Rare Plants

Northern comandra Swamp birch

Associated Rare Animals

Olive-sided flycatcher Rusty blackbird

Evergreen Seepage Forest

State Rank S4 Similar Types

Community Description

Northern white cedar and other conifers 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, though red spruce, white spruce, or black spruce may be co-dominant on some sites. Balsam fir, red maple, or vellow birch may be present but not dominant. Shrubs and dwarf shrubs are typically sparse but may be more abundant in canopy gaps caused by harvesting or natural disturbance. The herb layer may be extensive, typically >50% cover, and comprised mostly of non-woody species with 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.

Soil and Site Characteristics

The substrate is shallow peat or organic material 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 feathermosses and leafy liverworts rather than by peat mosses. Groundwater seeps may be visible.

Most similar to and often grade into Northern White Cedar Swamps, which occur in saturated, level basins on organic rather than mineral soils with extensive cover of peat mosses. Open Cedar 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. Evergreen Seepage Forests with a substantial amount of red spruce could grade into Spruce - Fir Wet Flats, which usually occur on flats.

Conservation, Wildlife, and **Management Considerations**

Most known occurrences of this community type in Maine have been harvested in the past, often targeting removal of spruce.

Location Map







Northern White Cedar Branch

Forest management generally does not result in permanent conversion of this type, although questions remain about how to most successfully regenerate cedar. Some high quality examples exist on public and private conservation lands.

Evergreen Seepage Forests support numerous orchid species, including some that are rare. 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 three-toed woodpecker. Cool, well-oxygenated forested seeps provide habitat for the northern spring salamander.

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 smaller in central and southern Maine.

Examples on Conservation Lands You Can Visit

- Big Reed Pond Preserve Piscataquis Co.
- Chamberlain Lake Public Lands - Piscataguis Co.

Characteristic Plants

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

Canopy

Balsam fir Northern white cedar* Red spruce*

Sapling/shrub

Fly honeysuckle

Herb

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

Bryoid

Mountain fern moss Sphagnum mosses Three-lobed bazzania

Associated Rare Plants

Giant rattlesnake-plantain Showy lady's-slipper Small yellow water crowfoot Swamp fly honeysuckle

Associated Rare Animals

Northern spring salamander

- Deboullie Ponds Public Lands - Aroostook Co.
- North Branch Inlet, Scopan Public Lands - Aroostook Co.
- Pollywog Gorge, Nahmakanta Public Lands - Piscataguis Co.
- Salmon Brook Lake Bog Public Lands - Aroostook Co.
- Sunkhaze Meadows National Wildlife Refuge - Penobscot Co.

Hardwood Seepage Forest

State Rank S3

Community Description

These closed canopy to partial canopy forests support a mixture of mostly deciduous overstory trees. Yellow birch, red maple, and/or green, black, or white ash are usually prominent species (35-85% cover each, sometimes lower). Hemlock or, less often, red spruce may create a mixed canopy (>25% conifer), with locally dense conifers. Sugar 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. Bryoids are sparse.

Soil and Site Characteristics

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. Sites often occur at breaks in slope - either at the base of a slope, or on a slope bench. Soils are loamy, or grading to silty in flats, and moderately acidic to neutral (pH 5.2-7.0). Soils place this as a wetland type, but some sites may grade from wetland to upland as one moves upslope. Small sites, or 'forest seeps' (i.e., less than one acre) are frequent and are typically considered as inclusions within the broader forest rather than distinct natural communities.

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.

Similar Types

Pocket Swamps feature hemlock and/or red maple as dominants, have heaths or winterberry in the shrub layer, and typically occur in distinct basins. Some Enriched Northern Hardwoods Forests may have areas of wet soils, but have very different herb layer composition. Red Maple Swamps can occur in similar settings but have different canopy composition.

Location Map





Hardwood Seepage Forest

Conservation, Wildlife, and Management Considerations

Many sites are on land with a long settlement history and have been either cleared or harvested in the past. 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. Like vernal pools, recognition of this type is more difficult in the winter, when snow cover and plant senescence may make it difficult to distinguish these sites from upland forest. Seeps may remain unfrozen through the winter, making it difficult to operate logging equipment.

Birds using a variety of hardwood types may use these communities. Cool, well oxygenated forested seeps provide habitat for the northern spring salamander. Occurrences of this community type in southern Maine may host the rare spicebush swallowtail butterfly, whose larvae feed only on spicebush and sassafras.

Distribution

Statewide, though not well documented

Landscape Pattern: Small Patch.
Occurrences less than one acre are generally considered inclusions rather than distinct natural communities.

Characteristic Plants

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

Canopy

American beech
Eastern hemlock*
Green ash*
Red oak
Red spruce
Sugar maple
Yellow birch*

Sapling/shrub

American beech Red spruce*

Herb

Bluejoint
Cinnamon fern*
Common speedwell
Goldthread
Jack-in-the-pulpit
New York fern
Sensitive fern*
Spinulose wood fern

Bryoid

Dicranum moss Sphagnum mosses*

Associated Rare Plants

Spicebush Swamp saxifrage

Associated Rare Animals

Northern spring salamander Spicebush swallowtail

Examples on Conservation Lands You Can Visit

• Dickwood IFW Lot - Aroostook County

Northern White Cedar Swamp

State Rank S4

Community Description

This type is moderately to densely forested, often with little light penetrating to the forest floor. Northern white cedar is dominant (up to 95% cover), often forming a fairly uniform stand, but may be interspersed with various amounts of red maple (up to 25% cover), black spruce (up to 40% cover), or, less frequently, larch, yellow birch, or balsam fir. The variable shrub and ground layers form a lush mosaic of vegetated hummocks interspersed with moist hollows; alder may be frequent. 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.

Soil and Site Characteristics

This community typically occupies level, poorly drained basins along stream flowages or the perimeter of ponds. The 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 wetlands with >60% tree canopy cover and northern white cedar as



the dominant tree. Peat mosses are the dominant bryophytes. The substrate is organic peat or muck. Small Round-

leaved Orchis

Similar Types

Evergreen Seepage Forests are underlain by mineral soils, sometimes with a thin peat layer, and tend to occur on gentle slopes. They also have different mosses; feathermosses (especially mountain-fern moss) and three-lobed bazzania will generally exceed peat mosses in total cover. Open Cedar 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. However, these three cedar types may grade into one another as part of large drainage basins.

Location Map



Community is known from this Ecorogical
Community may occur in this Ecorogical
Balley's Ecorogical
County





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. Cedar swamps in northern Maine can be very extensive, running into hundreds of acres. In southern Maine, they are often less than 50 acres in size. Although the overall extent of this community type appears stable, there are some indications that it is more difficult to regenerate cedar rather than fir through harvest practices. There has been little permanent conversion to other land uses or forest types. Some sites have been significantly altered by beaver activity.

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 three-toed woodpecker.

Examples on Conservation Lands You Can Visit

- Deboullie Ponds Public Lands
 Aroostook Co.
- Gott Brook, Dwinal Flowage Wildlife Management Area Penobscot Co.
- Great Heath Public Lands Washington Co.
- Petit Manan Point, Petit Manan National Wildlife Refuge - Washington Co.
- Salmon Brook Lake Bog Public Lands
 Aroostook Co.

Characteristic Plants

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

Canopy

Black spruce Larch Northern white cedar* Red spruce White spruce

Sapling/shrub

Black spruce*
Northern white cedar*
Red spruce
Speckled alder
Winterberry

Herb

Balsam fir* Creeping snowberry Northern white cedar* Red spruce Three-seeded sedge*

Bryoid

Mountain fern moss Sphagnum girgensohnii* Other peat mosses

Associated Rare Plants

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

Distribution

Throughout the New England - Adirondack Province and Laurentian Mixed Forest Province, but most extensive in northern Maine. Extends north, west, and east from Maine.

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

О

Open Cedar Fen

State Rank S4

Community Description

These open canopy woodlands occur in a peatland setting with northern white cedar dominant. Canopy closure is 20-60%. Black spruce, red maple, balsam fir, black ash, or larch may be mixed with the cedar. 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 heath 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.

Soil and Site Characteristics

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', ranging from quite acidic to circumneutral (pH 4.6-7.2), and typical of somewhat minerotrophic (fen) conditions, not raised bog conditions.



Yellow Lady's-slipper

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 Evergreen 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). Cedar swamps and seepage forests also have very low cover of peatland dwarf shrubs. Red Maple Fens can be similar, but have far less northern white cedar in the canopy.

Location Map





Open Cedar Fen

Gradations from cedar fens to Black Spruce Bogs also occur.

Conservation, Wildlife, and Management Considerations

These fens usually occur as part of larger peatlands, and maintaining the hydrologic integrity of the entire wetland is key. The cedars generally remain small, therefore this type is typically not a target for forest management. In some areas these fens have been altered by beaver activity.

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 three-toed woodpecker.

Distribution

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

Landscape Pattern: Large Patch

Examples on Conservation Lands You Can Visit

• Lake Umbagog National Wildlife Refuge - Oxford Co.

Characteristic Plants

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

Canopy

Black spruce* Larch* Northern white cedar*

Sapling/shrub

Balsam fir*
Black ash*
Northern white cedar*
Red maple*
Speckled alder

Dwarf Shrub

Black huckleberry* Labrador tea Leatherleaf* Sheep laurel Sweetgale*

Herb

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

Bryoid

Dicranum moss* Mountain fern moss Sphagnum mosses*

Associated Rare Plants

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

- Mattagodus Wildlife Management Area
 - Penobscot Co.
- Number Five Bog Public Lands

- Somerset Co.

Pitch Pine Bog

State Rank S2

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 covering the ground.

Soil and Site Characteristics

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. In some, but not all, cases these types are adjacent to pitch pine uplands.

Diagnostics

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



Sheep Laurel

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Similar Types

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

Conservation, Wildlife, and Management Considerations

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

Location Map





Pitch Pine Bog

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

Distribution

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

Landscape Pattern: Small Patch, mostly 5-40 acres.



Large Cranberry

Characteristic Plants

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

Canopy

Pitch pine

Sapling/shrub

Black chokeberry
Black huckleberry*
Highbush blueberry*
Maleberry
Mountain holly
Speckled alder

Dwarf Shrub

Large cranberry Leatherleaf* Sheep laurel

Herb

Bracken fern Cinnamon fern Three-seeded sedge Wild sarsaparilla

Bryoid

Sphagnum girgensohnii*

Associated Rare Plants

Smooth winterberry holly

Examples on Conservation Lands You Can Visit

- Brownfield Bog WildlifeManagement Area Oxford Co.
- East of Little River, Rachel Carson National Wildlife York Co.
- Saco Heath Preserve York Co.
- Scarborough Marsh Wildlife Management Area - Cumberland Co.

Pocket Swamp

State Rank S2

Community Description

These forested wetlands may be deciduous or mixed and typically 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. In southern Maine, several rare plants are associated with these wetlands.

Soil and Site Characteristics

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 typically occur as small patches (typically <3 acres) in otherwise well drained, forested uplands.

Diagnostics



Hemlock and/or red maple are dominant; black gum is often present, and high bush

Spicebush Swallowtail Larvae blueberry, winterberry, and/or maleberry occur in the understory. Wetland soils occur in isolated drainages, not along a stream or large drainage flat.

Similar Types

Red Maple Swamps occur along alluvial soils of broad streams or lake basins and are more strongly dominated by red maple. Hardwood Seepage Forests have less red maple, more ash and yellow birch.

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

Location Map





Spicebush

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. Only a few examples are known on public lands or private conservation lands.

Many occurrences of this community type function as vernal pools, which are important breeding habitats for a variety of amphibians including wood frogs, spotted salamanders, and blue-spotted salamanders. Rare turtles such as 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.

Distribution

Limited to the southern, central, 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 Plants

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

Canopy

Black gum Eastern hemlock Red maple Yellow birch

Sapling/shrub

Highbush blueberry Maleberry Mountain holly Wild-raisin

Winterberry Yellow birch

Dwarf Shrub

Lowbush blueberry

Herb

Bluejoint
Cinnamon fern*
Goldthread
Long sedge
Marsh fern
Northern water-horehound
Royal fern*
Three-seeded sedge*

Associated Rare Plants

Mountain laurel Smooth winterberry Spicebush

Associated Rare Animals

Blanding's turtle Spicebush swallowtail Spotted turtle

Examples on Conservation Lands You Can Visit

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

Red Maple Fen

State Rank S4

Community Description

Red maple dominates the canopy of this partly forested peatland, or it may be co-dominant with larch or black spruce. 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. Sedges are characteristic in the herb layer, and 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.

Soil and Site Characteristics

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). The substrate is less acidic than most true bogs (pH 5.0-5.4).



Skunk Cabbage

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.

Similar Types

Red Maple 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 heath shrubs characteristic of this type. Open

Location Map



Red Maple Fen

Cedar Fens are similar but are dominated by northern white cedar, sometimes mixed with red maple. Black Spruce 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.

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 community 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.

Distribution

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

Landscape Pattern: Large Patch

Characteristic Plants

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

Canopy

Black spruce Larch* Red maple*

Sapling/shrub

Balsam fir Rhodora* Sweetgale* Wild-raisin*

Winterberry*

Herb

Beaked sedge Cinnamon fern* Goldthread* Marsh fern* Skunk cabbage* Three-leaved false Solomon's seal* Three-seeded sedge* Tussock sedge*

Bryoid

Sphagnum mosses*

Associated Rare Plants

Bog bedstraw

Examples on Conservation Lands You Can Visit

- Appleton Bog Preserve Knox Co.
- Middle Pond State Park Oxford Co.
- The Heath, Massabesic Experimental Forest - York Co.

Red Maple Swamp

State Rank S5

Community Description

Red maple dominates the somewhat open to nearly closed canopy (20-90% closure), sometimes with a relatively large component (up to 40% cover) 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 and various other shrubs may be locally abundant. The herb layer is well developed and dominated by herbs, with dwarf shrubs <20% of herb 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.

Soil and Site Characteristics

Sites occupy mineral soils or well decomposed organic material over mineral soil on flats or gentle slopes in small basins, often on floodplains of streams to small rivers. Soils are typically 30-60 cm deep, loamy to silty in texture, sometimes with well decomposed muck over the mineral fraction, and pH 4.8-5.4.

Diagnostics

These are mineral soil wetlands in which



Red Maple Flowers

red maple dominates the canopy or is codominant with conifers other than black spruce or larch. The seasonally flooded soils usually remain saturated through the growing season.

Similar Types

Red Maple 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 Wet Flats, 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

Location Map



Community is known from this Ecoregion
Community may occur in this Ecoregion
Balley's Ecoregion
County





Red Maple Swamp

rivers, but the two types can intergrade on some floodplains.

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.

Distribution

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

Landscape Pattern: Large Patch

Characteristic Plants

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

Canopy

Balsam fir Gray birch Northern white cedar Red maple* Red spruce

Sapling/shrub

Arrowwood*
Balsam fir
Gray birch*
Red spruce
Speckled alder*
Winterberry*

Herb

Bluejoint*
Flat-topped white aster*
Interrupted fern
Tussock sedge
Royal fern*
Sensitive fern*

Bryoid

Sphagnum mosses*

Associated Rare Plants

Smooth winterberry holly
Spicebush
Swamp saxifrage
Swamp white oak
Sweet pepper-bush

Associated Rare Animals

Spotted turtle Wood turtle

Examples on Conservation Lands You Can Visit

- Kennebunk Plains Preserve York Co.
- Mt Agamenticus York Co.
- Steep Falls Wildlife Management Area
 Cumberland Co.
- Waterboro Barrens Preserve York Co.

Silver Maple Floodplain Forest

State Rank S3

Community Description

These forests are dominated by silver maple (>60% cover). Associates include red maple and American elm (up to 30% cover) or, in a few locations, bur oak (up to 25% cover). 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 such as trout lilies and bloodroot to dense fern cover in summer. Bryoid cover is minor. Some forests have a berm adjacent to the river channel, and herbaceous species composition here is different from the lower elevation interior of the floodplain.

Soil and Site Characteristics

Sites occur on plains flanking low gradient rivers, within the reach of seasonal floods, at elevations <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 typically 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.

Similar Types

Upper Floodplain Hardwood Forests may be adjacent to this type on the higher floodplain, but these have a much smaller proportion of silver maple in the canopy. Instead, the canopy is dominated by sugar maple, red oak, or green ash,

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and herb diversity is higher. Red Maple 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.

Conservation, Wildlife, and Management Considerations

Although a number of sites have been cleared or pastured in the past, current shoreland regulations provide increased protection to a number of these sites. Exotic plant species such as Japanese knotweed, 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.

Location Map





Silver Maple Floodplain Forest

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. Rare turtles like wood, spotted, and Blanding's turtles may feed on amphibian egg masses present in isolated pools within such forests. 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.

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)

Examples on Conservation Lands You Can Visit

- Brownfield Bog Wildlife Management Area Oxford Co.
- Saco River Preserve York Co.
- Sunkhaze Meadows National Wildlife Refuge Penobscot Co.
- The Oxbow, East Branch Penobscot River
 Penobscot Co.

Characteristic Plants

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

Canopy

American elm Basswood* Black ash Black cherry* Bur oak* Green ash* Red oak* Silver maple*

Sapling/shrub

Arrowwood*
Buttonbush*
Common blackberry*
Gray birch*
Meadowsweet*
Musclewood*
Nannyberry*
Winterberry holly*

Dwarf Shrub

Swamp dewberry*

Herb

Bluejoint
Cinnamon fern*
Green ash
Jack-in-the-pulpit
Ostrich fern*
Royal fern*
Sensitive fern*
Tall meadow-rue
Wood-nettle*

Associated Rare Plants

Swamp white oak Wild garlic Wild leek

Associated Rare Animals

Wood turtle

- Trout Brook, Baxter State Park
 - Piscataquis Co.
- Wassataquoik Public Lands Penobscot Co.

Spruce - Fir Wet Flat

State Rank S4

Community Description

This is a fairly homogeneous forest type in which red spruce, black spruce, or red-black spruce hybrids grow on poorly drained, level to gently sloping sites. Balsam fir may be present in regenerating patches or stands but tends to give way to the longer-lived spruces over time. Stands often form even-aged blocks hundreds to thousands of acres in size. The evenaged structure likely results from the past influences of spruce-budworm, fire, harvesting, blowdowns, or a combination of multiple factors.

Cinnamon fern and three-seeded sedge are typical in this type statewide. In northern Maine, understory herbs and shrubs are sparse, and the forest floor is dominated by a dense carpet of mosses ~ typically Sphagnum species, three-lobed bazzania, and red-stemmed moss. Dwarf heath shrubs may be abundant at St. John Valley sites, which approach boreal 'muskeg'. In southern Maine, red maple may be subdominant. At sites near the coast, skunk cabbage may be a prominent understory species.

Soil and Site Characteristics

Sites usually occur along drainages or low flats where soil remains moist throughout the growing season and may be saturated or temporarily flooded in the springtime. The substrate is acidic mineral soil and may be very stony, with or without an organic layer (<30 cm) on top. More information is needed statewide to determine if this type should be split into two separate types, reflecting northern and southern Maine variants.

Diagnostics

Sites occur on moist to saturated mineral

soils, usually with a dense carpet of mosses and liverworts. Closed canopies are dominated by spruce (>40% cover), or are rarely more open where red maple or northern white cedar mixes with spruce. Wetland plants occur in the herb layer, usually including cinnamon fern and threeseeded sedge.

Similar Types

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

Location Map



Bailey's Ecoregion

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immunity is known from this Econogic Community may occur in this Ecoregion



Spruce - Fir Wet Flat

Conservation, Wildlife, and **Management Considerations**

Nearly all known occurrences of this community type in Maine have been harvested in the past, and many have a history of natural disturbance such as fire or spruce-budworm. Large (>1000 acres) examples free from human disturbance are scarce. Forest management with natural regeneration generally does not with result in conversion of this type. Studies on some examples on public and private conservation lands may provide further information on the natural dynamics in these systems.

These stands may serve as deer wintering areas and may also provide habitat for pine marten and Canada lynx, depending on the age and successional stage. This community type may be used as nesting habitat by a number of coniferous forest specialist bird species, including the vellow-bellied flycatcher, sharp-shinned hawk, black-backed woodpecker, pine grosbeak, green heron, black-throated green warbler, Blackburnian warbler, common vellowthroat, Wilson's warbler, spruce grouse, blackpoll warbler, and the rare rusty blackbird.

Distribution

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

Landscape Pattern: Large Patch

Characteristic Plants

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

Canopy

Black spruce* Larch Northern white cedar Red maple Red spruce* White pine

Sapling/shrub

Alder* Balsam fir Black huckleberry* Mountain holly* Red maple Wild-raisin

Dwarf Shrub

Leatherleaf* Lowbush blueberry* Rhodora* Sheep laurel*

Herb

Bunchberry Cinnamon fern* Dwarf raspberry* Goldthread Skunk cabbage Three-seeded sedge*

Bryoid

Red-stemmed moss* Sphagnum mosses* Three-lobed bazzania

Associated Rare Animals

Rusty blackbird

Examples on Conservation Lands You Can Visit

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

Upper Floodplain Hardwood Forest

State Rank S3

Community Description

An almost complete canopy is dominated by sugar maple, red oak, or yellow birch, with red maple and ash often common and basswood or black cherry occasional. The understory is open and shrubs are sparse. The lush carpet of herbs changes from spring ephemerals such as trout lily and bloodroot to variable cover of mixed graminoids and forbs in summer. Bryoid cover is minor.

Soil and Site Characteristics

Sites occur on slightly elevated terraces flanking low-gradient rivers at elevations typically <1,000'. Flooding is occasional, sometimes less frequent than annually. These forests have lower frequency and duration of flooding than Silver Maple Floodplain Forests. Most known examples are along medium to 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 sugar maple, red oak or yellow birch. Silver maple and red maple may be present. A dense herb layer includes species not typical of wetlands



Floodplain High Water Marks

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(e.g. starflower, zig-zag goldenrod, bigleaved aster, silvery spleenwort). Sensitive fern is often present but not dominant. Spring ephemerals are often abundant.

Similar Types

On large rivers, Silver Maple Floodplain Forests are often adjacent to these forests, occur between them and the channel, and are dominated by silver maple. Red Maple Swamps have red maple dominant and soils that are flooded or saturated throughout the growing season. Northern Hardwoods Forests, Enriched Northern Hardwoods Forests, and Oak - Northern Hardwoods 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 with steeper gradients.

Location Map





Upper Floodplain Hardwood Forest

Conservation, Wildlife, and Management Considerations

Virtually all of these forests have been harvested, and many have been converted to agriculture. Non-native plant species such as Japanese knotweed and Asiatic bittersweet, which may displace plants native to our area, represent a threat to the integrity of these forests and have degraded 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 where they may feed on amphibian egg masses in vernal pools. The silver-haired bat often roosts in riparian habitats in trees with loose bark. Fairy shrimp may also occur in isolated vernal pools.

Distribution

Throughout Maine, New England, and New Brunswick.

Landscape Pattern: Large Patch

Characteristic Plants

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

Canopy

Basswood* Black cherry* Green ash* Red oak* Sugar maple*

Yellow birch* Sapling/shrub

American elm Choke cherry Musclewood* Nannyberry* White ash

Herb

Bloodroot
Blue cohosh
Jack-in-the-pulpit
Lady fern*
Ostrich fern*
Sensitive fern
Silvery spleenwort*
Tall meadow-rue

Associated Rare Plants

Bottlebrush grass Pubescent sedge Wild garlic Wild ginger Wild leek

Associated Rare Animals

Wood turtle

Examples on Conservation Lands You Can Visit

- Trout Brook, Baxter State Park
 Piscataquis Co.
- Wassataquoik Public Lands Penobscot Co.
- West Branch Piscataquis River, Appalachian Trail - Piscataquis Co.



Acidic Cliff

State Rank S4

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.

Soil and Site Characteristics

Sites occupy nearly vertical to vertical outcrops of non calcareous, erosion resistant rocks. Most are dry, with large unvegetated areas; a moist microclimate is maintained over local areas by runoff or seeps from higher elevations, or, in gorges, by the flowing streamwater. Smaller ledges and outcrops (e.g., less than 5,000 square feet of rock exposure) should be considered as inclusions in the surrounding forest rather than distinct natural communities.

Diagnostics

Sparsely vegetated cliffs occur below treeline, without circumneutral indicator species.



Rock Tripe and Rock Polypody

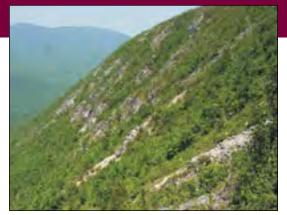
Similar Types

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

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.

Community may occur in this Ecorogian



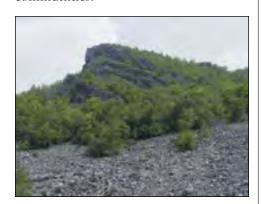
Acidic Cliff

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

Distribution

Essentially statewide except for extreme southern Maine, more common northward.

Landscape Pattern: Small Patch. The minimum mapping unit is 5,000 square feet of rock exposure; smaller ledges and outcrops should be considered as inclusions in the surrounding forest rather than distinct natural communities.



Acidic Cliff

Characteristic Plants

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

Herb

Brownish sedge Common hairgrass Marginal woodfern Rand's goldenrod Rock polypody

Bryoid

Rocktripe lichen

Associated Rare Plants

Fragrant wood fern

Associated Rare Animals

Golden eagle Peregrine falcon

Examples on Conservation Lands You Can Visit

- Deboullie Ponds Public Lands
 Aroostook Co.
- Dunn Falls, Appalachian Trail
 Oxford Co.
- Grindstone Falls Penobscot Co.
- Mount Kineo State Park Piscataquis Co.
- Tunk Mountain, Donnell Pond Public Lands – Hancock Co.

Maine Natural Areas Program

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Alpine Cliff

State Rank S1

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*.

Soil and Site Characteristics

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 above 3000'.



Common Butterwort

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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 alpine community types occur either on drier substrates (lacking extensive bryophytes) or in boggy situations with peat mosses, cottongrasses, and heath shrubs dominant. Subalpine Meadows may occur just below this community, but these are

Location Map



Alpine Cliff

denser and the dominants much taller. Riverside Seeps may share some of the unusual species but are at lower elevations along major rivers.

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 is 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 common ravens, peregrine falcons, and golden eagles.

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

Characteristic Plants

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

Sapling/shrub

Mountain alder Shrubby cinquefoil* Squashberry

Dwarf Shrub

Alpine bilberry* Labrador tea

Herb

Bluejoint Bulrush sedge* Deer-hair sedge* Highland rush Low rough aster*

Associated Rare Plants

Alpine bistort
Alpine bitter-cress
Arctic red fescue
Bulrush sedge
Common butterwort
Hairy arnica
Hornemann's willow-herb
Mountain timothy
Star saxifrage

Associated Rare Animals

Golden eagle Peregrine falcon

Examples on Conservation Lands You Can Visit

- Mt. Katahdin, Baxter State Park
 - Piscataquis Co.

Alpine Snowbank

State Rank S1

Community Description

Dwarfed alpine shrubs form low mats, with herbs interspersed. Alpine bilberry and/or dwarf bilberry are dominant, but mossplant and mountain-heath can form extensive patches among the bilberry. The relatively protected habitat amid otherwise exposed alpine vegetation 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 redstemmed moss.

Soil and Site Characteristics

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.



Mountain Cranberry, Labrador Tea, and Reinder Lichens

Diagnostics

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

Similar Types

Rocky Summit Heath occurs at lower elevation and lacks the strictly alpine species typical of this type. Heath 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. Windswept Alpine Ridge can also be adjacent, but is dominated by diapensia. Alpine Cliff vegetation has a higher proportion of

Location Map



Community is known from this Ecorogical
Community may occur in this Ecorogical
Balley's Ecorogical
County





Alpine Azalea

herbaceous species and occurs on seeps, with a well developed bryophyte layer.

Conservation, Wildlife, and Management Considerations

The major documented occurrence of this type in Maine is on 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 rare American pipit, which utilizes a variety of natural community types above treeline.

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 Plants

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

Dwarf Shrub

Alpine bilberry*
Dwarf bilberry*
Moss-plant
Mountain cranberry
Mountain-heath
Pale laurel

Herb

Bunchberry Canada mayflower Common hairgrass* Stiff clubmoss

Bryoid

Awned hair-cap moss Juniper hair-cap moss

Associated Rare Plants

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

Associated Rare Animals

American pipit

Examples on Conservation Lands You Can Visit

Mt. Katahdin, Baxter State Park
 Piscataguis Co.

de dieses

Blueberry Barren

State Rank S2

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. The characteristic expression of this community is as an opening within woodland barrens such as Pitch Pine - Scrub Oak Barrens or Black Spruce Barrens; smaller openings (e.g., less than an acre) would be considered inclusions, but larger ones should be segregated as this non-wooded type.

Soil and Site Characteristics

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



Gray Birch Leaves

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.

Similar Types

Sandplain Grasslands are more common southward, 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, Black Spruce Barrens) are closely related but have more tree cover.

Location Map









Burned Blueberry Barren

Conservation, Wildlife, and Management Considerations

Many former natural occurrences of this type have been converted to actively managed blueberry barrens in Downeast Maine. While these managed barrens maintain some superficial resemblance to natural barrens, pesticide use may have changed their species composition. The four documented occurrences of this type are on public or private conservation land.

Managed blueberry barrens provide some of the best habitat in the northeast for the rare upland sandpiper and other ground-nesting species like the rare short-eared owl. The whimbrel, a non-breeding migrant shorebird, uses near-coastal barrens for foraging. The graceful clearwing, a butterfly that feeds on blueberries in its larval phase, may inhabit examples of this community within Pitch Pine Barrens.

Distribution

Natural occurrences are known only from Downeast and extreme northwestern Maine; poorly documented.

Landscape Pattern: Small Patch

Characteristic Plants

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

Sapling/shrub

Gray birch Red pine White pine

Dwarf Shrub

Black chokeberry Lowbush blueberry* Meadowsweet Sheep laurel Sweetfern

Herb

Bracken fern Wintergreen

Bryoid

Awned hair-cap moss Juniper hair-cap moss Red-stemmed moss Reindeer lichen*

Associated Rare Plants

Canada mountain-ricegrass

Associated Rare Animals

Short-eared owl Upland sandpiper Whimbrel

Examples on Conservation Lands You Can Visit

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

Circumneutral Outcrop

State Rank S2

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.

Soil and Site Characteristics

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.



Fragrant Wood Fern

Diagnostics

A sparsely vegetated cliff/outcrop setting occurs below treeline, with herbs dominant; circumneutral indicator species are present.

Similar Types

Acidic Cliff vegetation is also on bare rock faces, but on more acidic rock, and lacks any circumneutral indicator species. Low-elevation 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').

Location Map





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.

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



Bulblet Fern

Characteristic Plants

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

Sapling/shrub

Meadowsweet

Dwarf Shrub

Shrubby cinquefoil

Herb

Brownish sedge Bulblet fern Fragile fern Fragrant wood fern Rusty cliff fern

Bryoid

Juniper hair-cap moss

Associated Rare Plants

Ebony sedge Intermediate sedge Lance-leaved draba Northern woodsia Rock whitlow-grass Slender cliffbrake Smooth rockcress Smooth woodsia White bluegrass

Examples on Conservation Lands You Can Visit

- Deboullie Ponds Public Lands Aroostook Co.
- Mount Kineo State Park Piscataquis Co.
- Trout Brook Mountain, Baxter State Park - Piscataquis Co.

Cold-air Talus Slope

State Rank S2

Community Description

This boreal 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.

Soil and Site Characteristics

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.



Black Spruce

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 Rocky Woodlands lack the abundant Labrador tea characteristic of this community and also have fewer reindeer lichens. Other spruce woodland types (Spruce - Pine Woodland and Black Spruce Woodland) have higher tree cover (>25%) and lower bryoid cover. Subalpine Hanging Bogs are similar, but have more continuous vegetation, peat accumulation, and

Location Map



Cold-air Talus Slope

occur on upper slopes at higher elevations.

Conservation, Wildlife, and Management Considerations

Known sites are on public lands or private conservation lands. One of the better known sites, Mahoosuc Notch, is traversed by the Appalachian Trail. Heavy foot traffic has caused some damage to the vegetation, but the community remains generally intact.

The long-tailed shrew and rock vole may show a preference for these rocky habitats.

Distribution

Restricted in Maine to northern and montane areas; New England - Adirondack Province extending west and likely northeastward to the Gaspé Peninsula.

Landscape Pattern: Small Patch

Characteristic Plants

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

Sapling/shrub

Black spruce

Dwarf Shrub

Black crowberry* Labrador tea* Lowbush blueberry Mountain cranberry Sheep laurel

Herb

Rock polypody

Bryoid

Reindeer lichen*

Examples on Conservation Lands You Can Visit

- Deboullie Ponds Public Lands
 Aroostook Co.
- Mahoosuc Lake Public Lands Oxford Co.



Lowbush Blueberry

Downeast Maritime Shrubland

State Rank S2

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.

Soil and Site Characteristics

Sites occur on extremely exposed, usually granitic headlands. Sites may contain pockets of peaty soil developing in rock hollows. Salt spray, fog, and wind are near 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.

Similar Types

Rose Maritime Shrublands occur in similar settings, but are dominated by taller shrubs without a strong component of mat-forming shrubs. Open Headlands share many species and often co-occur with Downeast Maritime Headlands, but

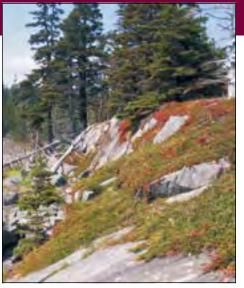
the former are much more sparsely vegetated (vegetation often covers <25% of the rock surface overall), and without extensive mats of dwarf shrub vegetation.

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

Location Map





Downeast Maritime Shrubland

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, American black duck, herring and great black-backed gulls, and Atlantic 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.

Distribution

Coastal Maine (often on islands) from Mount Desert Island eastward; extending into the Canadian Maritimes (Laurentian Mixed Forest Province).

Landscape Pattern: Small Patch

Characteristic Plants

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

Dwarf Shrub

Black crowberry*
Creeping juniper
Large cranberry*
Lowbush blueberry*
Mountain cranberry
Swamp dewberry*

Herb

Bluebell Canada mayflower Red fescue Three-toothed cinquefoil

Bryoid

Reindeer lichen

Associated Rare Plants

Nova Scotia false-foxglove

Associated Rare Animals

Crowberry blue

Examples on Conservation Lands You Can Visit

- Cutler Coast Public Lands Washington Co.
- Little Bois Bubert Island, Petit
 Manan National Wildlife Refuge

 Washington Co.
- Mistake Island Preserve Washington Co.
- Schoodic Peninsula, Acadia National Park - Hancock Co.

TO THE REAL PROPERTY.

Dune Grassland

State Rank S2

Community Description

These sand dunes are strongly dominated by beach grass, with patches of beach-pea, red raspberry, bristly gooseberry, or poison ivy. 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. Beach grass has stout rhizomes that allow it to colonize new places in its shifting substrate. Downeast of Acadia National Park, beach grass may be replaced by the ecologically and morphologically similar Virginia wild rye.

Soil and Site Characteristics

Sites occur on coastal sand dunes between the high tide line and 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.



Piping Plover

Similar Types

Rose Maritime Shrublands can occur with these dune grasslands, but are dominated by shrubs rather than herbs. Coastal Beaches often occur on the shoreward margin of Dune Grasslands and are dominated by forbs rather than grasses.

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

Location Map



Community may occur in this Ecorogical



Dune Grassland

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. The prospect of sea level rise may also put these systems at greater risk.

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.

Distribution

Mostly southwest of Merrymeeting Bay, occasionally eastward; extends southward along the Atlantic Coast to New Jersey

Landscape Pattern: Small Patch, linear.

Characteristic Plants

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

Sapling/shrub

Bristly gooseberry Red raspberry

Dwarf Shrub

Beach heather*

Herb

Beach grass*
Beach-pea*
Jointweed
Little bluestem*
Pinweed*
Virginia wild rye*

Associated Rare Plants

Beach plum Coast-blite goosefoot

Associated Rare Animals

Laughing gull Least tern Piping plover Short-eared owl

Examples on Conservation Lands You Can Visit

- Crescent Beach State Park
 Cumberland Co.
- Popham Beach State Park Sagadahoc Co.
- Rachel Carson National Wildlife Refuge - York Co.
- Reid Beach, Reid State Park
 Sagadahoc Co.
- Seawall Beach, Bates Morse
 Mountain Conservation Area –
 Sagadahoc Co.

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Heath Alpine Ridge

State Rank S2

Community Description

This is the one of the most common community types 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 occur only above treeline are found in this type. In one variant of this type, Bigelow's sedge is dominant and forms carpets, with heath shrubs and other herbaceous species far more sparse.

Soil and Site Characteristics

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,

Bigelow's Sedge

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such as boreal bentgrass, alpine sweetgrass, Lapland rosebay, bearberry willow, or alpine bearberry, are frequent but often at low cover.

Similar Types

Windswept Alpine Ridge vegetation has higher cover of diapensia and usually lower cover of graminoids. Rocky Summit Heath and Mid-elevation Bald vegetation lack the strictly alpine species (although alpine bilberry and highland rush may occur in both). Alpine Snowbank vegetation features tundra dwarf birch, moss-plant, or mountainheath. Alpine Bogs also lack the strictly alpine shrubs and have peat mosses and other wetland plants.

Location Map





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.

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. Likely extends northeastward to the Gaspé Peninsula.

Landscape Pattern: Small Patch

Characteristic Plants

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

Dwarf Shrub

Alpine bilberry* Diapensia* Mountain cranberry

Herb

Bigelow's sedge* Highland rush* Three-toothed cinquefoil

Associated Rare Plants

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

Associated Rare Animals

American pipit Katahdin arctic

Examples on Conservation Lands You Can Visit

- Bigelow Preserve Public Lands
 Somerset Co.
- Goose Eye Mountain, Mahoosuc Public Lands Oxford Co.
- Mt. Katahdin, Baxter State Park
 Piscataquis Co.
- The Brothers, Baxter State Park
 - Piscataquis Co.

Low-elevation Bald

State Rank S3

Community Description

Patches of blueberry, lichens, low herbs, and bare rock form a mosaic on these summits. Vegetation may be sparse, but usually forms 10-50% cover overall, often comprised of only a few species. Three-toothed cinquefoil may be locally abundant. A few coastal sites feature broom-crowberry, an uncommon species. Bryoid cover may be low or high and usually is dominated by lichens rather than bryophytes. This is the typical habitat of the rare smooth sandwort.

Soil and Site Characteristics

Sites are on bald hilltops, mostly near the coast. Soils are patchy and usually consist of a thin, mostly organic layer, creating dry conditions. The substrate is acidic (pH 5.0-5.4). Elevations range from 600'-1500'.

Diagnostics

Tree cover is virtually zero. Total vegetation cover is 10-50%, rarely more, and is dominated by a mixture of dwarf ericads, forbs, and graminoids, with three-toothed cinquefoil often locally dominant. Vegetation height rarely exceeds 0.3 m.



Low-elevation Bald on Mt. Cutler

Similar Types

Rocky Summit Heath is floristically similar and can occur with this type, but it has greater vegetation cover and height (patches > 0.5 m tall), and usually a sparse tree cover. Mid-elevation 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.

Conservation, Wildlife, and Management Considerations

Many sites have evidence of intense, vegetation-clearing fire (e.g., Acadia National Park fires of 1947), but it is not clear whether past fires were of natural

Location Map





Low-elevation Bald

or human origin. Moreover, at some sites historic fires may have pushed the vegetation beyond a 'resilience threshold', and there is now so little vegetation that it is unlikely that fire could return for several hundred years.

This type is well represented on public lands and private conservation lands. However, because this community type is usually associated with nice views, many sites have moderate to heavy hiker or ATV use. Because the vegetation is rather sparse, it is easy for visitors to wander off the trail, and off-trail traffic can seriously degrade the vegetation and has done so at several sites.

Distribution

Mid-coast Maine eastward, along the immediate coast to a short distance inland.

Landscape Pattern: Small Patch

Characteristic Plants

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

Sapling/shrub

Black chokeberry

Dwarf Shrub

Broom-crowberry*
Lowbush blueberry*

Herb

Poverty oatgrass
Three-toothed cinquefoil*

Bryoid

Awned hair-cap moss Reindeer lichen

Associated Rare Plants

Alpine blueberry Mountain sandwort Smooth sandwort

Examples on Conservation Lands You Can Visit

- Black Mountain, Donnell Pond Public Lands – Hancock Co.
- Mt Megunticook, Camden Hills State Park - Knox Co.
- Pemetic Mountain, Acadia National Park - Hancock Co.



Mountain Sandwort

Mid-elevation Bald

State Rank S3

Community Description

This patchy subalpine to alpine vegetation is dominated by a low mat of crowberry (usually black crowberry) and alpine bilberry. 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.

Soil and Site Characteristics

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

Diagnostics

Sparse and patchy vegetation occurs near or on mountain summits, with crowberry, bilberry, and/or highland



Mid-elevation Bald

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rush prominent, and without strictly alpine species such as Bigelow's sedge, diapensia, Lapland rosebay, etc.

Similar Types

This type often co-occurs with other alpine or sub-alpine types. Rocky Summit Heath 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. Heath Alpine Ridge occurs at higher elevations and features some strictly alpine species such as Bigelow's sedge, boreal bentgrass, diapensia, etc.

Location Map



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Mid-elevation Bald

Conservation, Wildlife, and **Management Considerations**

Most occurrences are on public or private conservation land; however, hiker traffic can cause degradation even on these 'protected' lands. As with all alpine and sub-alpine 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.

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 Plants

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

Sapling/shrub

Red spruce*

Dwarf Shrub

Alpine bilberry* Alpine blueberry* Black crowberry* Sheep laurel*

Herb

Three-toothed cinquefoil*

Associated Rare Plants

Alpine blueberry Alpine sweet-grass Dwarf rattlesnakeroot Mountain sandwort Silverling

Associated Rare Animals

Crowberry blue

Examples on Conservation Lands You Can Visit

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

Open Headland

State Rank S4

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.



Nova Scotia False-foxglove

Soil and Site Characteristics

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 sloping, 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

Downeast Maritime Shrublands share many species, but these have more vegetation (usually >50% total cover and >25% shrub or dwarf shrub cover) and

Location Map





Open Headland

are dominated by shrubs rather than herbs. Rose Maritime Shrublands are dominated by shrubs >1 m tall.

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.

Rocky headland communities, especially those that occur on uninhabited islands, may provide nesting habitat for some oceanic bird species.

Distribution

Coastwide, largest occurrences east of Penobscot Bay. Extends into the Canadian Maritimes and south to Massachusetts (Laurentian Mixed Forest Province and Eastern Broadleaf Forest Province).

Landscape Pattern: Small Patch

Characteristic Plants

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

Herb

Bluebell
Bluejoint grass
Gall of the earth
Goosetongue
Red fescue
Roseroot*
Seaside goldenrod*
Yarrow

Associated Rare Plants

Birds-eye primrose Blinks Marsh-felwort Nova Scotia false-foxglove

Examples on Conservation Lands You Can Visit

- Acadia National Park Hancock Co.
- Cutler Coast Public Lands Washington Co.
- Great Wass Island Preserve
 Washington Co.
- Petit Manan National Wildlife Refuge - Washington Co.
- Quoddy Head State Park -Washington Co.

Rivershore Outcrop

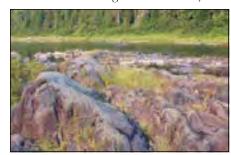
State Rank S2

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, balsam ragwort, 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), red osier 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.

Soil and Site Characteristics

This type occurs on dry ledges and outcrops along rivershores. Substrate is typically circumneutral or calcareous slate, with plants growing in vertical fissures. Sites are subject to annual flooding and ice scour,



Rivershore Outcrop

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. 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

Location Map



into a 'Bluestem Shoreline Outcrop' type, but more information is needed from both within and outside of Maine.

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.

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. Linear.

Examples on Conservation Lands You Can Visit

- Allagash Lake, Allagash Wilderness Waterway Piscataquis Co.
- Allagash Public Lands Aroostook Co.
- Coburn Park Somerset Co.
- Rocky Island Preserve
 Aroostook Co.

Characteristic Plants

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

Sapling/shrub

Meadowsweet
Morrow's honeysuckle
Poison-ivy
Red osier dogwood
Round-leaved dogwood
Shining willow

Dwarf Shrub

Dwarf bilberry Lowbush blueberry Velvet-leaf blueberry

Herb

Balsam ragwort
Bluebell
Common pussytoes
Dwarf raspberry
Early goldenrod
Field pussytoes
Kalm's lobelia
Narrow false oats
Silverrod
Stiff aster
Tufted hairgrass
Wild chive

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

Rocky Summit Heath

State Rank S4

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 mountain cranberries. 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, peat mosses are typical; otherwise, lichens are the dominant bryoids.

Soil and Site Characteristics

Sites occupy upper slopes and ridges near the coast or mid-elevation balds (2,000'-3,000' inland). Soils are patchy, in bedrock pockets, consist of a thin layer (5-25 cm deep) of organic duff mixed with sand or rock fragments, and are acidic (pH 4.8-5.0) and excessively well drained, except in localized peaty pockets.

Diagnostics

Tree cover is sparse, stunted, and patchy (<25% cover); balsam fir and heart-leaved paper birch are typical; red oak may occur at some coastal locations. Shrub cover is typically 10-50% at lower elevation sites or in pockets at higher elevations. Dwarf shrub cover exceeds herb cover, with lowbush blueberry or mountain cranberry prominent.

Similar Types

Mid-elevation Balds occur at higher elevations but lack tree cover and feature crowberry, bilberry, and/or highland rush. Low-elevation Balds occur at similar elevations and may co-occur with Rocky Summit Heaths, but the former usually have herbaceous species exceeding dwarf shrub species in the herb layer. Other open summit communities occur at higher elevations and feature at least some strictly alpine species such as Bigelow's sedge, highland rush, diapensia, Lapland rosebay, etc. Spruce - Pine Woodlands are floristically similar and may co-occur but have >25% tree cover.

Location Map



Community may occur in this Ecorogical

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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.

Coniferous forest specialists like blackpoll warblers and spruce grouse are common associates in this community.

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

Examples on Conservation Lands You Can Visit

- Bald Mountain, Little Concord Pond State Park - Oxford Co.
- Black Mountain, Donnell Pond Public Lands - Hancock Co.
- Blueberry Mountain, White Mountain National Forest - Oxford Co.
- Cadillac Mountain, Acadia National Park - Hancock Co.

Characteristic Plants

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

Canopy

Balsam fir*

Sapling/shrub

Balsam fir* Gray birch*

Mountain holly*

Northern white cedar*

Red spruce*

Shadbush*

Wild-raisin*

Winterberry holly*

Dwarf Shrub

Black huckleberry* Labrador tea* Lowbush blueberry* Mountain cranberry* Rhodora* Sheep laurel*

Herb

Balsam fir* Three-toothed cinquefoil

Bryoid

Reindeer lichen Sphagnum mosses*

Associated Rare Plants

Alpine blueberry Alpine sweet-grass Smooth sandwort

Associated Rare Animals

Bicknell's thrush

- Cold Brook Trail, White Mountain National Forest - Oxford Co.
- Sargent Mountain, Acadia National Park - Hancock Co.
- Tunk Mountain, Donnell Pond Public Lands Hancock Co.

Rose Maritime Shrubland

State Rank S4

Community Description

Medium height shrubs (1-2 m) usually cover 30-60% but may form 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 or rose. Wild-raisin and winterberry may occur in more protected or moist pockets. Lowbush blueberry and northern dewberry are occasional as dwarf shrubs. Herbs grow in sometimes extensive patches among the shrubs and include salt tolerant shore species such as beach grass, beach-pea, sea-beach sandwort, seabeach angelica, and seaside goldenrod. Bryoids are absent, except for small amounts of lichens in some areas.

Soil and Site Characteristics

The islands where this type occurs 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).



Virginia Rose

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Diagnostics

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

Similar Types

Downeast Maritime Shrublands 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 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 Coastal Beaches are sparsely vegetated with herbs and no shrubs.

Location Map





Bayberry Leaves

Conservation, Wildlife, and Management Considerations

Most known sites have been used historically for grazing sheep. Evidence of fire is common in most. Rugosa rose is an invasive species of these sites. 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 successional dynamics). At least some small sites along the immediate coastline appear to have developed by and are persisting through natural processes. Several occurrences are on public lands or private conservation lands.

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

Distribution

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

Landscape Pattern: Small Patch

Characteristic Plants

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

Sapling/shrub

Bayberry*
Bush-honeysuckle*
Meadowsweet*
Poison-ivy*
Red raspberry*
Rugosa rose*
Virginia rose*
Winterberry holly*

Dwarf Shrub

Large cranberry*
Lowbush blueberry*

Herb

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

Associated Rare Plants

Beach plum Small saltmarsh aster

Examples on Conservation Lands You Can Visit

- Little Duck Island- Hancock Co.
- North Libby Island Wildlife
 Management Area Washington Co.
- Popham Beach State Park Sagadahoc Co.
- Seawall Beach, Bates Morse Mountain Conservation Area Sagadahoc Co.
- Stratton Island York Co.

Sandplain Grassland

State Rank S1

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.

Soil and Site Characteristics

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. Riverwash Sand Barren also features little bluestem, but blueberry is scarce or absent and the riverside setting is distinctive.

Conservation, Wildlife, and Management Considerations

Two of the four Maine sites are in public or private conservation ownership, and the largest of these is managed for the rare community, rare animals, and rare plants that occur there. Prescribed burning is a major management tool. This type appears to

Location Map





Main Photo: Sandplain Grassland Inset: Black Racer

have been more common in southern Maine historically, but most nearby sites that might have supported this community have either been developed or have transitioned to other types due to lack of fire.

This community provides nesting habitat for several rare ground nesting grassland birds including the grasshopper sparrow, upland sandpiper, and short-eared owl. These open grasslands also provide excellent habitat for a rare snake, the northern black racer. The cobweb skipper inhabits open dry fields with bluestem grasses, which it uses as its larval host plant. The graceful clearwing feeds on blueberries in its larval phase and may be found in this community type.

Distribution

Extreme southern Maine, extending southward along the Atlantic Coast to Cape Cod (Eastern Broadleaf Forest Province).

Landscape Pattern: Large Patch

Characteristic Plants

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

Sapling/shrub

Gray birch Pin cherry Pitch pine Sweetfern Thicket shadbush

Dwarf Shrub

Black chokeberry Lowbush blueberry*

Herb

Arrow-leaved violet
Little bluestem*
Northern blazing star*
Pinweed
Poverty oatgrass
Sharp-pointed ricegrass
Silverrod
Whorled loosestrife
Woodland sedge*

Associated Rare Plants

Clothed sedge Dry land sedge Northern blazing star Upright bindweed White-topped aster

Associated Rare Animals

Cobweb skipper Grasshopper sparrow Northern black racer Short-eared owl Upland sandpiper

Examples on Conservation Lands You Can Visit

Kennebunk Plains Preserve - York Co.

Spruce - Fir Krummholz

State Rank S3

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 trees 0.5-2 m high. Mountain alder may be locally common, and mountain ash and mountain shadbush are 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 trees.

Soil and Site Characteristics

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.



Black Spruce Cones

Diagnostics

These are forests of the treeline zone in which dwarfed and matted trees form a dense shrub layer 0.5-2 m high; usually strongly coniferous.

Similar Types

Rocky Summit Heath can grade into or form a patchwork with this community, but it features lower tree cover (<25%) and more heath shrubs and open spaces. Subalpine Fir 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.

Location Map





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 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'. Coniferous forest specialists like blackpoll warblers and spruce grouse are common associates in this community.

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, and likely to the Gaspé Peninsula.

Landscape Pattern: Large Patch

Characteristic Plants

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

Sapling/shrub

Balsam fir* Black spruce* Heart-leaved paper birch*

Dwarf Shrub

Alpine bilberry* Labrador tea*

Herb

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

Bryoid

Common broom-moss Fringed Ptilidium liverwort Red-stemmed moss

Associated Rare Plants

Northern comandra

Associated Rare Animals

Bicknell's thrush

Examples on Conservation Lands You Can Visit

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

Subalpine Meadow

State Rank S1

Community Description

These shrub and graminoid dominated meadows occur near treeline. Dominants vary according to substrate moisture but often include mountain alder, bluejoint, 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.

Soil and Site Characteristics

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

Diagnostics

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



Bush-honeysuckle



Lowbush Blueberry

Similar Types

Other alpine and sub-alpine types have different characteristic species. However, this is not a well documented type, and its distribution and relationship to other alpine and subalpine vegetation types needs work.

Location Map



Community is known from this Ecorogical
Community may occur in this Ecorogical
Balley's Ecorogical
County



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.

Distribution

Upper-elevation ridges of Maine's western and central mountains (mostly in the New England - Adirondack Province); may extend to Gaspé Peninsula.

Landscape Pattern: Small Patch

Characteristic Plants

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

Sapling/shrub

Bush-honeysuckle* Meadowsweet Mountain alder* Squashberry

Dwarf Shrub

Lowbush blueberry

Herb

Bluejoint*
Gall of the earth
Large-leaved goldenrod
Low rough aster
Three-toothed cinquefoil

Associated Rare Plants

Black sedge Northern painted-cup Russett sedge

Examples on Conservation Lands You Can Visit

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

-

Windswept Alpine Ridge

State Rank S1

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.

Soil and Site Characteristics

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 with >20% cover.

Similar Types

Heath Alpine Ridge can occur at similar elevations and can grade into this type, but diapensia, if present,



Diapensia

is sparse (< 20% cover). Alpine Snowbanks similarly lack extensive diapensia. Rocky Summit Heath and Mid-elevation Balds lack diapensia and other strictly alpine species and generally occur at lower elevations.

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.

Location Map





Windswept Alpine Ridge

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

Distribution

Restricted to Maine's highest mountains (New England - Adirondack Province), extending west to New Hampshire and along the Appalachians, and possibly northeastward to the Gaspé Peninsula.

Landscape Pattern: Small Patch



Cutler's Goldenrod

Characteristic Plants

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

Dwarf Shrub

Alpine azalea Alpine bearberry Alpine bilberry* Black crowberry Diapensia*

Herb

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

Bryoid

Cetraria lichen

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

Associated Rare Animals

American pipit

Examples on Conservation Lands You Can Visit

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



Alder Floodplain

State Rank S4

>30% cover. Heath shrubs and peat are sparse or absent.

Community Description

These shrub dominated wetlands are characterized by speckled alder (or less commonly, mountain alder or smooth alder) and an assemblage of grasses and herbs indicative of alluvial conditions. Red maple, American elm, and red-osier dogwood may be co-dominant with alders, but other woody species are usually sparse in these moderate to high energy settings. Woody species may show signs of ice scour early in the season. Bluejoint is common, and frequent herbs include Virgin's bower, ostrich fern, flat-topped white aster, royal fern, sensitive fern, boneset, swamp dewberry, tall meadow-rue, and woodland horsetail.

Soil and Site Characteristics

This type occurs along medium to large moderate to high energy riverbanks that are seasonally flooded and subject to ice scour. It is usually on mineral soil.

Diagnostics

These are shrub-dominated floodplains along medium to large rivers. Alders dominate and comprise



Wood Turtle

Similar Types

Rivershore Shrub Thickets occur in similar floodplain settings in northern Maine, but alder is not dominant. Alder Thickets typically occur in stagnant basins on deeper organic (muck or peat) soils, with peat mosses frequent.

Conservation, Wildlife, and **Management Considerations**

The rivershore habitat of this natural community suggests that direct threats from development are relatively low, though excessive

Location Map



rimunity is known from this Ecorog Community may occur in this Econogical



Alder Floodplain

watershed development would likely increase the volume and intensity of runoff and potentially alter riverine structure and community composition. Additionally, hydrologic alteration (i.e., impoundments) would compromise the disturbance regime, but new dams are unlikely on medium and large rivers.

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, 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. In southern Maine, Blanding's and spotted turtles may feed on amphibian larvae and egg masses present in such pools. Wood turtles bask and forage in shrubby floodplains of moderate to large rivers statewide.

Distribution

Statewide; extending in all directions from Maine.

Landscape Pattern: Small to Large Patch

Characteristic Plants

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

Sapling/shrub

Arrow-wood Meadowsweet Red maple* Red osier dogwood Speckled alder*

Herb

Bluejoint* Boneset False nettle Flat-topped white aster* Lady fern Ostrich fern Royal fern Sensitive fern Swamp dewberry* Tall meadow-rue* Virgin's bower* Wild calla Woodland horsetail

Associated Rare Plants

Hollow joe-pye weed

Associated Rare Animals Wood turtle

Examples on Conservation Lands You Can Visit

- Moose River, Holeb Public Lands - Somerset Co.
- Narraguagus Wildlife Management Unit - Washington Co.
- St. John River Aroostook Co

Alder Thicket

State Rank S5

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% cover), 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.

Soil and Site Characteristics

This type occurs in basin wetlands that are usually saturated and may be seasonally flooded throughout the season. It is usually on muck or on peat. This type is very common as wet cleared areas revert to forest, such as old beaver meadows.

Diagnostics

These are shrub-dominated wetlands on peat or muck soils, often only temporarily flooded, in which alders dominate and comprise >20% cover, usually >40%.



Spotted Turtle

Alder Floodplains occur on mineral soils along medium to large rivers rather than in basins. Sedge Meadows, Tall Grass Meadows, and Grassy Shrub Marshes may have alder as a sub-dominant species, with lower cover than the graminoids. Tall Shrub Fens occur as part of a peatland and have mountain holly or heath shrubs mixed with the alder. Rivershore Shrub Thickets often contain alder, but it is subdominant.

Conservation, Wildlife, and **Management Considerations**

Well distributed and well replicated. These shrublands, especially when they occur in close proximity to open water, may provide habitat for common bird

Location Map



Community may occur in this Ecorogical

Similar Types

Alder Thicket

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 bluespotted 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.

Distribution

Statewide; extending in all directions from Maine.

Landscape Pattern: Small to Large Patch

Examples on Conservation Lands You Can Visit

- Bigelow Preserve Public Lands -Somerset Co.
- Bradley Wildlife Management Area - Penobscot Co.
- Branch Lake Wildlife Management Unit - Hancock Co.
- Kennebunk Plains Preserve York Co.

Characteristic Plants

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

Sapling/shrub

Speckled alder*

Balsam fir* Black spruce* Common blackberry* Gray birch* Hardhack* Meadowsweet Mountain alder* Red maple*

Herb

Bluejoint Cinnamon fern Flat-topped white aster* Royal fern Sensitive fern* Swamp dewberry* Three-seeded sedge Tussock sedge* Wild calla

Bryoid

Sphagnum mosses*

Associated Rare Plants

Bog bedstraw Northern bog sedge

Associated Rare Animals

Blanding's turtle Spotted turtle Wood turtle

- Muddy River Wildlife Management Area - Sagadahoc Co.
- Narraguagus Wildlife Management Unit - Washington Co.
- Redington Pond Public Lands - Franklin Co.

Alpine Bog

State Rank S1

Community Description

Peat 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 deerhair sedge and tufted cotton-grass interspersed with patches of dwarf heath shrubs such as 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. Small cranberry and round - leaved sundew grow on the peat moss. Baked apple-berry is frequent and is restricted in Maine to these alpine bogs and Downeast peatlands.

Soil and Site Characteristics

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. The substrate is permanently saturated organic soil. Unlike its lower elevation counterparts,



Cotton-Grass Tussock

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 saturated substrate. Peat mosses exceed cover of other vegetation, with reindeer lichens essentially absent. Shrubs include lower-elevation species as well as the more restricted bilberry and crowberry. Herbs are mostly graminoids.

Similar Types

The montane setting differentiates this from other peatland community types. The Sphagnum substrate differentiates it from other high-elevation types, except for Subalpine Hanging Bogs, which occur

Location Map





Alpine Bog

on steeper slopes (>20%), have the dwarf shrub - herb cover exceeding bryoid cover, have more krummholz (spruce, fir, or cedar) and fruticose lichens, and usually lack deer-hair sedge and cottongrass. Both types are floristically similar to certain coastal raised peatlands and Maritime Slope Bogs.

Conservation, Wildlife, and Management Considerations

The few known Maine occurrences of this type occur on public or private conservation land; hiker traffic has caused degradation in heavily used areas. As with all alpine 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.

Distribution

Montane western Maine, extending westward into New Hampshire and possibly northeasterly to the Gaspé Peninsula.

Landscape Pattern: Small Patch

Characteristic Plants

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

Dwarf Shrub

Alpine bilberry Baked apple-berry Black crowberry* Labrador tea Leatherleaf* Pale laurel Small cranberry*

Herb

Bog sedge*
Deer-hair sedge*
Few-flowered sedge*
Round-leaved sundew
Tufted cotton-grass*

Bryoid

Cetraria lichen* Fen sickle-moss* Sphagnum mosses*

Associated Rare Plants

Northern comandra

Associated Rare Animals

Northern bog lemming

Examples on Conservation Lands You Can Visit

- Mahoosuc Public Lands Oxford Co.
- Saddleback Mountain, Appalachian Trail - Franklin Co.

Brackish Tidal Marsh

State Rank S3

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, rosetteforming 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 waterpimpernel. Sweetgale and poison ivy are often present at the upper fringes of the marsh, at or above the tidal reach.

Soil and Site Characteristics

These marshes occupy intertidal reaches in larger tidal estuaries where freshwater and saltwater mix. Salinity ranges from 2-18 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 arrowgrass, or wire-rush are present; obligate



freshwater species, such as pickerelweed and common arrowhead, are absent.

Northern Blue Flag

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 Saltmarshes and Salt-hay Saltmarshes develop a peat substrate and are dominated by obligate saltwater species such as saltmarsh cordgrasses, sea lavender, blackgrass, or alkali bulrush.

Conservation, Wildlife, and Management Considerations

Tidal marshes provide valuable wildlife habitat and have received considerable conservation attention. Many occur on

Location Map





Brackish Tidal Marsh

or adjacent to public lands or private conservation lands. 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 prospect of sea level rise may also put these systems at greater risk.

Brackish Tidal Marshes provide important nesting habitat for Nelson's sparrow and the rare saltmarsh sparrow. These wetlands also provide foraging habitat for a large number of wading birds. The New England silt snail 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.

Distribution

Coastwide, extending in both directions from Maine (Laurentian Mixed Forest and Eastern Broadleaf Forest Provinces).

Landscape Pattern: Large Patch

Characteristic Plants

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

Sapling/shrub

Poison-ivy* Sweetgale*

Herb

Chaffy sedge*
Chair-maker's rush*
Common arrow-grass
Freshwater cordgrass*
Narrow-leaved cattail
Northern blue flag
Smooth cordgrass
Softstem bulrush
Wire rush*

Associated Rare Plants

Lilaeopsis Parker's pipewort Pygmyweed Stiff arrowhead Water-pimpernel

Associated Rare Animals

American oystercatcher
Black-crowned night-heron
Least bittern
Saltmarsh sparrow
Short-eared owl

Examples on Conservation Lands You Can Visit

- Acadia National Park Hancock Co.
- Hall Bay, Flying Point Preserve
 Sagadahoc Co.
- Mendall Wildlife Management Area
 Waldo Co.
- Bates Morse Mountain Conservation Area - Sagadahoc Co.
- Rachel Carson National Wildlife Refuge - York Co.
- Scarborough Marsh Wildlife Management Area - Cumberland Co.



Bulrush Marsh

State Rank S4

Community Description

Tall rushes and other non-persistent graminoids dominate this lakeshore or rivershore community. Hardstem bulrush, softstem bulrush, chairmaker'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.

Soil and Site Characteristics

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.



Softstem Bulrush

Similar Types

Pickerelweed Marsh vegetation can share species but is dominated by pickerelweed and floating leaved macrophytes (water-lilies, pondweeds, etc.). Open-water Marsh vegetation has 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.

Conservation, Wildlife, and Management Considerations

This type appears to be well distributed and secure in Maine. Anecdotal information indicates that the waters

Location Map





Bulrush Marsh

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, and American coot. They also offer excellent habitat for a number of insects including the New England bluet, pine barrens bluet, the rare scarlet bluet, and the rare citrine forktail.

Characteristic Plants

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

Herb

Bayonet rush* Chair-maker's rush* Hardstem bulrush* Softstem bulrush*

Associated Rare Animals

American coot
Black-crowned night heron
Citrine forktail
Common moorhen
Least bittern
Scarlet bluet

Distribution

Statewide, although not well documented. Extends southward and westward from Maine, and presumably into Canada.

Landscape Pattern: Small Patch

Examples on Conservation Lands You Can Visit

 Acadia National Park - Hancock Co.

Aerial View of Bulrush Marsh

Bulrush Marsh





Maine Natural Areas Program

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Cattail Marsh

State Rank S5

Community Description

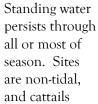
Tall marsh vegetation is dominated by cattails and mostly deciduous shrubs. The cattails may be patchy, locally dominant, and grow taller than the other plant species. Common cattail, narrow-leaved cattail, or both may be present; the latter is common near the coast or in brackish settings and the former is more widespread. Shrubs include winterberry, meadowsweet, and others. The dense growth of shrubs and cattails 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.

Soil and Site Characteristics

Cattail marshes often occur in impounded, semi-permanently flooded, and/or nutrient-rich waters. Documented sites are at low elevations (<500') and are generally associated with large basins and adjacent to open water. The substrate is muck

or mineral soil rather than peat.





Variable Darner

are prominent above a mixture of low shrubs and sedges.

Similar Types

Grassy 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 semipermanent standing water. Brackish Tidal Marshes and Freshwater Tidal Marshes may have patches of narrow-leaved cattail but usually contain plants indicative of tidal habitats.

Conservation, Wildlife, and Management Considerations

This community is well distributed

Location Map





Cattail Marsh

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, and American coot. Black terns may nest colonially in large inland occurrences of this community type with about 50% vegetative and 50% open water. Other birds commonly associated with cattail marshes include Virgina rails, redwinged blackbirds, and marsh wrens.

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 Plants

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

Sapling/shrub

Leatherleaf Meadowsweet* Sweetgale Winterberry

Herb

Common cattail* Narrow-leaved cattail Pickerelweed Small St. Johnswort

Associated Rare Plants

Tall beak-rush

Associated Rare Animals

American coot
Black tern
Common moorhen
Least bittern

Examples on Conservation Lands You Can Visit

- Alonzo Garcelon Wildlife
 Management Area Kennebec Co.
- Hurds Pond Wildlife Management Area - Waldo Co.
- Jamie's Pond Wildlife Management Area - Kennebec Co.
- Sebago Lake State Park Cumberland Co.

Circumneutral Fen

State Rank S2

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 Campylium fen moss indicative.

Soil and Site Characteristics

These peatlands are influenced by calcium rich, circumneutral (rather than acidic) water. The substrate pH is 5.6 or higher, and remains saturated through the year. These peatlands occur in minerotrophic basins where contact with groundwater provides some nutrients to the plants. Sites are typically at lower elevations (<1000') and usually in areas underlain by limestone or other calcareous bedrock.



Sphagnum in Cedar

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. Riverside Seeps have many similar species, but do not occur on peat substrate.

Conservation, Wildlife, and Management Considerations

This 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

Location Map





Clayton's Copper on Shrubby Cinquefoil

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 the rare Clayton's copper butterfly, which uses shrubby cinquefoil as its sole larval host plant and primary adult nectar plant. This butterfly is found at only 15 sites worldwide, ten in Maine and five in New Brunswick. All known occurrences are in circumneutral fens with shrubby cinquefoil stands large enough to support a persistent population of the butterfly. Thaxter's pinion moth uses sweetgale and larch as larval host plants and may be found in this community as well.

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 well known.

Landscape Pattern: Small Patch

Characteristic Plants

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

Sapling/shrub

Larch*
Northern white cedar*
Sweetgale*

Dwarf Shrub

Bog rosemary* Leatherleaf* Shrubby cinquefoil* Sweetgale*

Herb

Deer-hair sedge* Marsh muhly Northern blue flag Northern bog aster Slender sedge* Tussock sedge*

Bryoid

Campylium fen moss Sphagnum warnstorfii*

Associated Rare Plants

Capillary sedge
Dioecious sedge
Livid sedge
Low spike-moss
Prairie sedge
Slender-leaved sundew
Swamp birch

Associated Rare Animals

Clayton's copper

Examples on Conservation Lands You Can Visit

- Lake Umbagog National Wildlife Refuge
 Oxford Co.
- Mattagodus Wildlife Management Area
 Penobscot Co.
- Salmon Brook Lake Bog Public Lands
 Aroostook Co.
- Woodland Bog Preserve Aroostook Co.

Circumneutral Pond

State Rank S2

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.

Soil and Site Characteristics

This type occurs in alkaline lakes or ponds (conductivity usually >50 uMHOS/cm), in quiet waters at depths less than two meters.

Diagnostics

At least some of the indicator species listed above are present, and watershield, pipewort, water lobelia, and pickerelweed are virtually absent.



Circumneutral Fen Pond

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 Open-water Marsh type. That type has higher cover of yellow and white water-lilies or of bigleaf pondweed, but more sampling of both types is needed to better distinguish them.

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

Location Map









Aquatic Vegetation

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 watermilfoil 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 Open-water Marsh or Pickerelweed Marsh. It is unclear whether any wildlife species prefer the more alkaline conditions that this community provides.

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 Plants

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

Herb

Common waterweed* Robbins' pondweed* Slender water-milfoil* Tapegrass* Water-marigold*

Bryoid

Chara algae

Associated Rare Plants

Fries' pondweed Pygmy water-lily Straight-leaved pondweed Vasey's pondweed Water stargrass

Examples on Conservation Lands You Can Visit

- Caswell National Guard Site
 - Aroostook Co.
- Number Five Bog Public Lands
 - Somerset Co.



Floating Pondweed

Coastal Beach

State Rank S4

Community Description

This type consists of sparsely vegetated upper beaches, where plants are adapted to the effects of salt spray, coarse sand and cobble, and drying winds. Characteristic plants 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.

Soil and Site Characteristics

Coastal Beaches 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, Coastal Beaches 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;



Arctic Tern

but Dune Grasslands have a higher vegetative cover and are strongly dominated by graminoids rather than by forbs.

Conservation, Wildlife, and Management Considerations

This narrow band of vegetation usually lies landward of the most heavily walked portions of beaches and has likely been reduced or eliminated at popular beaches. Many 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. The prospect of sea level rise may also put these systems at greater risk.

Location Map



Demmunity may occur in this Ecorogical



Beach Strand - Seawall Beach

Upper beaches and adjacent Dune Grasslands are critical breeding habitat for two species of rare 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. Coastal Beach communities also provide breeding habitat for common terns, though this species also breeds on inland lakeshore beaches. Rare 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.

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, linear.

Characteristic Plants

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

Herb

American shore-grass Beach-pea Common saltwort Sea milkwort Sea-beach sandwort Sea-kale Spearscale White sea-blite Witch grass

Associated Rare Plants

Coast-blite goosefoot

Associated Rare Animals

American oystercatcher Common tern Least tern Piping plover Roseate tern

Examples on Conservation Lands You Can Visit

- Howard's Cove, Machiasport
 Washington Co.
- Petit Manan National Wildlife Refuge - Hancock Co.
- Popham Beach State Park Sagadahoc Co.
- Reid State Park Sagadahoc Co.
- Roque Bluffs State Park Washington Co.
- Scarborough Beach State Park
 Cumberland Co
- Seawall Beach, Bates Morse Mountain Conservation Area – Sagadahoc Co.

Coastal Sedge Bog

State Rank S2

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. Roundleaved sundew, pitcher plant, and small cranberry grow among the peat mosses, which form a dense and spongy ground layer. Reindeer lichens are scattered among the mosses.

Soil and Site Characteristics

This community is restricted to raised bogs along or near the coast, often forming expansive 'lawns' on the raised portions. The substrate is saturated, acidic (pH $^{\sim}$ 4.5) peat moss. 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.



Labrador Tea

Similar Types

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. Maritime Huckleberry Bogs can occur in similar settings to Coastal Sedge Bogs, and can share many species, but will have dwarf shrubs more dominant than sedges; the two types may occur adjacent to each other with a continuous gradation from one type to the next.

Conservation, Wildlife, and Management Considerations

This community type is not widely distributed, but has been subject to

Location Map



Community is known from this Ecorogical Community may occur in this Ecorogical Balley's Ecorogical County

Deer-hair Sedge

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.

Distribution

Downeast Maine, extending eastward into the Canadian Maritimes (Laurentian Mixed Forest Province).

Landscape Pattern: Small Patch, interspersed with other peatland types.

Characteristic Plants

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

Sapling/shrub

Black chokeberry Mountain holly

Dwarf Shrub

Black crowberry*
Dwarf huckleberry*
Labrador tea
Leatherleaf*
Pale laurel
Sheep laurel*

Small cranberry

Herb

Bog goldenrod Coast sedge* Deer-hair sedge* Horned bladderwort Pitcher plant Round-leaved sundew

Bryoid

Bog broom-moss Bog hair-cap moss Little-tree reindeer-lichen Sphagnum rubellum*

Associated Rare Animals

Crowberry blue

Examples on Conservation Lands You Can Visit

- Acadia National Park Hancock Co.
- Great Heath Public Lands Washington Co.
- Great Wass Island Preserve Washington Co.
- Larrabee Heath Preserve Washington Co.
- Quoddy Head State Park Washington Co.

Cobble Rivershore

State Rank: S4

Community Description

Vegetation on these rivershores may be sparse to dense depending on degree of flooding, length of exposure, and substrate type. Characteristic perennial species that tolerate inundation and flood scouring include twisted sedge and low-growing willow species. Associated species tend to vary widely from site to site and may be diverse; they include tufted hairgrass, red osier dogwood, sweetgale, water parsnip, water hemlock, cardinal flower, flattopped aster, and smartweeds. Bryoids are usually sparse but where present may include Bryum species. Invasive, exotic species may be problematic in these areas, especially coltsfoot, purple loosestrife, and Japanese knotweed.

Soil and Site Characteristics

Herbaceous and shrub vegetation of this type occurs on coarse substrates deposited along medium- to highenergy river channels and, less frequently, exposed lakeshores with heavy wave action. Seasonal flooding and ice-scour maintain the open nature of these communities; generally, they



Cardinal Flower

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develop in areas of the active channel that are exposed at low water or in drought years.

Diagnostics

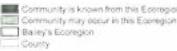
Herbs and graminoids are dominant or co-dominant with shrubs in a rivershore or streamshore setting.

Similar Types

Laurentian River Beaches are found along the St. John River and contain certain indicator species such as sand cherry and freshwater cordgrass. Rivershore Shrub Thickets may be adjacent to (landward of) these types and are dominated by shrubs rather than herbs. Rivershore Outcrops occur on bedrock outcrops rather than cobble or

Location Map









Cobble Rivershore

gravel. The Riverwash Sand Barren is restricted to sand and gravel bars of the Saco River and contains beach heather as a characteristic species.

Conservation, Wildlife, and Management Considerations

This community is linked to naturally fluctuating water levels and occasional ice scour. The rivershore habitat of this natural community suggests that threats from development are relatively low. Hydrologic alteration (i.e., impoundments) would compromise the disturbance regime, but new dams are unlikely on medium and large rivers. Exotic or agricultural species are common at some sites.

The rare White Mountain tiger beetle occurs in this habitat type. Another rare insect, the cobblestone tiger beetle, is currently under consideration for federal listing and in our area is known from Vermont, New Hampshire, and New Brunswick, but not Maine.

Characteristic Plants

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

Herbs

Bluejoint Boneset Cardinal flower Flat-topped aster Goldenrods Mad-dog skullcap Purple-stemmed aster Red osier dogwood Smartweeds Spotted joe-pye weed Sweetgale Tufted hairgrass Twisted sedge Virgin's bower Water hemlock Water parsnip Wool-grass

Associated Rare Animals

White Mountain tiger beetle

Distribution

One of the predominant rivershore types in the New England - Adirondack Province and Laurentian Mixed Forest Province. Extends in all directions from Maine.

Landscape Pattern: Small to large patch, linear.

Dwarf Shrub Bog

State Rank S5

Community Description

A dense layer of dwarf heath shrubs dominates this common 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 early in 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.

Soil and Site Characteristics

This type occurs within raised portions of peatlands, where ombrotrophic conditions prevail (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, with pH 3.9-4.6.



Pitcher Plant Flower

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 cottongrass is present. Black spruce is common as scattered trees, but tree cover <25%.

Similar Types

Black Spruce Bogs have more trees (canopy >25%). Maritime Huckleberry 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. Subalpine Hanging Bogs and Maritime Slope Bogs share

Location Map



Community is known from this Ecorogical
Community may occur in this Ecorogical
Balley's Ecorogical
County





Dwarf Shrub Bog

similar vegetation but overlay rock rather than occurring as part of a peatland.

Conservation, Wildlife, and Management Considerations

This community type is well represented in Maine and is 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, lead 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 uses black spruce as a larval host plant and may be found in this community when black spruce is abundant. Several dragonfly species may be found in examples of this community where bog pools occur, including the zigzag darner, subarctic darner, and incurvate emerald.

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: Small to Large Patch

Characteristic Plants

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

Sapling/shrub

Black spruce*
Mountain holly*

Dwarf Shrub

Black huckleberry* Labrador tea* Leatherleaf* Pale laurel Rhodora*

Sheep laurel*

Small cranberry

Herb

Black spruce* Narrow-leaved cotton-grass* Pitcher plant Tufted cotton-grass*

Bryoid

Reindeer lichen* Sphagnum mosses*

Associated Rare Plants

Swamp birch

Examples on Conservation Lands You Can Visit

- Gassabias Stream, Duck Lake Public Lands – Hancock Co.
- Harmon Heath, Cutler Coast Public Lands Washington Co.
- Number Five Bog Public Lands
 Somerset Co.
- Second Lake, Rocky Lake Public Lands
 Washington Co.
- Sunkhaze Meadows National Wildlife Refuge – Penobscot Co.
- The Heath, Massabesic Experimental Forest York Co.

Freshwater Tidal Marsh

State Rank S2

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. Brackish marsh species, such as chair-maker's rush, may be in these marshes as well, but at least some obligate freshwater plants such as pickerelweed, common arrowhead, sweet flag, and northern water-plantain will also be present. Bryophytes are essentially absent.

Soil and Site Characteristics

Freshwater Tidal Marshes are associated with major rivers, in low-gradient areas of the mid to upper tidal reaches.
Freshwater inputs lower the salinity to <1 ppt. Substrate is usually mud, or mud mixed with gravel. The tidal regime affects substrate and plant zonation.



Torrey's Bulrush

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 decreases. Grassy Shrub Marshes and Pickerelweed Marsh types can contain several of the same species, but do not occur in tidal settings.

Conservation, Wildlife, and Management Considerations

Tidal marshes provide valuable wildlife habitat and have received considerable conservation attention. Heavy metals,

Location Map







sewage overflows, and other pollutants have degraded the substrate in many areas, but some have recovered as water quality has improved over the past decades. Many occur on or adjacent to public lands or private conservation lands. Some have been managed for waterfowl 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. Invasive species such as Japanese knotweed and purple loosestrife have invaded the upper reaches at some sites. The prospect of sea level rise may also put these systems at greater risk in the future.

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 silt snail inhabits coastal marshes and small tidal rivers where the water ranges from fresh to upper brackish.

Distribution

Upper tidal reaches of major rivers: most well known from the Kennebec and Penobscot Rivers (Laurentian Mixed Forest Province).

Landscape Pattern: Large Patch, often linear.

Characteristic Plants

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

Herb

Chair-maker's rush*
Common arrowhead
Eaton's bur-marigold
Nodding beggar ticks
Northern water-plantain
Parker's pipewort
Pickerelweed*
Softstem bulrush*
Tidal arrowhead
Wild rice*

Associated Rare Plants

Beaked spikerush Eaton's bur-marigold Long's bitter-cress Parker's pipewort Pygmyweed Spongy arrowhead Stiff arrowhead Water-pimpernel

Associated Rare Animals

American oystercatcher Black-crowned night-heron Least bittern Short-eared owl

Examples on Conservation Lands You Can Visit

- Merrymeeting Bay Wildlife
 Management Area Sagadahoc Co.
- Muddy River Wildlife Management Area - Sagadahoc Co.
- Swan Island Wildlife Management Area Sagadahoc Co.

Grassy Shrub Marsh

State Rank S5

Community Description

This is a heterogeneous wetland 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 versus herbaceous types using additional site data and analyses.

Soil and Site Characteristics

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 5.0-6.0. Beaver activity often affects these wetlands, and can cause dramatic (although sometimes temporary) changes in dominance.

Diagnostics

Wetland herb and shrub species are mixed (herbs 25-95%, shrubs 0-70% cover), without a dominance of tussock sedge, bluejoint, or alder. Sites occur on mineral soil, but may have a thick organic layer of muck. Red maple may be occasional in sapling form. Mountain holly, dogwoods, or alder are often dominant shrubs; sweetgale and leatherleaf are frequent but usually total less than 50% cover.

Similar Types

Sweetgale Fens are similar, but occur

on organic soils and have plants more characteristic of peatlands, such as rhodora, sheep laurel, Labrador tea, bog rosemary, or pitcher plants. Those plants may be present in this type, but form <1% cover. Sedge

Meadows and Tall Grass Meadows are strongly dominated by tussock sedge and bluejoint, respectively. Alder Thickets have >20% cover of alder or alder mixed with gray birch. Outwash Plain Pondshores share diagnostic species but occur on sandy shores and contain other characteristic species.

Conservation, Wildlife, and Management Considerations

These marshes are well distributed throughout Maine and well represented on public lands and private conservation lands. Maintaining appropriate wetland buffers can help ensure

Location Map





Grassy Shrub Marsh

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 bluespotted salamanders. These wetlands provide nesting and foraging habitat for a number of wading birds including green heron, American bittern, and the rare least bittern. The rare sedge wren nests in graminoid marshes and wet meadows.

Distribution

Statewide, extending southward, westward, and into Canada.

Landscape Pattern: Small to Large Patch

Examples on Conservation Lands You Can Visit

- Kennebec Crossing, Appalachian Trail
 Somerset Co.
- Mt Agamenticus York Co.
- Stratton Brook Pond, Bigelow Preserve
 Franklin Co.
- Tunk Lake Area, Donnell Pond Public Lands - Hancock Co.

Characteristic Plants

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

Sapling/shrub

Bog willow*
Buttonbush*
Meadowsweet*
Mountain holly
Red osier dogwood*
Speckled alder*
Sweetgale*
Winterberry

Dwarf Shrub

Leatherleaf* Sweetgale*

Herb

Beaked sedge*
Black bulrush*
Bluejoint*
Expanded bulrush*
Few-seeded sedge*
Marsh St. Johnswort*
Royal fern*
Sensitive fern*
Three-way sedge*
Wool-grass*
Yellow loosestrife*

Bryoid

Sphagnum mosses*

Associated Rare Plants

Comb-leaved mermaid-weed Featherfoil Hollow joe-pye weed Red-root flatsedge Tall beak-rush

Associated Rare Animals

Black-crowned night-heron Blanding's turtle Least bittern Ribbon snake Sedge wren Short-eared owl Spotted turtle

Lakeshore Beach

State Rank S4

Community Description

These low sandy or gravelly lakeshores and associated berms are characterized by a variety of herbaceous plants that are tolerant of significant fluctuations in water level, ice scour, and wave action. Composition varies with substrate, with assemblages on sand possibly including large cranberry, switch-grass, black chokeberry, pinweed, poverty oat-grass, purplish northern panic-grass, and deer-tongue. On berms, a sparse canopy of trees or shrubs may be present, including common juniper, speckled alder, red maple, white pine, and gray birch. Typical assemblages on cobble or gravel include sweetgale, tufted hairgrass, water parsnip, beggar-ticks, spikerushes, common horsetail, boneset, creeping spearwort, and three square.

Soil and Site Characteristics

Beaches typically occur on the perimeters of larger lakes in landscapes of low to rolling terrain, where icepush, wave action, and natural or



Water Parsnip

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anthropogenic drawdown (e.g., from impoundments) have created broad open bands and berms around portions of the lakeshore. Berms may consist of sand or gravel, with organic matter deposited by waves and forming wrack lines.

Diagnostics

Herbaceous plants are dominant or co-dominant with shrubs in a lakeshore setting.

Similar Types

Outwash Plain Pondshores may have similar soil and site characteristics but contain certain indicators that are not present on other lakeshores, including three-leaved goldenrod, golden pert, and meadow beauty. Aquatic community

Location Map





Lakeshore Beach

types are dominated by submerged plants.

Conservation, Wildlife, and Management Considerations

This is the most frequent lakeshore type for medium and large lakes in Maine. While many lakeshore beaches are protected by fee ownership, easement, or regulation, activities such as ATV use have significantly altered the vegetation at some sites. Hydrologic integrity is also a concern; as water use increases from neighboring homes and businesses, aquifer drawdowns could impair these water dependent systems and lead to vegetational changes. Invasive plants may be a problem at some sites.

Lakeshore Beaches with abundant sections of exposed sand or sand-gravel may provide valuable nesting habitat for resident painted, snapping, and musk turtles if water levels remain relatively stable during the incubation period of June through October.

Distribution

Extends east, west, and north from Maine; occurs only as scattered areas southward.

Landscape Pattern: Small to large patch, linear.

Characteristic Plants

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

Sapling/shrub

Gray birch Red maple Speckled alder White pine

Dwarf Shrub

Black chokeberry Sweetgale

Herb

Beggar-ticks Boneset Common horsetail Common juniper

Creeping spearwort

Flatsedges
Large cranberry

Panic grasses

Pinweed

Poverty oat-grass

Spikerushes

Sweetgale Switch-grass

Swamp candles

Three square

Tufted hairgrass

Water parsnip

Associated Rare Animals

Black tern

Examples on Conservation Lands You Can Visit

- Fourth Machias Lake Washington County
- Gero Island Piscataquis County

Laurentian River Beach

State Rank S2

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 milkvetch may be locally common. Bryoids are virtually absent.

Soil and Site Characteristics

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.



Glaucous Rattlesnake-root

Diagnostics

Patchy herbs and low shrubs occur on a rivershore below the high water mark and adjacent trees, with sandy cherry typical and circumneutral indicator plants present (e.g., freshwater cordgrass, wild chive). The cover of grasses and forbs exceeds that of sweetgale and sedges, and the substrate is unconsolidated gravelly to cobbly glaciofluvial deposits.

Similar Types

This type is related to and sometimes contiguous with other rivershore types. Tall Grass Meadows are dominated by bluejoint and occur on finer substrates. Riverside Seeps have more sweetgale and

Location Map





Alpine Sweet-broom

sedges, seepage waters at the surface, and certain indicator species (e.g., grass-ofparnassus and yellow sedge). Rivershore Shrub Thickets are dominated by shrubs over 1 m tall. Riverwash Sand Barren features beach heather, little bluestem, and other temperate species compared to the northern plants typical of this type.

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 and the vegetation could be easily degraded. Exotic agricultural species are common at some sites, and at least one site has the invasive Japanese knotweed.

Distribution

Currently known only from the St. John River, but may be elsewhere in northern Maine; poorly documented. Presumably extends to eastern Canadian rivers. (New England - Adirondack and Laurentian Mixed Forest Provinces.)

Landscape Pattern: Small Patch, linear.

Characteristic Plants

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

Sapling/shrub

Meadowsweet Poison-ivv Red osier dogwood Smooth rose Willow

Dwarf Shrub

Sand cherry*

Herb

Bladder campion Bluebell Canadian tick-trefoil Early goldenrod Freshwater cordgrass Hemp dogbane New York aster Northern blue flag Reed canarygrass Silverweed Tufted hairgrass* Wild chive

Associated Rare Plants

Alpine milk-vetch Alpine sweet-broom Anticosti aster Canada burnet Glaucous rattlesnake-root Huron tansy Northern gentian Soft-leaf muhly St. John oxytrope

Examples on Conservation Lands You Can Visit

• St. John River Preserve - Aroostook Co.

tom.

Leatherleaf Bog

State Rank S4

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 including pitcher plant, sundew, and small cranberry are scattered on the peat moss substrate. Trees, if present at all, are \$15% total cover.

Soil and Site Characteristics

This type is common in the wetter parts of bogs and acidic, nutrient poor fens (average pH is 4.0) with peat substrate. It usually occurs in settings where groundwater contact is maintained, and so is technically a fen from a hydrologic standpoint, although it is often referred to as 'bog' because of the dominance of heath vegetation. This type is often a major constituent of 'kettlehole bog' ecosystems, and it may be present in lakeshore peatlands or other sites with a fluctuating water table.



Ringed Boghaunter

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.

Similar Types

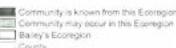
This type is intermediate in composition and nutrient regime between a Dwarf Shrub Bog (which is drier and has sheep laurel more abundant) and Sedge - Heath Fen or other graminoid dominated fen community types (which have graminoids more dominant).

Conservation, Wildlife, and Management Considerations

This type is well represented in Maine and is fairly stable in extent, with several examples on

Location Map









Leatherleaf

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.

The ringed boghaunter, a rare dragonfly restricted to York and southern Oxford counties, is found in this natural community type, especially in very wet locations with abundant inundated peat moss (often suspended in the water column). 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, an uncommon damselfly that inhabits open marshes and fens and reaches the southern edge of its range in northern Maine.

Distribution

Statewide; extends in all directions from Maine.

Landscape Pattern: Small Patch

Characteristic Plants

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

Sapling/shrub

Black huckleberry* Maleberry*

Dwarf Shrub

Bog rosemary* Leatherleaf* Sheep laurel* Small cranberry Sweetgale*

Beaked sedge*

Herb

Bog aster*
Few-flowered sedge*
Pitcher plant*
Tawny cotton-grass
Three-leaved false Solomon's seal*
Tufted cotton-grass*
White beak-rush*

Bryoid

Sphagnum mosses*

Associated Rare Plants

Inkberry Long's bulrush Screwstem Swamp birch

Associated Rare Animals

Ringed boghaunter

Examples on Conservation Lands You Can Visit

- Brownfield Bog Wildlife Management Area - Oxford Co.
- Great Heath Public Lands Washington
- Number Five Bog Public Lands
- Somerset Co.
- Salmon Brook Lake Bog Public Lands
- Aroostook Co.
- Sunkhaze Meadows National Wildlife Refuge - Penobscot Co.

Low Sedge Fen

State Rank S3

Community Description

This type is characterized by peatland vegetation dominated by low mats of sedges (typically 40-60% cover), sometimes with sparse low heaths, over a continuous and very wet peat moss substrate. White beakrush, 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.

Soil and Site Characteristics

This community occurs in very wet portions of peatlands but not in raised portions nor adjacent to open water. 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

Graminoids are dominant over a well developed bryoid layer. White beak-rush, mud sedge, and occasionally few-seeded sedge are the dominant sedges. Dwarf



Bog Buckbean

shrubs form less than 20% cover and the substrate is saturated to the surface.

Similar Types

Sedge - Heath Fens are closely related but have more leatherleaf (usually > 25%) and often have coast sedge as a characteristic species. Leatherleaf Bogs are shrub dominated, rather than sedge dominated. 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. Tall Sedge Fens feature taller and denser graminoids and usually have abundant slender sedge.

Conservation, Wildlife, and Management Considerations

This community type is not particularly common, but it has been subject to few threats to date. Some examples occur

Location Map





Low Sedge Fen

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 uncommon dragonfly species may be found where bog pools and seasonally inundated depressions occur, including the zigzag darner, subarctic darner, and incurvate emerald. Occurrences in northern Maine may be inhabited by the subarctic bluet, an uncommon 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, as is the rare Quebec emerald.

Distribution

Northern and eastern Maine (New England Adirondack and Laurentian Mixed Forest Provinces), presumably extending into Canada.

Landscape Pattern: Small Patch

Characteristic Plants

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

Sapling/shrub

Speckled alder

Dwarf Shrub

Bog rosemary Labrador tea Leatherleaf Rhodora Small cranberry

Herb

Bog goldenrod
Buckbean*
Mud sedge*
Pitcher plant

Pitcher plant Podgrass*

Round-leaved sundew Tawny cotton-grass

Three-leaved false Solomon's seal White beak-rush*

Bryoid

Sphagnum mosses*

Associated Rare Plants

Livid sedge Sparse-flowered sedge

Associated Rare Animals

Ouebec emerald

Examples on Conservation Lands You Can Visit

- Marble Fen Preserve Penobscot Co.
- St. John River Preserve Aroostook Co.
- Telos Public Lands Piscataguis Co.

Maritime Huckleberry Bog

State Rank S3

Community Description

This peatland type is characterized by low (usually < 60 cm) heath shrubs, such as sheep laurel and leatherleaf, as 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 peat mosses underlies the plants.

Soil and Site Characteristics

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 \leq 5.0, occasionally slightly higher).

Diagnostics

Dwarf shrub peatland vegetation is



characterized by dwarf huckleberry and/or black crowberry together forming >20% cover. Sheep laurel and leatherleaf are usually

240

Pitcher Plant Leaf with Dragonfly Exuvia

present but at lower cover than in other dwarf-shrub peatland types.

Similar Types

Dwarf Shrub Bog and Leatherleaf Bog 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 Maritime Huckleberry Bogs. The dominance of dwarf huckleberry with either crowberry or deer-hair sedge distinguishes Maritime Huckleberry Bogs from other bog vegetation types.

Conservation, Wildlife, and Management Considerations

This community type is not widely distributed, but has been subject to

Location Map





Maritime Huckleberry Bog

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 uncommon dragonfly species may be found in examples of this community where bog pools occur, including the zigzag darner, subarctic darner, and incurvate emerald.

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 Plants

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

Sapling/shrub

Black spruce

Dwarf Shrub

Black crowberry* Dwarf huckleberry* Labrador tea* Leatherleaf*

Pale laurel Sheep laurel*

Small cranberry

Herb

Bog goldenrod Deer-hair sedge* Pitcher plant Round-leaved sundew

Bryoid

Cladonia lichen* Reindeer lichen* Sphagnum fuscum*

Associated Rare Plants

Northern comandra

Associated Rare Animals

Crowberry blue

Examples on Conservation Lands You Can Visit

- Acadia National Park Hancock Co.
- Great Wass Island Preserve Washington Co.
- Quoddy Head State Park Washington Co.

Maritime Slope Bog

State Rank S2

Community Description

A well developed layer of dwarf shrubs is dominated by heath shrubs and black crowberry in a dense carpet in this vegetation type. 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.

Soil and Site Characteristics

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 Downeast coast.

Diagnostics

Tree cover is less than 25% and



Baked Apple-berry

heath shrubs are dominant. Although the ground layer is composed of peat mosses, peat forms only a thin layer over bedrock or mineral substrate, so this is not a true peatland type.

Similar Types

Dwarf Shrub Bogs and Maritime Huckleberry Bogs share species and structure with Maritime Slope Bogs; however, those are found in true peatlands (basins with deep accumulations of saturated peat), not on thin peat over rock. Subalpine Hanging Bogs are compositionally similar but occur in the mountains.

Location Map





Black Crowberry

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 and climate change are the primary threats; careful planning of trails and ensuring that users stay on trails can help minimize recreational impacts.

The rare crowberry blue butterfly is restricted to coastal heaths in east-coastal Maine. It is uses black crowberry as a larval host plant.

Distribution

Downeast coastal Maine, extending eastward into the Canadian Maritimes (Laurentian Mixed Forest Province).

Landscape Pattern: Small Patch



Round-leaved Sundew

Characteristic Plants

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

Sapling/shrub

Black chokeberry Common juniper Mountain holly Wild-raisin

Dwarf Shrub

Baked apple-berry Black crowberry* Black huckleberry Labrador tea Mountain cranberry Rhodora Sheep laurel*

Herb

Bog goldenrod Deer-hair sedge Pitcher plant Round-leaved sundew Starflower White beak-rush

Bryoid

Bog hair-cap moss Grey reindeer-lichen Sphagnum mosses* Woodland reindeer-lichen

Associated Rare Animals

Crowberry blue

Examples on Conservation Lands You Can Visit

- Great Wass Island Preserve
 Washington Co.
- Petit Manan Point, Petit Manan National Wildlife - Washington Co.

Mixed Saltmarsh

State Rank S3

Community Description

These saltmarshes contain a mixture of graminoids and forbs, sometimes with patches 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, sea lavender, 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 Salt-hay Saltmarshes.

Soil and Site Characteristics

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 species (saltmarsh regularly inundated twice daily by tides).

Diagnostics

These are tidal marshes in which various saltmarsh plants share dominance with



Saltmarsh Bulrush

cordgrasses and/or black-grass; chair-maker's rush is typically present and may be dominant; saltmarsh sedge is also characteristic. Vegetation tends to be patchy rather than zoned.

Similar Types

Salt-hay 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.).

Location Map





Mixed Graminoid - Forb 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 Nelson's sparrow and the rare saltmarsh sparrow. These wetlands also provide foraging habitat for a large number of wading birds and shorebirds, including the rare least tern. The big bluet, a rare damselfly, inhabits saltmarsh ponds with emergent vegetation in southern Maine.

Distribution

Coastwide; almost all of the east coastal Maine saltmarshes contain this type. Extends eastward into the Canadian Maritimes (Laurentian Mixed Forest Province) and westward into New Hampshire and Massachusetts.

Landscape Pattern: Small Patch

Characteristic Plants

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

Herb

Alkali bulrush*

Black-grass*
Chaffy sedge*
Chair-maker's rush*
Common arrow-grass
Creeping bentgrass*
Freshwater cordgrass
New York aster*
Salt-loving spikerush*
Saltmeadow cordgrass*
Wire rush*

Associated Rare Plants

Gaspé arrow-grass Marsh-elder Saltmarsh false-foxglove Saltmarsh sedge Small saltmarsh aster

Associated Rare Animals

Big bluet
Black-crowned night-heron
Laughing gull
Least tern
Saltmarsh sparrow
Short-eared owl

Examples on Conservation Lands You Can Visit

- Cobscook Bay State Park Washington Co.
- Great Wass Island Preserve Washington Co.
- Petit Manan National Wildlife Refuge
 Hancock Co.
- Reid State Park Sagadahoc Co.
- Scarborough Marsh Wildlife
 Management Area Cumberland Co.

Mossy Bog Mat

State Rank S4

Community Description

The bryophyte layer is the most obvious component of this peatland type. A dense and usually very wet layer of peat 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, bog rosemary (very dwarfed), horned bladderwort, small cranberry, and white beak-rush. The most typical bryophytes are *Sphagnum cuspidatum* and bog-mat liverwort.

Soil and Site Characteristics

Mossy Bog Mats 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 (pH \sim 4.0).

Diagnostics

A carpet of bryophytes, mostly Sphagnum mosses, is the main feature



Small Cranberry

in this 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 - Heath Fens, Low Sedge Fens, and Leatherleaf Bogs can all have similar vascular plant species, but will have the vascular plants more strongly dominant (typically >50% cover).

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

Location Map





Mossy Bog Mat

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 or logging access, 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 peat moss may host a number of uncommon damselflies and dragonflies including the Quebec emerald, zigzag darner, subarctic darner, incurvate emerald, and delicate emerald. Sites in northwestern Maine may include the bog fritillary butterfly, which uses small cranberry as its larval host plant.

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 Plants

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

Dwarf Shrub

Black crowberry Dwarf huckleberry Leatherleaf* Pale laurel Small cranberry

Herb

Horned bladderwort Pitcher plant Round-leaved sundew Tawny cotton-grass White beak-rush

Bryoid

Bog-mat liverwort Mylia liverwort Sphagnum mosses*

Associated Rare Animals

Quebec emerald

Examples on Conservation Lands You Can Visit

- Crystal Bog Preserve Aroostook Co.
- Great Heath Public Lands Washington Co.
- Number Five Bog Public Lands
 Somerset Co.
- Wiggins Brook, Little Moose Public Lands Piscataquis Co.



Sphagnum Mosses

Open-water Marsh

State Rank S5

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 water-lilies altogether and be dominated by floating leaved pondweed species such as bigleaf pondweed or others. Submerged aquatic plants are also common and may include bladderworts and pipewort.

Soil and Site Characteristics

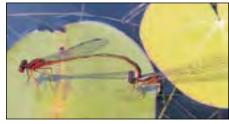
These aquatic beds occur in quiet waters at depths mostly between 0.5 and 2.5 m. The substrate is typically a mixture of silty organic muck.

Diagnostics

Water-lily species are prominent (or in variants, pondweed species are prominent); pickerelweed is basically absent.

Similar Types

Pickerelweed Marsh and Bulrush Marsh vegetation have greater dominance of emergent versus submerged plants. Sandy Lake-bottom vegetation has



Scarlet Bluet Damsel Flies Mating

low cover of floating aquatics and is dominated instead by plants with basal rosettes growing on the bottom. The pondweed variant can be similar to Circumneutral Pond but lacks the alkaline water indicator species such as watermarigold, common waterweed, Robbins' pondweed, and straight-leaved pondweed.

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 it provides habitat for many water-dependent animals. Many examples occur on public and private conservation

Location Map









Open-water Marsh

lands; however, because the type is so common it is often not documented. The major threats to this natural 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 species such as the turquoise bluet, little bluet, lilypad forktail, and the rare spatterdock darner.

Characteristic Plants

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

Herb

Bayonet rush
Bigleaf pondweed*
Pipewort
Spotted bladderwort*
Water-shield*
White water-lily*
Yellow water-lily*

Associated Rare Plants

Pygmy water-lily Spotted pondweed

Associated Rare Animals

American coot Common moorhen Spatterdock darner

Distribution

Statewide; extending southward and westward from Maine and presumably into Canada

Landscape Pattern: Small Patch, often linear along lakeshores.

Examples on Conservation Lands You Can Visit

- Acadia National Park Hancock Co.
- Tyler Pond Wildlife Management Area Kennebec Co.



Yellow and White Water Lilies

Outwash Plain Pondshore

State Rank S1

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 spikerushes. There is no well developed bryoid layer.

Soil and Site Characteristics

This community forms a band around the perimeter of shallow, sandy bottomed ponds in glacial outwash plains. It occurs on shores that are inundated for the early part of the growing season and exposed later in 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.



Ribbon Snake

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. Golden pert and meadow beauty are indicator species.

Similar Types

Grassy Shrub Marshes can also occur on temporarily flooded mineral soils and can share some dominants such as three-way sedge, but they lack the concentric zonation of outwash plain pondshores and typically intermingle shrubs and herbs rather than segregating them into zones. The more variable and widespread Lakeshore Beaches lack three-way sedge, golden pert, and meadow beauty.

Location Map



Community is known from this Ecoregion
Community may occur in this Ecoregion
Balley's Ecoregion
County





Three-way Sedge

Conservation, Wildlife, and Management Considerations

This extremely rare natural community is under pressure from adjacent land uses and recreational impacts. The periphery of several sites has been developed or converted to other uses. At the few known sites on conservation lands, the major recreational impact is off-road vehicle use. At low water, ATV use has significantly altered the vegetation at some sites. Hydrologic integrity is also a concern, as water use increases from neighboring homes and businesses and aquifer drawdowns could impair these water dependent systems and lead to vegetational changes.

These Outwash Plain Pondshores provide excellent foraging habitat for the rare ribbon snake. The pondshores also provide habitat for the big bluet, a rare damselfly. Other more wide-ranging rare insects are likely to be found in this community. This community may also provide feeding habitat for wading birds.

Characteristic Plants

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

Herb

Bluejoint*
Brown-fruited rush*
Bur-reed*
Canada rush
Fly-away grass
Golden pert*
Narrow-leaved goldenrod*
Pipewort*
Robbin's spikerush*
Three-way sedge
Toothed flat-sedge*
Yellow loosestrife

Associated Rare Plants

Dwarf bulrush Englemann's spikerush Fall fimbry Huron tansy Long-tubercled spike-rush Narrow-leaved goldenrod

Associated Rare Animals

Big bluet Ribbon snake

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

Examples on Conservation Lands You Can Visit

- Killick Pond Wildlife Management Area – York Co.
- Waterboro Barrens Preserve Oxford Co.

Pickerelweed Marsh

State Rank S5

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, bulrushes, bur-reed species, and other aquatics may be present. Total cover ranges from 30-100% and is typically >50%.

Soil and Site Characteristics

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.



Maine Moose

Similar Types

Open-water Marsh vegetation shares many species but is dominated by floating or submerged plants, not emergent plants. Both types have waterlily species, but they are less abundant in the pickerelweed type than in the water-lily type. Sandy Lake-bottom 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.

Location Map









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.

Characteristic Plants

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

Herb

Pickerelweed* Pipewort Spotted bladderwort* Water bulrush* White water-lilv* Yellow water-lily*

Associated Rare Animals

American coot Black-crowned night heron Common moorhen Least bittern Spatterdock darner

Dragonfly and damselfly diversity is typically high in these wetlands.

Distribution

Statewide, extending into lower New England and Canada.

Landscape Pattern: Small Patch

Examples on Conservation Lands You Can Visit

- Merrymeeting Bay Wildlife Management Area - Sagadahoc Co.
- Range Pond State Park -Androscoggin Co.
- Sebago Lake State Park -Cumberland Co.



Pickerelweed

Rivershore Shrub Thicket

State Rank S2

Community Description

Dense riparian shrub vegetation (>80% cover) is dominated by a mixture of red osier 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 may include some calciphiles as well as more widespread species. Bryoids are minor, and consist of bryophytes rather than lichens. More study of alluvial shrub communities is needed.

Soil and Site Characteristics

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; and 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.



Pussy Willow Leaves

Diagnostics

This type is characterized by 1-3 m tall shrub vegetation, with red osier dogwood and willows prominent, on riverbanks where annual disturbance creates a nonforested 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. Tall Grass Meadows are strongly dominated by bluejoint and occur on flatter substrates. 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. Laurentian

Location Map



Community is known from this Ecoregion
Community may occur in this Ecoregion
Bailey's Ecoregion
County





Slender Willow

River Beaches are dominated by herbs and low shrubs.

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 an intact buffer of adjoining upland would be helpful. No studies of the dynamics of this community have been done.

These rivershore shrublands provide habitat for 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.

Distribution

Documented from northern Maine along the St. John and Allagash Rivers, and 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, linear.

Characteristic Plants

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

Sapling/shrub

Bush-honeysuckle*
Red osier dogwood*
Red-tipped willow*
Round-leaved dogwood
Shining willow
Speckled alder

Herb

Bluejoint
Flat-topped white aster
Fringed bromegrass
Fringed loosestrife
Spotted joe-pye weed

Associated Rare Plants

Auricled twayblade Blueleaf willow Furbish's lousewort Nantucket shadbush Northern painted-cup Sandbar willow

Examples on Conservation Lands You Can Visit

• The Nature Conservancy's St. John River lands – Aroostook Co.



Furbish's Lousewort

Riverside Seep

State Rank S2

Community Description

This type can include graminoid dominated, graminoid/forb, or shrubby vegetation, often with all three forms adjacent to one another. 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 sparse or low shrubs or downslope on the shore and includes fen indicators such as sticky false asphodel, 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 peat mosses.

Soil and Site Characteristics

These riparian seeps are below the annual high water mark on a substrate of unconsolidated, coarse textured soil and are constantly saturated by groundwater seepage. The substrate varies from fairly steep gravelly banks with locally extensive moss cover to lower shore flats with stabilized cobble. This type is restricted to larger rivers where spring floods and ice scour maintain a semi-open shore, versus a shoreline of dense shrubs. Continued exposure of glacial tills produces



Hairy Arnica

comparatively high pH.

Diagnostics

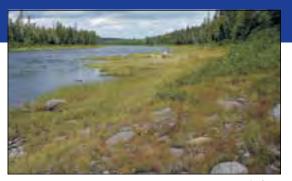
Intermingled short graminoids, forbs, and shrubs grow on an open rivershore. The substrate is usually unconsolidated sandy to gravelly soil, saturated by groundwater discharge. Indicator species include grass-of-parnassus, hidden-scale sedge, and sweetgale.

Similar Types

Circumneutral Fens contain many of the same species but occur in a peatland setting, not on a rivershore. Tall Grass Meadows, which may be adjacent to these seeps, are more homogeneous and are dominated by tall graminoids, particularly bluejoint grass. Laurentian River Beach vegetation occurs on somewhat drier cobble or sand substrates and includes few if any sedges.

Location Map





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.

Many seeps are protected along the upper portions of the St. John River, 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.

Distribution

Known primarily from the St. John River and sparsely on other northern Maine rivers and lakes, 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, linear.

Characteristic Plants

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

Sapling/shrub

Beaked hazelnut*
Bush-honeysuckle*
Meadowsweet
Mountain alder*
Mountain maple*
Red-tipped willow
Shining willow
Speckled alder*

Dwarf Shrub

Shrubby cinquefoil* Sweetgale*

Herb

Bluejoint
Common horsetail*
Dwarf raspberry
Field mint
Flat-topped white aster
Fowl mannagrass
Grass-of-parnassus
Purple-stemmed aster
Sticky false asphodel
Swamp buttercup
Tall meadow-rue
Wild strawberry*

Associated Rare Plants

Auricled twayblade
Black sedge
Furbish's lousewort
Garber's sedge
Glaucous rattlesnake-root
Mistassini primrose
Mountain timothy
Northern gentian
Northern painted-cup

Examples on Conservation Lands You Can Visit

- Allagash Public Lands Aroostook Co.
- St. John River Preserve Aroostook Co.

Riverwash Sand Barren

State Rank S1

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 trees 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 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 vears).

Soil and Site Characteristics

Sites occur on gravelly or sandy barrens along river beaches and back beach areas where periodic flooding



Silverling

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.

Similar Types

This type is quite distinct. Sandplain Grasslands share some species with this type, but are on flat outwash plains, not in rivercourses.

Location Map







Beach Heather

Conservation, Wildlife, and Management Considerations

All occurrences in Maine are on or adjacent to private land. Heavy recreational use on the Saco River poses a threat to some occurrences, which can be attractive picnicking or camping spots. Although this is a disturbanceadapted community, the impacts of ATVs and heavy foot traffic 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.

Distribution

Known only from the Saco River in southern Maine and adjacent New Hampshire.

Landscape Pattern: Small Patch

Characteristic Plants

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

Sapling/shrub

Pitch pine Red Oak White pine

Dwarf Shrub

Beach heather*

Big bluestem

Herb

Early goldenrod Flat-topped goldenrod Gray goldenrod Jointweed Little bluestem* Pinweed Poverty oatgrass Rand's goldenrod Silverling

Silverrod

Wooly panic-grass

Bryoid

Awned hair-cap moss Reindeer lichen

Associated Rare Plants

Silverling

Examples on Conservation Lands You Can Visit

• None documented on conservation lands.

Salt-hay Saltmarsh

State Rank S3

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.

Soil and Site Characteristics

Salt-hay 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. Salt marsh peat is typically several meters thick. Most are large (>10 acres), but they occasionally occur as smaller pockets along estuaries and coves.



Saltmarsh False-foxglove

260

Diagnostics

These types are coastal back dune marshes, or near the outer reaches of estuaries, with saltmeadow cordgrass, smooth cordgrass, and black-grass totaling >35% cover, often in bands. The high marsh is well developed.

Similar Types

Mixed 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 less than 5 acres, and tend to occur farther upstream in estuaries or in smaller, more protected pockets. Brackish Tidal Marshes, which also occur farther upstream in estuaries, lack saltmarsh cordgrasses.

Location Map



Community is known from this Ecorogical Community may occur in this Ecorogical



Salt-hay Saltmarsh - Kinney Shores

Conservation, Wildlife, and Management Considerations

Few of the larger saltmarshes in Maine are pristine, with some having been filled and nearly all 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 Salt-hay Saltmarshes are on public land or private conservation land. Maintenance of appropriate wetland buffers can help reduce degradation that could result from adjacent land uses.

Saltmarshes are important nesting habitat for Nelson's sparrow and the rare saltmarsh sparrow. These wetlands also provide foraging habitat for a large number of wadingbirds and shorebirds, including rare species such as the laughing gull, black-crowned night-heron, and least tern. The big bluet, a rare damselfly, inhabits saltmarsh ponds with emergent vegetation in southern Maine.

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 Plants

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

Herb

Alkali bulrush
Black-grass*
Common arrow-grass*
Goosetongue*
Purple-stemmed aster
Saltmeadow cordgrass*
Sea milkwort*
Seashore saltgrass*
Seaside goldenrod*
Smooth cordgrass*
Wire rush*

Associated Rare Plants

Dwarf glasswort Lilaeopsis Saltmarsh bulrush Saltmarsh false-foxglove Slender blue flag

Associated Rare Animals

Big bluet
Black-crowned night-heron
Laughing gull
Least tern
Saltmarsh sparrow
Short-eared owl

Examples on Conservation Lands You Can Visit

- Bass Harbor Marsh, Acadia National Park
 Hancock Co.
- Bates Morse Mountain Conservation
 Area Sagadahoc Co.
- Rachel Carson National Wildlife Refuge
 York Co.
- Reid State Park Sagadahoc Co.
- Scarborough Marsh Wildlife
 Management Area Cumberland Co.

Sandy Lake-bottom

State Rank S5

Community Description

In this shallow water 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 below the water surface. Associated species may be rosette plants or submerged plants growing in the water column (e.g., leafless watermilfoil). Water-shield, a plant with leaves that float on the surface, may be abundant in patches. Water-lilies and pickerelweed may be present, but at low cover. Vegetation cover ranges from sparse to extensive.

Soil and Site Characteristics

This community type can be found in quiet waters of lakes, ponds, streams, and rivers; 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 lake bottom, especially pipewort and water lobelia. Floating leaved plants are absent or very low in cover.

Pipewort

Similar Types

Open-water Marsh vegetation and Pickerelweed Marsh vegetation can share many species with this type, but these community types are dominated by floating leaved plants or emergent plants, respectively.

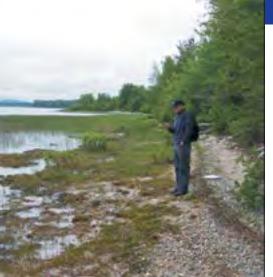
Conservation, Wildlife, and **Management Considerations**

This aquatic community type is widespread in Maine. It can be found in the quieter portions of streams and rivers as well as in lakeshores and pondshores. It provides habitat for a variety of waterdependent animals. Many examples occur on public lands and private conservation lands; however, because the type is so

Location Map







common it is not always documented.

water quality degradation from excess

as Eurasian water-milfoil and variable

water-milfoil.

The major threats to this community are

nutrients, damage from boat wakes, and

the spread of invasive aquatic plants, such

These aquatic beds, especially where they

contain floating-leaved plants like water-

such as the rare 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

communities such as Open-water Marsh

species found in more acidic aquatic

or Pickerelweed Marsh. It is unclear

the more alkaline conditions that this

whether any wildlife species prefer

community provides.

shield, may provide habitat for damselflies

Sandy Lake-bottom

Characteristic Plants

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

Herb

Creeping spearwort Pipewort* Water lobelia* Water-shield*

Associated Rare Plants

Acadian quillwort Prototype quillwort Shore quillwort Spotted pondweed Water stargrass

Associated Rare Animals

Scarlet bluet

Distribution

Statewide: extending southward and westward from Maine, and presumbably into Canada.

Landscape Pattern: Small Patch, linear.

Examples on Conservation Lands You Can Visit

- Chemo Pond, Penobscot Experimental Forest - Penobscot Co.
- Kidney Pond, Baxter State Park - Piscataguis Co.
- Pepperpot Pond, Richardson Lake Public Lands - Oxford Co.
- Range Pond State Park -Androscoggin Co.



Water-shield

Sedge - Heath Fen

State Rank S4

Community Description

This open peatland type 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 peat mosses, often with tracings of large cranberry running across the surface.

Soil and Site Characteristics

This type occurs in open 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 beakrush, and narrow-leaved cotton-grass.



Sheep Laurel

Similar Types

Leatherleaf Bog is shrubbier, has more leatherleaf than sedge cover, and has tufted cotton-grass or tawny cotton-grass as prominent sedges. Dwarf Shrub Bog is drier and shrubbier and features sheep laurel as the dominant shrub. Low Sedge Fen occurs in similar, although usually somewhat wetter settings. It has a greater dominance of sedges than shrubs and often features mud sedge and podgrass. 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.

Conservation, Wildlife, and Management Considerations

This community type is well represented in Maine and is fairly stable in extent,

Location Map







Sedge - Heath Fen

with several examples on public lands and private conservation lands. Impoundment or draining would have negative impacts on bog hydrology and on vegetation. 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 peat moss (often suspended in the water column). 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 Maine this type may support the bog fritillary butterfly, which uses small cranberry as its larval host plant.

Distribution

Statewide, though more common northward. Throughout northern New England and New York; Canadian distribution unknown.

Landscape Pattern: Small Patch

Characteristic Plants

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

Sapling/shrub

Larch*

Mountain holly*

Dwarf Shrub

Bog rosemary*

Large cranberry*

Leatherleaf*

Sheep laurel

Small cranberry

Herb

Bog aster*

Bog goldenrod

Coast sedge*

Few-flowered sedge*

Few-seeded sedge*

Narrow-leaved cotton-grass*

Pitcher plant

Round-leaved sundew

Slender sedge

Spatulate-leaved sundew

White beak-rush*

Yellowish sedge

Bryoid

Sphagnum magellanicum*

Associated Rare Animals

Quebec emerald

Ringed boghaunter

Examples on Conservation Lands You Can Visit

- Acadia National Park Hancock Co.
- Great Heath Public Lands Washington Co
- Great Wass Island Preserve Washington Co
- Number Five Bog Public Lands
 Somerset Co.
- Salmon Brook Lake Bog Public Lands
 Aroostook Co.
- St. John River Preserve Aroostook/ Somerset Co.

Sedge Meadow

State Rank S4

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, usually in small amounts. Plant species vary from site to site but typically include royal fern, cinnamon fern, sensitive fern, St. Johnswort, flat-topped white aster, or wool-grass. Bryophytes are usually very sparse.

Soil and Site Characteristics

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 and may be influenced by beaver activity.



Mulberrywing

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 growing season.

Similar Types

Tall Grass Meadows share many species but have lower abundance of tussock sedge and are usually only temporarily flooded. Sweetgale Fens and Alder 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. Grassy Shrub Marshes also have <25% tussock sedge.

Location Map



Community is known from this Ecorogic Community may occur in this Ecorogical



Sedge Meadow

Conservation, Wildlife, and Management Considerations

While graminoid marshes are common throughout the state, the 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. This wetland type is particularly susceptible to alteration from the non-native purple loosestrife.

The rare Tomah mayfly is found in a few large sedge meadows in central, eastern, and northern Maine. In addition to numerous common bird species, the rare 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.

Characteristic Plants

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

Sapling/shrub

Meadowsweet* Speckled alder* Winterberry*

Dwarf Shrub

Leatherleaf

Herb

Bluejoint*
Tussock sedge*

Bryoid

Sphagnum mosses

Associated Rare Plants

Bog bedstraw

Associated Rare Animals

Blanding's turtle Comet darner Least bittern Ribbon snake Sedge wren Short-eared owl Spotted turtle Tomah mayfly

Yellow rail

Distribution

Statewide, extending throughout the northeastern U.S.; Canadian distribution unknown.

Landscape Pattern: Large Patch

Examples on Conservation Lands You Can Visit

- Cold Stream, Passadumkeag
 Penobscot Co.
- Great Heath Public Lands Washington Co.
- Middle Pond State Park Oxford Co.
- Roberts Pond Inlet, Massabesic Experimental Forest - York Co.

Sweetgale Fen

State Rank S4

Community Description

A mixture of shrubs, typically about 1 m high (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 are 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.

Soil and Site Characteristics

These basin wetlands occur either as part of larger peatlands bordering open water or in impounded areas with peat or muck soils (e.g. beaver flowages). Slow moving open water usually borders this vegetation. The substrate is seasonally to semipermanently flooded organic material.

Diagnostics

This type has a dominance of mediumheight shrubs of sweetgale, meadowsweet, and leatherleaf. Graminoids are present but subordinate to shrubs. Sites occur on saturated or flooded organic soils.



Sweetgale

268

Similar Types

Sweetgale Fens are usually embedded within a mosaic of other peatland types. Tall Sedge Fens occur in similar settings but have graminoids far more dominant than shrubs. Tall Shrub Fens have more alder or mountain holly and usually occur at the peatland/upland interface. Grassy Shrub Marshes have graminoids equaling or exceeding shrub cover and occur on mineral soils or with only a thin organic layer over saturated mineral soil. Alder Thickets also usually occur on mineral soils rather than peat or muck and have a stronger dominance of alder.

Location Map



ommunity is known from this Econogic Community may occur in this Ecoregion



Sweetgale Fen

Conservation, Wildlife, and **Management Considerations**

This wetland type is well distributed throughout the state and 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 in close proximity to open water, may provide habitat for bird species such as common vellowthroat, alder flycatcher, Wilson's warbler, Lincoln's sparrow, and the rare 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 dragonfly of open fens and marshes, may occur here as well. Sites of this community type in northern Maine may be inhabited by the subarctic bluet.

Distribution

Statewide; extends westward and probably eastward and northward as well.

Landscape Pattern: Small Patch

Characteristic Plants

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

Sapling/shrub

Alder*

Black spruce*

Larch*

Leatherleaf*

Meadowsweet*

Mountain holly*

Red maple*

Sweetgale*

Winterberry holly*

Dwarf Shrub

Leatherleaf*

Rhodora*

Sheep laurel*

Sweetgale*

Herb

Bluejoint

Bog aster*

Few-seeded sedge*

Royal fern*

Slender sedge

Tussock sedge*

White beak-rush*

Brvoid

Sphagnum mosses*

Associated Rare Plants

Long's bulrush

Associated Rare Animals

Rusty blackbird

Examples on Conservation Lands You Can Visit

- Mattagodus Wildlife Management Area - Penobscot Co.
- Middle Pond State Park Oxford Co.
- Moose River Somerset Co.
- Nahmakanta Public Lands Piscataguis
- Little Moose Public Lands Piscataguis Co.



Subalpine Hanging Bog

State Rank S1

Community Description

A dwarf shrub bog tilted on its side, this community consists of typical heath bog shrubs growing on a dense peat 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.

Soil and Site Characteristics

Known sites are documented from nearly vertical talus slides in at elevations >2000', but this type may occur in other subalpine settings.

Diagnostics

Heath shrubs (sheep laurel, Labrador tea, leatherleaf) are dominant on a peat moss substrate, but this type is not a peatland. Vegetation occurs as a thin layer over bedrock, talus, or scree in a subalpine setting.



Larch

270

Similar Types

Dwarf Shrub Bog vegetation is compositionally similar, but occurs in a peatland setting. Maritime Slope Bogs are floristically almost identical but occur in a different setting. Alpine Bogs occur in basins rather than on slopes and typically have higher herbaceous cover. Cold-air Talus Slopes have less vegetation cover (particularly of peat moss) and occur at lower elevations; but the two types may grade into one another.

Conservation, Wildlife, and Management Considerations

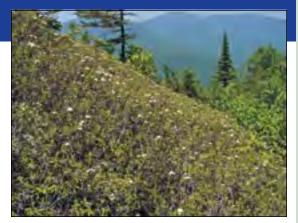
The few documented sites are away from trails. Access is difficult to dangerous,

Location Map



Community is known from this Ecoregical Community may excur in this Ecoregical Balley's Ecoregical County





Subalpine Hanging Bog

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.

Distribution

Montane western Maine, extending west into New Hampsire and possibly Vermont and upstate New York (New England - Adirondack Province); likely extends northeasterly to the Gaspé Peninsula.

Landscape Pattern: Small Patch

Characteristic Plants

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

Sapling/shrub

Black spruce Heart-leaved paper birch Larch Mountain alder

Dwarf Shrub

Alpine bilberry Labrador tea* Leatherleaf Rhodora

Sheep laurel* Squashberry

Herb

Bunchberry Goldthread Northern comandra

Bryoid

Reindeer lichen* Sphagnum mosses*

Associated Rare Plants

Northern comandra

Examples on Conservation Lands You Can Visit

• Crocker Mountain, Appalachian Trail - Franklin Co.

Tall Grass Meadow

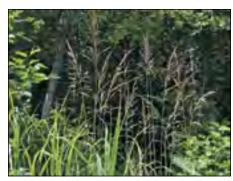
State Rank S4

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 sedges 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.

Soil and Site Characteristics

Sites occupy mineral soils in temporarily flooded rivershores or streamsides that are flat to slightly sloped. At some sites this type extends onto poorly drained uplands as grassy barrens. Soils are sandy to silty along rivers, with higher clay or organic content in other settings.



Bluejoint

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), by beaver flooding, or by fire (some Downeast grasslands).

Diagnostics

Bluejoint grass exceeds 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.

Similar Types

Sedge Meadows share many species, but have less bluejoint grass (usually <30% cover) and more tussock sedge

Location Map



Community is known from this Ecoregion
Community may occur in this Ecoregion
Balley's Ecoregion
County





Tall Grass Meadow

(>30%). Grassy 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.

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 rare 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.

Distribution

Larger rivers of far northern Maine, coastal grasslands of Downeast Maine (New England - Adirondack and Laurentian Mixed Forest Provinces),

Characteristic Plants

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

Sapling/shrub

Meadowsweet Speckled alder

Herb

Bluejoint*
Flat-topped white aster
Tall meadow-rue
Tussock sedge*

Bryoid

Sphagnum mosses

Associated Rare Plants

Blue-leaf willow

Associated Rare Animals

Short-eared owl Yellow rail

and meandering streams statewide.

Distribution outside of Maine is not clear.

Landscape Pattern: Small patch; some Downeast grasslands approaching Large Patch

Examples on Conservation Lands You Can Visit

- Allagash Public Lands Aroostook Co.
- Cutler Coast Public Lands Washington Co.
- Narraguagus Wildlife Management Area - Washington Co.
- Petit Manan Point, Petit Manan National Wildlife – Washington Co.
- St. John River Preserve Aroostook Co.

Tall Sedge Fen

State Rank S4

Community Description

Expanses of tall sedges and grasses grow on saturated 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 but does not form dense tussocks. The herb layer is often continuous, and whatever shrubs occur are usually below or mixed in with the graminoid cover, 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 varies from sparse to almost continuous, inverse to the amount of standing water.

Soil and Site Characteristics

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 is often flooded at high water. Sites are acidic to circumneutral (pH 4.8-6.8).

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.



Tall Sedge Fen

Similar Types

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

Conservation, Wildlife, and Management Considerations

This community type is well represented in Maine and is fairly stable in extent, with several examples on public lands and

Location Map



Community may occur in this Ecorogical



Tall Sedge Fen

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. The rare ringed boghaunter dragonfly, restricted to the southern part of the state in York and southern Oxford Counties, is found in this community, especially in very wet locations with peat moss often suspended in the water column. The black meadowhawk, an uncommon dragonfly of open fens and marshes, may also be found in this community. Sites in northern Maine may be inhabited by the subarctic bluet, an uncommon damselfly that inhabits open marshes and fens and reaches the southern edge of its range in northern Maine.

Distribution

Statewide. Probably extends throughout northern New England, New York, and adjacent Canada, but not well documented.

Landscape Pattern: Small to Large Patch

Characteristic Plants

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

Sapling/shrub

Meadowsweet

Dwarf Shrub

Large cranberry* Leatherleaf Sweetgale

Herb

Beaked sedge*
Bluejoint
Lake sedge*
Inflated sedge
Silvery sedge
Slender sedge*
Three-way sedge
Tusseek sedge

Tussock sedge Yellow loosestrife

Yellow loosestrite

Bryoid

Sphagnum mosses

Associated Rare Plants

Long's bulrush

Associated Rare Animals

Blanding's turtle Ribbon snake Ringed boghaunter Spotted turtle

Examples on Conservation Lands You Can Visit

- Fourth Machias Lake Public Lands Hancock Co.
- Jones Pond, Bigelow Preserve
 Franklin Co.
- Killick Pond Wildlife Management Area - York Co.
- Saco Heath Preserve York Co.

Tall Shrub Fen

State Rank S4

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 frequent, though not necessarily in high abundance. Cinnamon fern and wild calla are good indicators. The bryoid layer is mostly peat mosses and is patchy, averaging ~50% cover.

Soil and Site Characteristics

Sites occur in peat filled basin wetlands, often at the upland/peatland transition. 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-heath shrubs and often with scattered trees. Some heaths and other peatland species are present.



The substrate is peat or is transitional from peat to mineral soil.

Cinnamon Fern

Similar Types

Alder Thickets can be similar, but occur on mineral/muck soil and are not associated with peatlands. Sweetgale Fens can have similar structure and can be associated with peatlands, but they are more strongly dominated by sweetgale and heath shrubs rather than alder or other shrubs. Black Spruce Bogs and Red Maple Fens have greater tree cover, less tall shrub cover, and typically occur on deeper peat.

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

Location Map





Mountain Holly Flowers

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, an uncommon 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.

Distribution

Central Maine northward, extending west through New England and New York, and presumably north and east into Canada.

Landscape Pattern: Small Patch

Characteristic Plants

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

Canopy

Black spruce
Red maple
Sapling/shrub
Balsam fir
Highbush blueberry
Mountain holly*
Red maple
Speckled alder*
Wild-raisin

Dwarf Shrub

Labrador tea Leatherleaf Small cranberry

Herb

Cinnamon fern*
Marsh St. Johnswort
Pitcher plant
Three-leaved false Solomon's seal
Three-seeded sedge

Bryoid

Sphagnum mosses

Associated Rare Plants

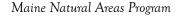
Bog bedstraw

Associated Rare Animals

Rusty blackbird

Examples on Conservation Lands You Can Visit

- Acadia National Park Hancock Co.
- Appleton Bog Preserve Knox Co.
- Great Heath Public Lands Washington Co.
- Number Five Bog Public Lands
 Somerset Co.
- Sunkhaze Meadows National Wildlife Refuge - Penobscot Co.



Appendix A: State and Global Rarity Ranks

Native plants, animals, natural communities, and ecosystems constitute the elements of natural diversity. State and global rarity ranks indicate the biological status, or relative rarity of plants, animals, natural communities, and ecosystems. Rarity ranks are based on the known number of occurrences for each element in Maine, modified by additional considerations such as the number of occurrences that are protected and the ecological fragility of the element – that is, how sensitive it is to human-caused disturbance. Each state rank begins with an 'S' to indicate state (as opposed to national or global) rank. Other states and provinces throughout North America apply these state rarity ranks similarly.

Global rarity ranks follow the same criteria as state ranks but are applied over the entire range of the element. They are preceded by 'G' rather than by 'S'. The majority of Maine's species and communities are not globally rare. Those that are globally rare should be considered especially high priorities for conservation efforts.

The state or global rarity rank is an objective reflection of an element's known distribution and abundance (in Maine or worldwide, respectively). Because continuing inventories bring new knowledge, element ranks sometimes change as our understanding of particular elements becomes more complete.

State Rarity Ranks for Maine Natural Communities

- S1 Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State.
- S2 Imperiled in Maine because of rarity (6-20 occurrences or few remaining acres) or because of other factors making it vulnerable to further decline.
- 83 Rare in Maine (on the order of 20-100 occurrences), though not, to our knowledge, imminently imperiled.
- S4 Apparently secure in Maine.
- S5 Demonstrably secure in Maine.
- SU Possibly in peril in Maine, but status uncertain; need more information.

Global Rarity Ranks for Maine Natural Communities

Global ranks have been only provisionally assigned for many natural community types, with attention focused on those types considered by NatureServe to be globally rare (Grossman et al. 1994 and the Association for Biodiversity Information 2001). Please check the MNAP web site for current global ranks of Maine's natural community types.

Appendix B:

Cross-walk of Maine Natural Communities,
Maine Ecosystems, Maine Widlife
Action Plan Habitat Groups,
NVC (International Vegetation) Associations,
and NVC (International) Ecological Systems

Cross-walk of Maine Natural Communities, Maine Ecosystems, Maine Widlife Action Plan Habitat Groups, NVC (International Vegetation) Associations, and NVC (International) Ecological Systems

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	Maine Natural Communities: 104 types	Maine Ecosystems: 24 types	Maine Wildlife Action Plan Habitat Types: 21 Types	NVC (International) Vegetation Associations: 182 types	NVC (International) Ecological Systems: 50 types
-	Acidic cliff - gorge	Rock Outcrop	Cliff Face and Rocky Outcrops (including talus)	Polypodium (virginianum, appalachianum) Cliff Sparse Vegetation	Laurentian-Acadian Acidic Cliff and Talus
	Alder floodplain	Streamshore	Rivers and Streams	Alnus incana - Cornus (amomum, sericea) / Clematis virginiana Shrubland	Laurentian-Acadian Wet Meadow-Shrub Swamp; Eastern Boreal Floodplain
	Alder shrub thicket	Streamshore	Shrub-scrub Wetland	Alnus incana Swamp Shrubland / Alnus incana ssp. rugosa - Nemopanihus mucronatus / Sphagnum spp. Shrubland	Laurentian-Acadian Wet Meadow-Shrub Swamp
_	Alpine cliff	Alpine	Alpine	Trichophorum caespitosum - Saxifraga (foliolosa, paniculata, rivularis) Herbaceous Vegetation	Acadian-Appalachian Alpine Tundra
, , ,	Aspen - birch woodland/forest complex	Spruce – Fir – Northern Hardwood Forest	Shrub / Early Successional and Regenerating Forest	Populus (fremuloides, grandidentata) - Betula (populifolia, papyrifera) Woodland	Acadian Low-Elevation Spruce-Fir-Hardwood Forest: Laurentian-Acadian Pine-Hemlock-Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest
	Atlantic white cedar bog	Unpatterned Fen (most likely) or several other peatland types	Peatlands	Chamaecyparis thyoides / Chamaedaphne calyculata Woodland	North-Central Interior and Appalachian Acidic Peatland
- ",	Atlantic white cedar swamp	Appalachian – Acadian Basin Swamp	Forested Wetland	Chamaecyparis thyoides - Picea rubens / Gaylussacia baccata / Gaultheria hispidula Forest	Northern Atlantic Coastal Plain Basin Peat Swamp
_ +	Balsam poplar floodplain forest	Streamshore	Rivers and Streams	Populus balsamífera - Fraxinus nigra / Matteuccia struthiopteris Forest	Eastern Boreal Floodplain

Cross-walk of Maine Natural Communities, Maine Ecosystems, Maine Widlife Action Plan Habitat Groups, NVC (International Vegetation) Associations, and NVC (International) Ecological Systems

NVC (International) Ecological Systems: 50 types	Northern Atlantic Coastal Plain Sandy Beach	Appalachian (Hemlock)-Northern Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest	Acadian-Appalachian Alpine Tundra	Laurentian-Acadian Acidic Cliff and Talus	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp	Acadian Near-Boreal Spruce Barrens; Northern Appalachian-Acadian Rocky Heath Outcrop
NVC (International) Vegetation Associations: 182 types	Cakile edentula ssp. edentala - Chamaesyce polygonifolia Sparse Vegetation; Cakile edentula ssp. edentula - Mertensia maritima Sparse Vegetation	Betula papyrifera / Acer saccharum - Mixed Hardwoods Forest; Acer saccharum - Pinus strobus / Acer pensylvanicum Forest; Acer saccharum - Betula alleghaniensis - Fagus grandifolia / Viburnum lantanoides Forest	Vaccinium uliginosum - Harrimanella hypnoides - Loiseleuria procumbens Dwarf-shrubland; Tricophorum caespitosum - Carex scirpoidea - Carex bigelowii Herbaceous Vegetation	Betula alleghaniensis - Quercus rubra / Polypodium virginianum Woodland; Polypodium (virginianum, appalachianum) / Lichens Nonvascular Vegetation	Populus balsamifera - Fraxinus nigra / Matteuccia struthiopteris Forest	Picea mariana / Kalmia angustifolia Woodland
Maine Wildlife Action Plan Habitat Types: 21 Types	Unconsolidated Shore	Deciduous and Mixed Forest	Alpine	Deciduous and Mixed Forest	Forested Wetland	Coniferous Forest
Maine Ecosystems: 24 types	Coastal Dune – Marsh	Spruce – Fir – Northern Hardwood Forest	Apine	Central Hardwoods Oak Forest	Appalachian – Acadian Basin Swamp	Spruce – Fir – Northern Hardwood Forest
Maine Natural Communities: 104 types	Beach strand	Beech - birch - maple forest	Bilberry - mountain- heath alpine snowbank	Birch - oak talus woodland	Black ash swamp	Black spruce woodland

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	Maine Natural Communities: 104 types	Maine Ecosystems: 24 types	Maine Wildlife Action Plan Habitat Types: 21 Types	NVC (International) Vegetation Associations: 182 types	NVC (International) Ecological Systems: 50 types
	Bluebell - balsam ragwort shoreline outcrop	Streamshore	Rivers and Streams	Andropogon gerardii - Campanula rotundifolia - Solidago simplex Herbaceous Vegetation: Campanula rotundifolia - Packera paupercula - (Aquilegia canadensis) Sparse Vegetation	Boreal Ice-Scour Rivershore; Laurentian-Acadian Floodplain Forest
	Blueberry - lichen barren	Spruce – Fir – Northern Hardwood Forest	Coniferous Forest	Vaccinium (angustifolium, myrtilloides, pallidum) - Cladina rangiferina Dwarf-shrubland	Acadian Near-Boreal Spruce Barrens
	Bluejoint meadow	Appalachian-Acadian Rivershore; Streamshore	Emergent Marsh and Wet Meadows	Calamagrostis canadensis - Phalaris arundinacea Herbaceous Vegetation; Calamagrostis canadensis - Doellingeria umbellata - Spartina pectinata Herbaceous Vegetation	Laurentian-Acadian Wet Meadow-Shrub Swamp: Boreal Ice-Scour Rivershore
l.	Bog moss lawn	Unpatterned Fen (most likely) or several other peatland ecosystem types	Peatlands	Sphagnum (rubellum, cuspidatum, torreyanum) - Vaccinium macrocarpon Nonvascular Vegetation	Boreal-Laurentian Bog; Acadian Maritime Bog
1	Boreal circumneutral open outcrop	Rock Outcrop	Dry Woodlands and Barrens	Carex scirpoidea Alkaline Cliff Sparse Vegetation	Laurentian-Acadian Calcareous Rocky Outcrop
l	Brackish tidal marsh	Tidal Marsh Estuary	Estuaries and Bays	Typha angustifolia - Hibiscus moscheutos Herbaceous Vegelation; Sagittaria subulata - Limosella australis Tidal Herbaceous Vegetation; Schoenoplectus pungens - Eleocharis parvula Herbaceous Vegetation	Acadian Estuary Marsh

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Maine Natural Communities: 104 types	Maine Ecosystems: 24 types	Maine Wildlife Action Plan Habitat Types: 21 Types	NVC (International) Vegetation Associations: 182 types	NVC (International) Ecological Systems: 50 types
Bulrush bed	Lakeshore; Coastal Plain Pond; Tidal Marsh Estuary	Emergent Marsh and Wet Meadows	Schoenoplectus (tabernaemontani, acutus) Eastern Herbaceous Vegetation	Laurentian-Acadian Freshwater Marsh
Cattail marsh	Lakeshore; Coastal Plain Pond; Tidal Marsh Estuary	Emergent Marsh and Wet Meadows	Typha (angustifolia, latifolia) - (Schoenoplectus spp.) Eastern Herbaceous Vegetation	Laurentian-Acadian Freshwater Marsh
Cedar - spruce seepage forest	Appalachian – Acadian Basin Swamp	Forested Wetland	Thuja occidentalis - (Picea rubens) / Tiarella cordifolia Forest	Acadian-Appalachian Conifer Seepage Forest
Chestnut oak woodland	Central Hardwoods Oak Forest	Dry Woodlands and Barrens	Quercus prinus - Quercus (rubra, velutina) / Vaccinium angustifolium Forest	Central Appalachian Pine-Oak Rocky Woodland
Circumneutral riverside seep	Streamshore	Rivers and Streams	Triantha glutinosa - Carex garberi Herbaceous Vegetation	Boreal Ice-Scour Rivershore
Circumneutral-alkaline water macrophyte suite	Lakeshore; Appalachian - Acadian Rivershore	Peatlands	Elodea canadensis - Potamogeton ssp. Eastern Herbaceous Vegetation [Placeholder]	Laurentian-Acadian Freshwater Marsh
Cotton-grass - heath alpine bog	Alpine	Alpine	Empetrum nigrum - Vaccinium uliginosum - Vaccinium oxycoccos / Rubus chamaemorus Dwarf-shrubland	Acadian-Appalachian Alpine Tundra
Crowberry - bayberry headland	Coastal Headlands	Rocky Coastline and Islands	Morella pensylvanica - Empetrum nigrum Dwarf- shrubland	Acadian-North Atlantic Rocky Coast
Crowberry - bilberry summit bald	Alpine	Alpine	Vaccinium uliginosum / Sibbaldiopsis tridentata Sparse Vegetation	Acadian-Appalachian Subalpine Woodland and Heath-Krummholz
Deer-hair sedge bog lawn	Coastal Plateau Bog	Peatlands	Trichophorum caespitosum - Gaylussacia dumosa / Sphagnum (fuscum, rubellum, magellanicum) Herbaceous Vegetation	Acadian Maritime Bog

	Maine Natural Communities: 104 types	Maine Ecosystems: 24 types	Maine Wildlife Action Plan Habitat Types: 21 Types	NVC (International) Vegetation Associations: 182 types	NVC (International) Ecological Systems: 50 types
	Diapensia alpine ridge	Alpine	Alpine	Diapensia lapponica Dwarf-shrubland	Acadian-Appalachian Alpine Tundra
	Dogwood - willow shoreline thicket	Streamshore	Rivers and Streams	Alnus incana - Cornus (amomum, sericea) / Clematis virginiana Shrubland	Boreal Ice-Scour Rivershore
-	Dune grassland	Coastal Dune – Marsh	Unconsolidated Shore (beaches and mudflats)	Ammophila breviligulata - Lathyrus japonicus Herbaceous Vegetation	Northern Atlantic Coastal Plain Dune and Swale
	Dwarf heath - graminoid alpine ridge	Alpine	Alpine	Vaccinium uliginosum - Diapensia lapponica Dwarf- shrub Herbaceous Vegetation; Carex bigelowii Herbaceous Vegetation; Vaccinium uliginosum - Rhododendron lapponicum / Juncus trifidus Dwarf- shrubland; Arctoparmelia centrifuga - Rhizocarpon geographicum Nonvascular Vegetation	Acadian-Appalachian Alpine Tundra
	Fir - heart-leaved birch subalpine forest	Alpine	Mountaintop Forest (including krummholz)	Abies balsamea - (Betula papyrifera var. cordifolia) Forest	Acadian-Appalachian Montane Spruce-Fir Forest
	Freshwater tidal marsh	Tidal Marsh Estuary	Emergent Marsh and Wet Meadows	Nuphar lutea ssp. advena Tidal Herbaceous Vegetation: Amaranthus cannabinus Tidal Herbaceous Vegetation: Impatiens capensis - Peltandra virginica - Polygonum arifolium - Schoenoplectus fluviatilis - Typha angustifolia Tidal Herbaceous Vegetation; Eriocaulon parkeri - Polygonum punctatum Herbaceous Vegetation	Northern Allantic Coastal Plain Fresh and Oligohaline Tidal Marsh

Maine Natural Communities: 104 types	Maine Ecosystems: 24 types	Maine Wildlife Action Plan Habitat Types: 21 Types	NVC (International) Vegetation Associations: 182 types	NVC (International) Ecological Systems: 50 types
Hardwood river terrace forest	Streamshore	Rivers and Streams	Acer saccharum - Fraxinus spp Tilia americana / Matteuccia struthiopteris - Ageratina altissima Forest; Acer saccharum / Ostrya virginiana / Brachyelytrum erectum Floodplain Forest	Laurentian-Acadian Floodplain Forest
Hardwood seepage forest	Central Hardwoods Oak Forest: Appalachian – Acadian Basin Swamp	Deciduous and Mixed Forest; Forested Wetland	Betula alleghaniensis - Acer rubrum - (Tsuga canadensis, Abies balsamea) / Osmunda cinnamomea Forest	Appalachian (Hemlock)-Northern Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest
Heath - crowberry maritime slope bog	Coastal Plateau Bog	Peatlands	Empetrum nigrum - Gaylussacia dumosa - Rubus chamaemorus / Sphagnum spp. Dwarf-shrubland	Acadian Maritime Bog
Heath - lichen subalpine slope bog	Alpine	Alpine	Kalmia angustifolia - Chamaedaphne calyculata / Rubus chamaemorus / Cladina spp. Dwarf-shrubland	Acadian-Appalachian Subalpine Woodland and Heath-Krummholz
Hemlock - hardwood pocket swamp	Coastal Plain Basin Swamp	Forested Wetland	Acer rubrum - Nyssa sylvatica - Betula alleghaniensis / Sphagnum spp. Forest, Tsuga canadensis - Betula alleghaniensis / Ilex verticillata / Sphagnum spp. Forest	Northern Appalachian-Acadian Conifer-Hardwood Acidic Swamp
Hemlock forest	White Pine – Mixed Hardwood	Conifer Forest	Tsuga canadensis - Betula alleghaniensis - Acer saccharum / Dryppleris intermedia Forest; Tsuga canadensis - (Betula alleghaniensis) - Picea rubens / Corrus canadensis Forest	Appalachian (Hemlock)-Northern Hardwood Forest; Laurentian-Acadian Pine-Hemlock-Hardwood Forest
Huckleberry - crowberry bog	Coastal Plateau Bog	Peatlands	Empetrum nigrum - Gaylussacia dumosa - Rubus chamaemorus / Sphagnum spp. Dwarf-shrubland	Acadian Maritime Bog; Huckleberry - crowberry bog

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	Maine Natural Communities: 104 types	Maine Ecosystems: 24 types	Maine Wildlife Action Plan Habitat Types: 21 Types	NVC (International) Vegetation Associations: 182 types	NVC (international) Ecological Systems: 50 types
	Hudsonia river beach	Streamshore	Rivers and Streams	Hudsonia tomentosa - Paronychia argyrocoma Dwarf-shrubland	Laurentian-Acadian Floodplain Forest
	Ironwood - oak - ash woodland	Central Hardwoods Oak Forest	Deciduous and Mixed Forest	Acer saccharum - Tilia americana - Fraxinus americana / Ostrya virginiana / Geranium robertianum Woodland	Ironwood - oak - ash woodland
	Jack pine forest	Spruce – Fir – Northern Hardwood Forest	Conifer Forest	Pinus banksiana / Vaccinium spp. / Pleurozium schreberi Forest	Boreal Jack Pine-Black Spruce Forest
000	Jack pine woodland	Rock Outcrop	Dry Woodlands and Barrens	Pinus banksiana / Kalmia angustifolia - Vaccinium spp. Woodland	Northern Appalachian-Acadian Rocky Heath Outcrop
	Labrador tea talus dwarf-shrubland	Rock Outcrop	Cliff Face and Rocky Outcrops (including talus)	Picea mariana / Ledum groenlandicum - Empetrum nigrum / Cladina spp. Dwarf-shrubland	Laurentian-Acadian Acidic Cliff and Talus
	Lakeshore sand/ cobble beach	Lakeshore	Freshwater Lakes and Ponds	Inland Freshwater Strand Beach Sparse Vegetation	Laurentian-Acadian Lakeshore Beach
	Leatherleaf boggy fen	Unpatterned Fen, Pattemed Fen, or other peatland types	Peatlands	Chamaedaphne calyculata - (Gaylussacia dumosa) - Decodon verticillatus / Woodwardia virginica Dwarf- shrubland; Chamaedaphne calyculata / Eriophorum virginicum / Sphagnum rubellum Dwarf-shrubland	Boreal-Laurentian-Acadian Acidic Basin Fen; Boreal-Laurentian Bog; North-Central Interior and Appalachian Acidic Peatland
	Little bluestem - blueberry sandplain grassland	Pine Barrens	Grassland, Agricultural, Old Field	Vaccinium angustifolium / Schizachyrium scoparium - Carex lucorum Shrub Herbaceous Vegetation	Northern Atlantic Coastal Plain Pitch Pine Barrens

Cross-walk of Maine Natural Communities, Maine Ecosystems, Maine Widlife Action Plan Habitat Groups, NVC (International Vegetation) Associations, and NVC (International) Ecological Systems

Maine Natural Communities: 104 types	Maine Ecosystems: 24 types	Maine Wildlife Action Plan Habitat Types: 21 Types	NVC (International) Vegetation Associations: 182 types	NVC (International) Ecological Systems: 50 types
Low sedge - buckbean fen lawn	Unpatterned Fen, Patterned Fen, or other peatland types	Peatlands	Carex limosa - Rhynchospora alba / Sphagnum pulchrum - Cladopodiella sp. Herbaceous Vegetation	Boreal-Laurentian-Acadian Acidic Basin Fen; Laurentian-Acadian Alkaline Fen; Boreal-Laurentian Bog
Maple - basswood - ash forest	Spruce – Fir – Northern Hardwood Forest	Deciduous and Mixed Forest	Acer saccharum - Fraxinus americana - Tilia americana / Acer spicatum / Caulophyllum thalictroides Forest	Appalachian (Hemlock)-Northern Hardwood Forest; Laurentian-Acadian Northern Hardwood Forest
Maritime spruce - fir forest	Maritime Forest	Deciduous and Mixed Forest	Picea rubens - Picea glauca Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest
Mixed graminoid - forb saltmarsh	Tidal Marsh Estuary; Coastal Dune – Marsh	Estuarine Emergent Saltmarsh	Spartina alterniflora / (Ascophyllum nodosum) Acadian/Virginian Zone Herbaceous Vegetation; Salicornia bigelovii - Triglochin maritima Herbaceous Vegetation.	Acadian Coastal Salt Marsh; Northern Atlantic Coastal Plain Tidal Salt Marsh;
Mixed graminoid - shrub marsh	Appalachain-Acadian Basin Swamp; Streamshore	Shrub-scrub Wetland	Cephalanthus occidentalis - Decadon verticillatus Shrubland; Juncus militaris - Eriocaulon aquaticum Herbaceous Vegetation; Scipus cyperinus Seasonally Flooded Herbaceous Vegetation; Calamagrostis canadensis - Scirpus spp Dulichium arundinaceum Herbaceous Vegetation	Laurentian-Acadian Wet Meadow-Shrub Swamp

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	Maine Natural Communities: 104 types	Maine Ecosystems: 24 types	Maine Wildlife Action Plan Habitat Types: 21 Types	NVC (International) Vegetation Associations: 182 types	NVC (International) Ecological Systems: 50 types
	Mixed tall sedge fen	Unpatterned Fen (most likely) or several other peatland ecosystem types	Peatlands	Carex (rostrata, utriculata) - Carex lacustris - (Carex vesicaria) Herbaceous Vegetation; Myrica gale - Chamaedaphne calyculata / Carex (lasiocarpa, utriculata) - Utricularia spp. Shrub Herbaceous Vegetation	North-Central Interior and Appalachian Acidic Peatland: Boreal-Laurentian-Acadian Acidic Basin Fen
	Mountain alder - bush- honeysuckle subalpine meadow	Alpine	Alpine	Alnus viridis ssp. crispa - Spiraea alba / Solidago macrophylla Shrubland	Acadian-Appalachian Subalpine Woodland and Heath-Krummholz
	Mountain holly - alder woodland fen	Unpatterned Fen (most likely) or several other peatland ecosystem types	Peatlands	Alnus incana ssp. rugosa - Nemopanihus mucronatus / Sphagnum spp. Shrubland; Alnus (serrulata, incana) / Osmunda cinnamomea - Sphagnum spp. Shrubland; Vaccinium corymbosum / Sphagnum spp. Shrubland	Boreal-Laurentian-Acadian Acidic Basin Fen
	Northern white cedar swamp	Appalachian – Acadian Basin Swamp	Forested Wetland	Thuja occidentalis / Sphagnum (girgensohnii, warnstorfii) Forest	Laurentian-Acadian Alkaline Conifer-Hardwood Swamp
	Northern white cedar woodland fen	Appalachian – Acadian Basin Swamp ; Unpatterned Fen	Peatlands	Thuja occidentalis - Abies balsamea / Ledum groenlandicum / Carex trisperma Woodland	Laurentian-Acadian Alkaline Fen
	Oak - pine forest	Central Hardwoods Oak Forest	Deciduous and Mixed Forest	Pinus strobus - Quercus (rubra, velutina) - Fagus grandifolia Forest; Quercus rubra - Acer rubrum - Betula spp Pinus strobus Forest	Central Appalachian Dry Oak-Pine Forest; Laurentian- Acadian Pine-Hemlock-Hardwood Forest

Maine Natural Communities: 104 types	Maine Ecosystems: 24 types	Maine Wildlife Action Plan Habitat Types: 21 Types	NVC (International) Vegetation Associations: 182 types	NVC (International) Ecological Systems: 50 types
Oak - pine woodland	Central Hardwoods Oak Forest	Deciduous and Mixed Forest	Ouercus rubra - (Ouercus prinus) / Vaccinium spp. / Deschampsia flexuosa Woodland	Central Appalachian Pine-Oak Rocky Woodland; Northern Appalachian-Acadian Rocky Heath Outcrop
Oak Hickory Forest	Central Hardwoods Oak Forest	Deciduous and Mixed Forest	Ouercus rubra - Carya (glabra, ovata) / Ostrya virginiana / Carex lucorum Forest; Ouercus (alba, rubra, velutina) / Cornus florida / Viburnum acerifolium Forest	Central Appalachian Dry Oak-Pine Forest
Pickerelweed - macrophyte aquatic bed	Lakeshore; Coastal Plain Pond; Appalachian- Acadian Rivershore; Streamshore	Emergent Marsh and Wet Meadows	Pontederia cordata - Sagittaria latifolia Herbaceous Vegetation	Laurentian-Acadian Freshwater Marsh
Pipewort - water Iobelia aquatic bed	Lakeshore	Freshwater Lakes and Ponds	Eriocaulon aquaticum - Lobelia dortmanna Herbaceous Vegetation; Eriocaulon aquaticum Sparse Vegetation	Laurentian-Acadian Lakeshore Beach; Laurentian- Acadian Freshwater Marsh
Pitch pine - heath barren	Pine Barrens	Dry Woodlands and Barrens	Pinus rigida / Vaccinium spp Gaylussacia baccata Woodland	Northeastern Interior Pine Barrens
Pitch pine - scrub oak barren	Pine Barrens	Dry Woodlands and Barrens	Pinus rigida / Quercus ilicifolia / Piptatherum pungens Woodland	Northeastern Interior Pine Barrens
Pitch pine bog	Pine Barrens	Dry Woodlands and Barrens	Pinus rigida / Chamaedaphne calyculata / Sphagnum spp. Woodland	Atlantic Coastal Plain Northern Bog

Maine Natural Communities: 104 types	Maine Ecosystems: 24 types	Maine Wildlife Action Plan Habitat Types: 21 Types	NVC (International) Vegetation Associations: 182 types	NVC (International) Ecological Systems: 50 types
Pitch pine dune woodland	Pine Barrens	Dry Woodlands and Barrens	Pinus rigida / Hudsonia tomentosa Woodland: Hudsonia tomentosa - Arctostaphylos uva-ursi Dwarf- shrubland	Northern Atlantic Coastal Plain Dune and Swale
Pitch pine woodland	Rock Outcrop	Dry Woodlands and Barrens	Pinus rigida / (Ouercus ilicifolia) / Photinia melanocarpa / Deschampsia flexuosa Woodland; Pinus rigida / Corema conradii Woodland	Northern Appalachian-Acadian Rocky Heath Outcrop: Central Appalachian Pine-Oak Rocky Woodland
Red maple - sensitive fern swamp	Appalachian – Acadian Basin Swamp	Forested Wetland	Acer rubrum / Carex stricta - Onoclea sensibilis Woodland; Picea rubens - Acer rubrum / Nemopanthus mucronatus Forest; Acer rubrum / Nemopanthus mucronatus - Vaccinium corymbosum Forest; Acer rubrum - Abies balsamea / Viburrum nudum var. cassinoides Floodplain Forest; Acer rubrum - Prunus serotina / Cornus amomum Floodplain Forest	Northern Appalachian-Acadian Conifer-Hardwood Acidic Swamp
Red maple wooded fen	Appalachian – Acadian Basin Swamp	Forested Wetland	Acer rubrum / Alnus incana - Ilex verticillata / Osmunda regalis Woodland	Northern Appalachian-Acadian Conifer-Hardwood Acidic Swamp
Red oak - northern hardwoods - white pine forest	White Pine – Mixed Hardwood	Deciduous and Mixed Forest	Ouercus rubra - Acer saccharum - Fagus grandifolia / Viburnum acerifolium Forest	Laurenlian-Acadian Pine-Hemlock-Hardwood Forest; Laurenlian-Acadian Northern Pine-(Oak) Forest
Red pine - white pine forest	Spruce – Fir – Northern Hardwood Forest	Deciduous and Mixed Forest	Pinus strobus - Pinus resinosa / Cornus canadensis Forest	Laurentian-Acadian Northern Pine-(Oak) Forest

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Red pine woodland	Rock Outcrop	Dry Woodlands and Barrens	Pinus resinosa / Gaylussacia baccata - Vaccinium angustifolium Woodland	Northern Appalachian-Acadian Rocky Heath Outcrop
Red spruce - mixed conifer woodland	Rock Outcrop	Dry Woodlands and Barrens	Pice rubens / Vaccinium angustifolium / Sibbaldiopsis tridentata Woodland	Northern Appalachian-Acadian Rocky Heath Outcrop
Rocky summit heath	Alpine	Alpine: Mountaintop Forest (including krummholz)	Picea mariana / Kalmia angustifolia Dwarf-shrubland	Acadian-Appalachian Subalpine Woodland and Heath-Krummholz
Rose - bayberry maritime shrubland	Coastal Headlands	Rocky Coastline and Islands	Morella pensylvanica - Prunus maritima Shrubland; Prunus serotina - Rhus typhina Shrubland	Acadian-North Atlantic Rocky Coast
Sand cherry - tufted hairgrass river beach	Streamshore	Rivers and Streams	Prunus pumila var. depressa / Deschampsia caespitosa Herbaceous Vegetation	Boreal Ice-Scour Rivershore
Seaside goldenrod - goosetongue open headland	Coastal Headlands	Rocky Coastline and Islands	Solidago sempervirens - (Rhodiola rosea) - Juniperus horizontalis Sparse Vegetatation	Acadian-North Atlantic Rocky Coast
Sedge - leatherleaf fen lawn	Unpatterned Fen (most likely) or several other peatland ecosystem types	Peatlands	Carex oligosperma - Carex pauciflora - Eriophorum vaginatum / Sphagnum spp. Herbaceous Vegetation; Carex (oligosperma, exilis) - Chamaedaphne calyculata Shrub Herbaceous Vegetation	North-Central Interior and Appalachian Acidic Peatland; Boreal-Laurentian-Acadian Acidic Basin Fen
Semi-rich northern hardwood forest	Spruce – Fir – Northern Hardwood Forest	Deciduous and Mixed Forest	Acer saccharum - (Fraxinus americana) / Arisaema triphyllum Forest	Appalachian (Hemlock)-Northern Hardwood Forest; Laurentian-Acadian Northern Hardwoods Forest

Maine Natural Communities: 104 types	Maine Ecosystems: 24 types	Maine Wildlife Action Plan Habitat Types: 21 Types	NVC (International) Vegetation Associations: 182 types	NVC (International) Ecological Systems: 50 types
Sheep laurel dwarf shrub bog	Unpatterned Fen (most likely) or several other peatland ecosystem types	Peatlands	Kalmia angustifolia - Chamaedaphne calyculata - (Picea mariana) / Cladina spp. Dwarf-shrubland; Rhododendron canadense - Chamaedaphne calyculata Dwarf-shrubland	Boreal-Laurentian Bog; Acadian Maritime Bog
Shrubby cinquefoil - sedge circumneutral fen	Unpatterned Fen; Patterned Fen	Peatlands	Dasiphora fruticosa ssp. floribunda / Carex lasiocarpa / Campylium stellatum Shrub Herbaceous Vegetation	Laurentian-Acadian Alkaline Fen
Silver maple floodplain forest	Streamshore	Rivers and Streams	Acer saccharinum / Onoclea sensibilis - Boehmeria cylindrica Forest	Laurentian-Acadian Floodplain Forest
Spartina saltmarsh	Coastal Dune – Marsh	Estuarine Emergent Saltmarsh	Salicornia (virginica, bigelovii, maritima) - Spartina alterniflora Herbaceous Vegetation; Spartina patens - Distichlis spicata - (Juncus gerardii) Herbaceous Vegetation; Ruppia maritima Acadian/Virginian Zone Temperate Herbaceous Vegetation	Acadian Coastal Salt Marsh; Northern Atlantic Coastal Plain Tidal Salt Marsh
Spruce - fir - birch krummholz	Spruce – Fir – Northern Hardwood Forest	Deciduous and Mixed Forest	Picea mariana - Abies balsamea / Sibbaldiopsis tridentata Shrubland	Acadian-Appalachian Subalpine Woodland and Heath-Krummholz
Spruce - fir - broom- moss forest	Spruce – Fir – Northern Hardwood Forest	Conifer Forest	Picea rubens - Abies balsamea - Betula papyrifera Forest; Picea rubens - Abies balsamea - Betula spp Acer rubrum Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest

Maine Natural Communities: 104 types	Maine Ecosystems: 24 types	Maine Wildlife Action Plan Habitat Types: 21 Types	NVC (International) Vegetation Associations: 182 types	NVC (International) Ecological Systems: 50 types
Spruce - fir - cinnamon fern forest	Spruce – Fir – Northern Hardwood Forest	Coniferous Forest	Picea rubens - Abies balsamea / Sphagnum magellanicum Forest; Picea rubens - Abies balsamea / Gaultheria hispidula / Osmunda cinnamomea / Sphagnum spp. Forest; Picea mariana - Picea rubens / Pleurozium schreberi Forest	Acadian Near-Boreal Spruce Flat; Northern Appalachian-Acadian Conifer-Hardwood Acidic Swamp
Spruce - fir - wood- sorrel - feather-moss forest	Spruce – Fir – Northern Hardwood Forest	Conifer Forest	Picea rubens - Abies balsamea / Sorbus americana Forest	Acadian-Appalachian Montane Spruce-Fir Forest
Spruce - heath barren	Spruce – Fir – Northern Hardwood Forest	Coniferous Forest	Picea mariana - Picea rubens / Rhododendron canadense / Cladina spp. Woodland	Acadian Near-Boreal Spruce Barrens
Spruce - larch wooded bog	Unpatterned Fen; Domed Bog; Eccentric Bog	Peatlands	Picea mariana / Ledum groenlandicum / Carex trisperma / Sphagnum spp. Forest; Picea mariana - (Larix laricina) / Ledum groenlandicum / Sphagnum spp. Forest; Picea mariana / Rubus chamaemorus / Sphagnum spp. Woodland; Picea mariana / (Vaccinium corymbosum, Gaylussacia baccata) / Sphagnum sp. Woodland	Boreal-Laurentian Bog; North-Central Interior and Appalachian Acidic Peatland
Spruce - northern hardwoods forest	Spruce – Fir – Northern Hardwood Forest	Deciduous and Mixed Forest	Picea rubens - Betula alleghaniensis / Dryopteris campyloptera Forest	Acadian Low-Elevation Spruce-Fir-Hardwood Forest; Acadian-Appalachian Montane Spruce-Fir Fores
Spruce talus woodland	Rock Outcrop	Cliff Face and Rocky Outcrops (including talus)	Picea rubens / Ribes glandulosum Woodland: Polypodium (virginianum, appalachianum) / Lichens Nonvascular Vegetation	Laurentian-Acadian Acidic Cliff and Talus

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3	Maine Natural Communities: 104 types	Maine Ecosystems: 24 types	Maine Wildlife Action Plan Habitat Types: 21 Types	NVC (International) Vegetation Associations: 182 types	NVC (International) Ecological Systems: 50 types
	Sweetgale mixed shrub fen	Appalachian-Acadian Basin Swamp; Streamshore	Shrub-scrub Wetland	Betula pumila / Chamaedaphne calyculata / Carex lasiocarpa Shrubland; Myrica gale - Spiraea alba - Chamaedaphne calyculata Shrubland	Laurentian-Acadian Wet Meadow-Shrub Swamp; Boreal-Laurentian-Acadian Acidic Basin Fen
	Three-toothed cinquefoil - blueberry low summit bald	Rock Outcrop	Dry Woodlands and Barrens	Vaccinium angustifolium - Sorbus americana / Sibbaldiopsis tridentata Dwarf-shrubland	Northern Appalachian-Acadian Rocky Heath Outcrop
204	Three-way sedge - goldenrod outwash plain pondshore	Lakeshore	Freshwater Lakes and Ponds	Lysimachia terrestris - Dulichium arundinaceum - Rhexia virginica Herbaceous Vegetation; Eleocharis (obtusa, flavescens) - Eriocaulon aquaticum Herbaceous Vegetation; Juncus militaris - Eriocaulon aquaticum Herbaceous Vegetation	Northern Atlantic Coastal Plain Pond
	Tussock sedge meadow	Appalachian-Acadian Basin Swamp; Streamshore	Emergent Marsh and Wet Meadows	Carex stricta - Carex vesicaria Herbaceous Vegetation	Laurentian-Acadian Wet Meadow-Shrub Swamp
	Twisted sedge cobble rivershore	Appalachian-Acadian Rivershore; Streamshore	Rivers and Streams	Carex torta - Apocynum cannabinum - Cyperus spp. Herbaceous Vegetation: Prunus pumila var. depressa / Deschampsia caespitosa Herbaceous Vegetation	Boreal Ice-Scour Rivershore
	Water-lily - macrophyte aquatic bed	Lakeshore; Coastal Plain Pond; Appalachain- Acadian Rivershore	Freshwater Lakes and Ponds	Nuphar lutea ssp. advena - Numphaea odorata Herbaceous Vegetation: Vallisneria americana - Potamogeton perfoliatus Herbaceous Vegetation	Laurentian-Acadian Freshwater Marsh

Cross-walk of Maine Natural Communities, Maine Ecosystems, Maine Widlife Action Plan Habitat Groups, NVC (International Vegetation) Associations, and NVC (International) Ecological Systems

Maine Natural Communities: 104 types	Maine Ecosystems: 24 types	Maine Wildlife Action Plan Habitat Types: 21 Types	Maine Wildlife Action NVC (International) Vegetation Associations: 182 NVC (International) Ecological Systems: 50 types Types	NVC (International) Ecological Systems: 50 types
White cedar woodland Rock Outcrop	Rock Outcrop	Cliff Face and Rocky Outcrops (including talus)	Thuja occidentalis / Gaylussacia baccata - Vaccinium angustifolium Woodland; Thuja occidentalis - Fraxinus pennsylvanica / Acer pensylvanicum Woodland	Laurentian-Acadian Calcareous Cliff and Talus
White oak - red oak forest	Central Hardwoods Oak Forest	Deciduous and Mixed Forest	Quercus (alba, rubra, velutina) / Cornus florida / Viburnum acerifolium Forest	Central Appalachian Dry Oak-Pine Forest
White pine - mixed conifer forest	Spruce – Fir – Northern Hardwood Forest	Deciduous and Mixed Forest	Pinus strobus - Tsuga canadensis - Picea rubens Forest; Pinus strobus - Tsuga canadensis Lower New England / Northern Pledmont Forest	Laurentian-Acadian Northern Pine-(Oak) Forest

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Appendix C: Plant Common and Scientific Names

Vascular plant nomenclature for scientific names follows Flora Novae Angliae (Haines 2011). Common names are drawn from common usage Flora Novae Angliae, Newcomb's Wildflower Guide (Newcomb 1977), or from a translation of the scientific name. Moss nomenclature is from the Checklist of Maine Mosses (Allen 1999); liverwort names follow Crum 1991; lichen names are drawn from Hinds and Hinds (1998), with nomenclature following Esslinger (1997). Visit the Maine Natural Areas Program website for most up-to-date information regarding rare species, http://www.maine.gov/dacf/mnap.

Common Name	Scientific Name
Acadian quillwort	Isoetes acadiensis
Alder	Alnus sp./spp.
Alderleaf buckthorn	Rhamnus alnifolia
Alkali bulrush	Bolboschoenus maritimus
Alpine azalea	Kalmia procumbens
Alpine bearberry	Arctous alpina
Alpine bilberry	Vaccinium uliginosum
Alpine bistort	Bistorta vivipara
Alpine bitter-cress	Cardamine bellidifolia
Alpine blueberry	Vaccinium boreale
Alpine cotton-grass	Trichophorum alpinum
Alpine milk-vetch	Astragalus alpinus
Alpine pondweed	Stuckenia filiformis
Alpine sweet-broom	Hedysarum alpinum
Alpine sweet-grass	Anthoxanthum monticola
Alternate-leaved dogwood	Swida alternifolia
American beech	Fagus grandifolia
American chestnut	Castanea dentata
American dunegrass	Leymus mollis
American elm	Ulmus americana
American ginseng	Panax quinquefolius

Common Name	Scientific Name
American shore-grass	Littorella uniflora
American stickseed	Hackelia deflexa
Anticosti aster	Symphyotrichum anticostense
Arctic red fescue	Festuca prolifera
Arrow-arum	Peltandra virginica
Arrow-leaved violet	Viola sagittata
Arrowwood	Viburnum dentatum var. lucidum
Aspen	Populus tremuloides or P. grandidentata
Atlantic white cedar	Chamaecyparis thyoides
Auricled twayblade	Neottia auriculata
Autumn coral-root	Corallorhiza odontorhiza
Awned hair-cap moss	Polytrichum piliferum
Baked apple-berry	Rubus chamaemorus
Balsam fir	Abies balsamea
Balsam poplar	Populus balsamifera
Balsam ragwort	Packera paupercula
Basswood	Tilia americana
Bayberry	Morella caroliniensis
Bayonet rush	Juncus militaris
Beach grass	Ammophila breviligulata
Beach heather	Hudsonia tomentosa
Beach-pea	Lathyrus japonicus
Beach plum	Prunus maritima
Beachhead iris	Iris hookeri
Beaked hazelnut	Corylus cornuta
Beaked sedge	Carex utriculata
Beaked spikerush	Eleocharis rostellata
Bearberry willow	Salix uva-ursi
Beggar-ticks	Bidens spp.
Big bluestem	Andropogon gerardii

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Common Name	Scientific Name
Bigelow's sedge	Carex bigelowii
Bigleaf pondweed	Potamogeton amplifolius
Big-leaved aster	Eurybia macrophylla
Big-toothed aspen	Populus grandidentata
Bird's-eye primrose	Primula laurentiana
Bitternut hickory	Carya cordiformis
Black ash	Fraxinus nigra
Black bulrush	Scirpus atrovirens
Black cherry	Prunus serotina
Black chokeberry	Aronia melanocarpa
Black crowberry	Empetrum nigrum
Black-grass	Juncus gerardii
Black gum	Nyssa sylvatica
Black huckleberry	Gaylussacia baccata
Black oak	Quercus velutina
Black sedge	Carex atratiformis
Black spruce	Picea mariana
Black willow	Salix nigra
Bladder campion	Silene vulgaris
Bladderwort	Utricularia sp./spp.
Blinks	Montia fontana
Bloodroot	Sanguinaria canadensis
Blue birch	Betula x caerulea
Blue cohosh	Caulophyllum thalictroides
Bluebead lily	Clintonia borealis
Bluebell	Campanula rotundifolia
Bluejoint	Calamagrostis canadensis
Blue-leaf willow	Salix myricoides
Blunt-lobed woodsia	Woodsia obtusa
Bog aster	Oclemena nemoralis

Common Name	Scientific Name
Bog bedstraw	Galium labradoricum
Bog broom-moss	Dicranum undulatum
Bog goldenrod	Solidago uliginosa
Bog hair-cap moss	Polytrichum strictum
Bog-mat liverwort	Cladopodiella fluitans
Bog rosemary	Andromeda polifolia var. glaucophylla
Bog sedge	Carex magellanica
Bog willow	Salix pedicellaris
Boneset	Eupatorium perfoliatum
Boreal bedstraw	Galium kamtschaticum
Boreal bentgrass	Agrostis mertensii
Bottlebrush grass	Elymus hystrix
Bracken fern	Pteridium aquilinum
Braun's holly fern	Polystichum braunii
Bristly gooseberry	Ribes hirtellum
Broad beech fern	Phegopteris hexagonoptera
Broad-leaved goldenrod	Solidago flexicaulis or S. macrophylla
Broom-crowberry	Corema conradii
Broom-moss	Dicranum sp./spp. or Dicranella sp./spp.
Brown-fruited rush	Juncus pelocarpus
Brownish sedge	Carex brunnescens
Buckbean	Menyanthes trifoliata
Bulblet fern	Cystopteris bulbifera
Bulrush	Bolboschoenus sp/spp. or Schoenoplectus
Bulrush sedge	Carex scirpoidea
Bunchberry	Chamaepericlymenum canadense
Bur oak	Quercus macrocarpa
Bur-reed	Sparganium sp./spp.
Bush-honeysuckle	Diervilla Ionicera
Butterfly weed	Asclepias tuberosa

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Common Name	Scientific Name
Butternut	Juglans cinerea
Butterwort	Pinguicula vulgaris
Buttonbush	Cephalanthus occidentalis
Campylium fen moss	Campylium stellatum
Canada burnet	Sanguisorba canadensis
Canada goldenrod	Solidago canadensis
Canada mayflower	Maianthemum canadense
Canada mountain-ricegrass	Piptatherum canadense
Canada rush	Juncus canadensis
Canadian tick-trefoil	Desmodium canadense
Capillary sedge	Carex capillaris
Cardinal flower	Lobelia cardinalis
Cattail	Typha sp./spp.
Cetraria lichen	Cetraria sp./spp.
Chaffy sedge	Carex paleacea
Chair-maker's rush	Schoenoplectus pungens
Chara algae	Chara sp./spp.
Chestnut oak	Quercus montana
Choke cherry	Prunus virginiana
Christmas fern	Polystichum acrostichoides
Cinnamon fern	Osmundastrum cinnamomeum
Clinton's bulrush	Tricophorum clintonii
Clothed sedge	Carex vestita
Clover	Trifolium sp./spp.
Coast sedge	Carex exilis
Coast-blite goosefoot	Chenopodium rubrum
Coltsfoot	Tussilago farfara
Columbine	Aquilegia canadensis
Comb-leaved mermaidweed	Proserpinaca pectinata
Common arrow-grass	Triglochin maritima

Common Name	Scientific Name
Common arrowhead	Sagittaria latifolia
Common blackberry	Rubus allegheniensis
Common broom-moss	Dicranum scoparium
Common cattail	Typha latifolia
Common grapefern	Botrychium virginianum
Common hairgrass	Deschampsia flexuosa
Common horsetail	Equisetum arvense
Common juniper	Juniperus communis
Common pussytoes	Antennaria howellii
Common saltwort	Salsola kali
Common speedwell	Veronica officinalis
Common St. Johnswort	Hypericum perforatum
Common waterweed	Elodea canadensis
Cotton-grass	Eriophorum sp./spp.
Cow vetch	Vicia cracca
Cranberry	Vaccinium oxycoccos or V. macrocarpon
Creeping bentgrass	Agrostis stolonifera
Creeping juniper	Juniperus horizontalis
Creeping snowberry	Gaultheria hispidula
Creeping spearwort	Ranunculus flammula
Crinkled hair-grass	Deschampsia flexuosa
Crowberry	Empetrum nigrum
Cut-leaved anemone	Anemone multifida
Cut-leaved toothwort	Cardamine concatenata
Cutler's goldenrod	Solidago leiocarpa
Deer-hair sedge	Trichophorum cespitosum
Deertongue	Dichanthelium clandestinum
Dewdrop	Rubus dalibarda
Diapensia	Diapensia lapponica
Dicranum moss	Dicranum sp./spp.

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Common Name	Scientific Name
Dioecious sedge	Carex sterilis
Dogwood	Benthamidia sp./spp. or Swida sp./spp.
Doll's eyes	Actaea pachypoda
Douglas' knotweed	Polygonum douglasii
Dry land sedge	Carex siccata
Dutchman's breeches	Dicentra cucullaria
Dwarf bilberry	Vaccinium cespitosum
Dwarf bulrush	Lipocarpha micrantha
Dwarf glasswort	Salicornia bigelovii
Dwarf huckleberry	Gaylussacia bigeloviana
Dwarf raspberry	Rubus pubescens
Dwarf rattlesnakeroot	Nabalus trifoliolatus
Early crowfoot	Ranunculus fascicularis
Early goldenrod	Solidago juncea
Eastern hemlock	Tsuga canadensis
Eastern hop-hornbeam	Ostrya virginiana
Eastern mannagrass	Glyceria septentrionalis
Eaton's bur-marigold	Bidens eatonii
Ebony sedge	Carex eburnea
Ebony spleenwort	Asplenium platyneuron
Englemann's spikerush	Eleocharis engelmannii
English sundew	Drosera anglica
Eurasian water-milfoil	Myriophyllum spicatum
Expanded bulrush	Scirpus expansus
Fall fimbry	Fimbristylis autumnalis
False nettle	Boehmeria cylindrica
False spikenard	Maianthemum racemosum
False water-pepper	Persicaria hydropiperoides
Featherfoil	Hottonia inflata
Fen sickle-moss	Drepanocladus sp./spp.

Common Name	Scientific Name
Fern-leaved false foxglove	Aureolaria pedicularia
Fern moss	Thuidium delicatulum
Few-flowered sedge	Carex pauciflora
Few-seeded sedge	Carex oligosperma
Fibrous-rooted sedge	Carex communis
Field mint	Mentha arvensis
Field pussytoes	Antennaria neglecta
Flatsedge	Cyperus sp./spp.
Flat-topped goldenrod	Euthamia graminifolia
Flat-topped white aster	Doellingeria umbellata
Flat-tufted feather-moss	Hypnum imponens
Floating pondweed	Potamogeton natans
Flowering dogwood	Benthamidia florida
Fly-away grass	Agrostis scabra
Fly honeysuckle	Lonicera canadensis
Foamflower	Tiarella cordifolia
Fowl mannagrass	Glyceria striata
Fragile fern	Cystopteris fragilis
Fragrant wood-fern	Dryopteris fragrans
Freshwater cordgrass	Spartina pectinata
Fries' pondweed	Potamogeton friesii
Fringed bromegrass	Bromus ciliatus
Fringed loosestrife	Lysimachia ciliata
Fringed Ptilidium liverwort	Ptilidium ciliare
Furbish's lousewort	Pedicularis furbishiae
Gall of the earth	Nabalus trifoliolatus
Garber's sedge	Carex garberi
Gaspé arrow-grass	Triglochin gaspensis
Giant rattlesnake-plantain	Goodyera oblongifolia
Glabrous knotted pearlwort	Sagina nodosa ssp. borealis

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Common Name	Scientific Name
Glaucous rattlesnake-root	Nabalus racemosus
Golden heather	Hudsonia ericoides
Golden pert	Gratiola aurea
Goldie's wood-fern	Dryopteris goldiana
Goldthread	Coptis trifolia
Gooseberry	Ribes sp./spp.
Goosetongue	Plantago maritima var. juncoides
Grapefern	Botrychium sp./spp.
Grass-of-parnassus	Parnassia glauca
Gray birch	Betula populifolia
Gray goldenrod	Solidago nemoralis
Green ash	Fraxinus pennsylvanica
Greene's rush	Juncus greenei
Grey reindeer-lichen	Cladina rangiferina
Grimmia rock-moss	Grimmia sp./spp.
Haircap moss	Polytrichum sp./spp.
Hairy arnica	Arnica lanceolata
Hairy goldenrod	Solidago hispida
Hairy wood brome-grass	Bromus pubescens
Hardhack	Spiraea tomentosa
Hardstem bulrush	Schoenoplectus acutus
Hay-scented fern	Dennstaedtia punctilobula
Heart-leaved paper birch	Betula cordifolia
Hemlock	Tsuga canadensis
Hemp dogbane	Apocynum cannabinum
Hepatica	Anemone americana
Herb Robert	Geranium robertianum
Hickory	Carya sp./spp.
Hidden-scale sedge	Carex cryptolepis
Highbush blueberry	Vaccinium corymbosum

Common Name	Scientific Name
Highbush cranberry	Viburnum opulus
Highland rush	Juncus trifidus
Hoary willow	Salix candida
Hobblebush	Viburnum lantanoides
Hollow joe-pye weed	Eutrochium fistulosum
Horned beak-rush	Rhynchospora capillacea
Horned bladderwort	Utricularia cornuta
Hornemann's willow-herb	Epilobium hornemannii
Huckleberry	Gaylussacia baccata or G. bigeloviana
Huron tansy	Tanacetum bipinnatum ssp. huronense
Hypnum moss	Hypnum sp./spp.
Indian cucumber-root	Medeola virginiana
Indian grass	Sorghastrum nutans
Indian pipe	Monotropa uniflora
Inflated sedge	Carex vesicaria
Inkberry	llex glabra
Intermediate sedge	Carex media
Interrupted fern	Osmunda claytoniana
Ironwood	Ostrya virginiana
Jack pine	Pinus banksiana
Jack-in-the-pulpit	Arisaema triphyllum
Japanese knotweed	Fallopia japonica
Joe-pye weed	Eutrochium sp./spp.
Jointweed	Polygonum articulatum
Juniper hair-cap moss	Polytrichum juniperinum
Kalm's lobelia	Lobelia kalmii
Labrador tea	Rhododendron groenlandicum
Lady fern	Athyrium angustum
Lake sedge	Carex lacustris
Lance-leaved draba	Draba cana

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Common Name	Scientific Name
Lapland buttercup	Coptidium lapponicum
Lapland rosebay	Rhododendron lapponicum
Larch	Larix laricina
Large cranberry	Vaccinium macrocarpon
Large hair-cap moss	Polytrichum commune
Large-leaved goldenrod	Solidago macrophylla
Large yellow pond-lily	Nuphar advena
Leatherleaf	Chamaedaphne calyculata
Lesser wintergreen	Pyrola minor
Lilaeopsis	Lilaeopsis chinensis
Little bluestem	Schizachyrium scoparium
Little-tree reindeer-lichen	Cladina arbuscula
Livid sedge	Carex livida
Long sedge	Carex folliculata
Long-stalked sedge	Carex pedunculata
Long-tubercled spikerush	Eleocharis tuberculosa
Long's bitter-cress	Cardamine longii
Long's bulrush	Scirpus longii
Low rough aster	Eurybia radula
Low spikemoss	Selaginella selaginoides
Lowbush blueberry	Vaccinium angustifolium
Mad-dog skullcap	Scutellaria lateriflora
Maidenhair fern	Adiantum pedatum
Male fern	Dryopteris filix-mas
Maleberry	Lyonia ligustrina
Map lichen	Rhizocarpon geographicum
Maple-leaved viburnum	Viburnum acerifolium
Marginal wood-fern	Dryopteris marginalis
Marsh-elder	Iva frutescens
Marsh-felwort	Lomatogonium rotatum

Common Name	Scientific Name
Marsh fern	Thelypteris palustris
Marsh muhly	Muhlenbergia glomerata
Marsh St. Johnswort	Triadenum virginicum
Marsh valerian	Valeriana uliginosa
Mayflower	Epigaea repens
Meadow beauty	Rhexia virginica
Meadowsweet	Spiraea alba
Michaux's sedge	Carex michauxiana
Missouri rockcress	Boechera missouriensis
Mistassini primrose	Primula mistassinica
Moss-plant	Harrimanella hypnoides
Mountain alder	Alnus viridis
Mountain ash	Sorbus decora or S. americana
Mountain cranberry	Vaccinium vitis-idaea
Mountain fern moss	Hylocomium splendens
Mountain firmoss	Huperzia appressa
Mountain-heath	Phyllodoce caerulea
Mountain holly	llex mucronata
Mountain laurel	Kalmia latifolia
Mountain maple	Acer spicatum
Mountain sandwort	Minuartia groenlandica
Mountain timothy	Phleum alpinum
Mountain wood fern	Dryopteris campyloptera
Mud sedge	Carex limosa
Musclewood	Carpinus caroliniana
Mylia liverwort	Mylia anomala
Nannyberry	Viburnum lentago
Nantucket shadbush	Amelanchier nantucketensis
Narrow false oats	Trisetum spicatum
Narrow-leaved cattail	Typha angustifolia

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Common Name	Scientific Name
Narrow-leaved cotton-grass	Eriophorum angustifolium
Narrow-leaved goldenrod	Euthamia caroliniana
Neglected reed grass	Calamagrostis stricta ssp. stricta
New England northern reed	Calamagrostis stricta ssp. inexpansa
New England violet	Viola novae-angliae
New Jersey tea	Ceanothus americanus
New York aster	Symphyotrichum novi-belgii
New York fern	Parathelypteris novaeboracensis
Nodding beggar ticks	Bidens cernua
Nodding pogonia	Triphora trianthophora
Northern blazing star	Liatris novae-angliae
Northern blue flag	Iris versicolor
Northern bog aster	Symphyotrichum boreale
Northern bog sedge	Carex gynocrates
Northern comandra	Geocaulon lividum
Northern dewberry	Rubus flagellaris
Northern firmoss	Huperzia selago
Northern gentian	Gentianella amarella
Northern meadow groundsel	Packera paupercula
Northern painted-cup	Castilleja septentrionalis
Northern slender pondweed	Stuckenia filiformis
Northern water-horehound	Lycopus uniflorus
Northern water-plaintain	Alisma triviale
Northern white cedar	Thuja occidentalis
Northern wood sorrel	Oxalis montana
Northern woodsia	Woodsia alpina
Nova Scotia false-foxglove	Agalinis neoscotica
Oak fern	Gymnocarpion dryopteris
Ostrich fern	Matteucia struthiopteris
Ox-eye daisy	Leucanthemum vulgare

Common Name	Scientific Name
Oysterleaf	Mertensia maritima
Painted trillium	Trillium undulatum
Pale corydalis	Capnoides sempervirens
Pale green orchis	Platanthera flava
Pale jewel-weed	Impatiens pallida
Pale laurel	Kalmia polifolia
Panic grass	Panicum sp./spp. or Dichanthelium sp./spp.
Paper birch	Betula papyrifera
Parker's pipewort	Eriocaulon parkeri
Partridgeberry	Mitchella repens
Peat moss	Sphagnum sp./spp.
Pickerelweed	Pontederia cordata
Pin cherry	Prunus pensylvanica
Pincushion moss	Leucobryum glaucum
Pinweed	Lechea intermedia
Pipewort	Eriocaulon aquaticum
Pitch pine	Pinus rigida
Pitcher plant	Sarracenia purpurea
Plantain-leaved pussytoes	Antennaria plantaginifolia
Podgrass	Scheuchzeria palustris
Poison ivy	Toxicodendron radicans
Polytrichum moss	Polytrichum sp./spp.
Pondweed	Potamogeton sp./spp.
Poverty oatgrass	Danthonia spicata
Prairie sedge	Carex prairea
Prototype quillwort	Isoetes prototypus
Pubescent sedge	Carex hirtifolia
Purple avens	Geum rivale
Purple clematis	Clematis occidentalis
Purple false-oats	Graphephorum melicoides

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Common Name	Scientific Name
Purple loosestrife	Lythrum salicaria
Purple-stemmed aster	Symphyotrichum puniceum
Pygmy water-lily	Nymphaea leibergii
Pygmyweed	Crassula aquatica
Quaking aspen	Populus tremuloides
Ram's-head lady's-slipper	Cypripedium arietinum
Rand's goldenrod	Solidago simplex var. randii
Raspberries	Rubus sp./spp.
Red elderberry	Sambucus racemosa
Red fescue	Festuca rubra
Red maple	Acer rubrum
Red oak	Quercus rubra
Red osier dogwood	Swida sericea
Red pine	Pinus resinosa
Red raspberry	Rubus idaeus
Red-root flatsedge	Cyperus erythrorhizos
Red spruce	Picea rubens
Red-stemmed moss	Pleurozium schreberi
Red-tipped willow	Salix eriocephala
Reed canarygrass	Phalaris arundinacea
Reindeer lichen	Cladina or Cladonia sp./spp.
Rhodora	Rhododendron canadense
Robbins' pondweed	Potamogeton robbinsii
Robbins' ragwort	Packera schweinitziana
Robbins' spikerush	Eleocharis robbinsii
Rock polypody	Polypodium virginianum or P. appalachianum
Rock spikemoss	Selaginella rupestris
Rock tripe lichen	Umbilicaria sp./spp.
Rock whitlow-grass	Draba arabisans
Rose	Rosa sp./spp.

Common Name	Scientific Name
Rose twisted stalk	Streptopus lanceolatus
Roseroot	Rhodiola rosea
Rough-leaved ricegrass	Oryzopsis asperifolia
Rough-stemmed goldenrod	Solidago rugosa
Round-leaved dogwood	Swida rugosa
Round-leaved pyrola	Pyrola americana
Round-leaved sundew	Drosera rotundifolia
Round-leaved violet	Viola rotundifolia
Round-lobed hepatica	Anemone americana
Royal fern	Osmunda regalis var. spectabilis
Rugosa rose	Rosa rugosa
Russett sedge	Carex saxatilis
Rusty cliff fern	Woodsia ilvensis
Salt-loving spikerush	Eleocharis uniglumis
Saltmarsh bulrush	Bolboschoenus robustus
Saltmarsh false-foxglove	Agalinis maritima
Saltmarsh sedge	Carex vacillans
Saltmeadow cordgrass	Spartina patens
Sand cherry	Prunus pumila
Sandbar willow	Salix exigua var. interior
Sarsparilla	Aralia nudicaulis
Sassafras	Sassafras albidum
Scarlet oak	Quercus coccinea
Screwstem	Bartonia paniculata
Scrub oak	Quercus ilicifolia
Sea-beach angelica	Angelica lucida
Sea-beach sandwort	Honckenya peploides
Sea-kale	Cakile edentula
Sea lavender	Limonium carolinianum
Sea milkwort	Lysimachia maritima

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Common Name	Scientific Name
Seashore saltgrass	Distichlis spicata
Seaside goldenrod	Solidago sempervirens
Sensitive fern	Onoclea sensibilis
Shadbush	Amelanchier sp./spp.
Shagbark hickory	Carya ovata
Sharp-pointed ricegrass	Piptatherum pungens
Sheep fescue	Festuca ovina
Sheep laurel	Kalmia angustifolia
Shining clubmoss	Huperzia lucidula
Shining willow	Salix lucida
Shore quillwort	Isoetes riparia
Showy lady's-slipper	Cypripedium reginae
Shrubby cinquefoil	Dasiphora floribunda
Silver maple	Acer saccharinum
Silverling	Paronychia argyrocoma
Silverrod	Solidago bicolor
Silverweed	Argentina anserina
Silvery sedge	Carex canescens
Silvery spleenwort	Deparia acrostichoides
Skunk cabbage	Symplocarpus foetidus
Slender blue flag	Iris prismatica
Slender cliffbrake	Cryptogramma stelleri
Slender-leaved sundew	Drosera linearis
Slender sedge	Carex lasiocarpa
Slender water-milfoil	Myriophyllum alterniflorum
Small cranberry	Vaccinium oxycoccos
Small enchanter's nightshade	Circaea canadensis ssp. canadensis
Small purple bladderwort	Utricularia resupinata
Small round-leaved orchis	Amerorchis rotundifolia
Small saltmarsh aster	Symphyotrichum subulatum

Common Name	Scientific Name
Small St. Johnswort	Triadenum fraseri
Small yellow water crowfoot	Ranunculus gmelinii
Smartweeds	Persicaria spp.
Smooth alder	Alnus serrulata
Smooth cordgrass	Spartina alterniflora
Smooth rockcress	Boechera laevigata
Smooth rose	Rosa blanda
Smooth sandwort	Minuartia glabra
Smooth shadbush	Amelanchier laevis
Smooth winterberry (holly)	llex laevigata
Smooth woodsia	Woodsia glabella
Soft-leaf muhly	Muhlenbergia richarsdonis
Softstem bulrush	Schoenoplectus tabernaemontanii
Sparse-flowered sedge	Carex tenuiflora
Spatulate-leaved sundew	Drosera intermedia
Spearscale	Atriplex patula
Speckled alder	Alnus incana
Sphagnum moss	Sphagnum sp./spp.
Spicebush	Lindera benzoin
Spikenard	Aralia racemosa
Spikerush	Eleocharis sp./spp.
Spinulose wood fern	Dryopteris carthusiana
Spongy arrowhead	Sagittaria montevidensis var. spongiosa
Spotted bladderwort	Utricularia purpurea
Spotted joe-pye weed	Eutrochium maculatum
Spotted pondweed	Potamogeton pulcher
Spotted touch-me-not	Impatiens capensis
Spring beauty	Claytonia caroliniana
Squashberry	Viburnum edule
Squirrel-corn	Dicentra canadensis

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Common Name	Scientific Name
St. John oxytrope	Oxytropis campestris var. johannensis
St. Johnswort	Hypericum sp./spp.
Star saxifrage	Micranthes foliolosa
Starflower	Lysimachia borealis
Stair-step moss	Hylocomium splendens
Sticky false asphodel	Triantha glutinosa
Stiff arrowhead	Sagittaria rigida
Stiff aster	Ionactis linariifolia
Stiff clubmoss	Spinulum annotinum
Straight-leaved pondweed	Potamogeton strictifolius
Striped maple	Acer pensylvanicum
Sugar maple	Acer saccharum
Summer grape	Vitis aestivalis
Sundew	Drosera sp./spp.
Swamp birch	Betula pumila
Swamp buttercup	Ranunculus hispidus
Swamp candles	Lysimachia terrestris
Swamp dewberry	Rubus hispidus
Swamp fly honeysuckle	Lonicera oblongifolia
Swamp milkweed	Asclepias incarnata
Swamp saxifrage	Micranthes pensylvanica
Swamp white oak	Quercus bicolor
Swarthy sedge	Carex adusta
Sweet-coltsfoot	Petasites frigidus
Sweet pepper-bush	Clethra alnifolia
Sweetfern	Comptonia peregrina
Sweetflag	Acorus americanus
Sweetgale	Myrica gale
Sweetgrass	Anthoxanthum nitens
Switchgrass	Panicum virgatum

Common Name	Scientific Name
Tall beak-rush	Rhynchospora macrostachya
Tall goldenrod	Solidago altissima
Tall meadow-rue	Thalictrum pubescens
Tall white violet	Viola canadensis
Tamarack	Larix laricina
Tapegrass	Vallisneria americana
Tawny cotton-grass	Eriophorum virginicum
Thicket shadbush	Amelanchier spicata
Three-leaved false Solomon's seal	Maianthemum trifolium
Three-lobed bazzania	Bazzania trilobata
Three-seeded sedge	Carex trisperma
Three-square	Schoenoplectus punguns
Three-toothed cinquefoil	Sibbaldiopsis tridentata
Three-way sedge	Dulichium arundinaceum
Tidal arrowhead	Sagittaria montevidensis ssp. spongiosa
Trout lily	Erythronium americanum
Tufted cotton-grass	Eriophorum vaginatum ssp. spissum
Tufted hairgrass	Deschampsia cespitosa
Tufted reindeer-lichen	Cladina stellaris
Tundra dwarf birch	Betula glandulosa
Tussock sedge	Carex stricta
Twinflower	Linnaea borealis
Unicorn root	Aletris farinosa
Upright bindweed	Calystegia spithamea
Variable sedge	Carex polymorpha
Variable water-milfoil	Myriophyllum heterophyllum
Vasey's pondweed	Potamogeton vaseyi
Velvet-leaf blueberry	Vaccinium myrtilloides
Venus' looking-glass	Triodanis perfoliata
Violet	Viola sp./spp.

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Common Name	Scientific Name
Virgin's bower	Clematis virginiana
Virginia chain fern	Woodwardia virginica
Virginia rose	Rosa virginiana
Virginia wild rye	Elymus virginicus
Water bulrush	Schoenoplectus subterminalis
Water hemlock	Cicuta maculata
Water-lily	Nuphar variegata or Nymphaea sp./spp.
Water lobelia	Lobelia dortmanna
Water-marigold	Bidens beckii
Water-parsnip	Sium suave
Water-pimpernel	Samolus valerandi ssp. parviflorus
Water-shield	Brasenia schreberi
Water stargrass	Heterantha dubia
Wavy broom-moss	Dicranum polysetum
White adder's-mouth	Malaxis monophyllos
White ash	Fraxinus americana
White beak-rush	Rhynchospora alba
White bluegrass	Poa glauca
White oak	Quercus alba
White pine	Pinus strobus
White sea-blite	Suaeda maritima
White spruce	Picea glauca
White-topped aster	Sericocarpus asteroides
White turtlehead	Chelone glabra
White water crowfoot	Ranunculus aquatilis
White water-lily	Nymphaea odorata
White wood aster	Eurybia divaricata
Whorled aster	Oclemena acuminata
Whorled loosestrife	Lysimachia quadrifolia
Wide-leaved sedge	Carex platyphylla

Common Name	Scientific Name
Wiegand's sedge	Carex wiegandii
Wild calla	Calla palustris
Wild chess	Bromus kalmii
Wild chive	Allium schoenoprasum
Wild garlic	Allium canadense
Wild ginger	Asarum canadense
Wild indigo	Baptisia tinctoria
Wild leek	Allium tricoccum
Wild-licorice	Galium lanceolatum
Wild lupine	Lupinus perennis
Wild-oats	Uvularia sessilifolia
Wild raisin	Viburnum nudum var. cassinoides
Wild rice	Zizania aquatica or Z. palustris
Wild sarsaparilla	Aralia nudicaulis
Wild strawberry	Fragaria virginiana
Willow	Salix sp./spp.
Winterberry (holly)	llex verticillata
Wintergreen	Gaultheria procumbens
Wire rush	Juncus balticus ssp. littoralis
Witch grass	Elymus repens
Witch-hazel	Hamamelis virginiana
Witherod	Viburnum nudum var. cassinoides
Wood fern	Dryopteris sp./spp.
Wood lily	Lilium philadelphicum
Wood-nettle	Laportea canadensis
Wood-sorrel	Oxalis montana
Woodland horsetail	Equisetum sylvaticum
Woodland reindeer-lichen	Cladina sylvatica
Woodland sedge	Carex lucorum
Wool-grass	Scirpus cyperinus

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Common Name	Scientific Name
Wooly panic-grass	Dichanthelium acuminatum
Xanthoria lichen	Xanthoria sp./spp.
Yarrow	Achillaea millefolium
Yellow birch	Betula alleghaniensis
Yellow lady's-slipper	Cypripedium parviflorum or C. pubescens
Yellow loosestrife	Lysimachia terrestris
Yellow sedge	Carex flava
Yellow violet	Viola pubescens
Yellow water-lily	Nuphar variegata
Zig-zag goldenrod	Solidago flexicaulis

Appendix D: Animal Common and Scientific Names

This list includes rare animals that do or have occurred in Maine. For more information regarding animal rarity ranks and state protection status (Endangered, Threatened, or Special Concern), please contact the Maine Department of Inland Fisheries and Wildlife, http://www.maine.gov/ifw.

Common Name	Scientific Name
A moth	Nepytia pellucidaria
A noctuid moth	Chaetaglaea cerata
American coot	Fulica americana
American oystercatcher	Haematopus palliatus
American pipit	Anthus rubescens
Aureolaria seed borer	Rhodoecia aurantiago
Bald eagle	Haliaeetus leucocephalus
Barrens chaetaglaea	Chaetaglaea tremula
Barrens itame	Speranza exonerata
Bicknell's thrush	Catharus bicknelli
Big bluet	Enallagma durum
Black-crowned night-heron	Nycticorax nycticorax
Black meadowhawk	Sympetrum danae
Black tern	Chlidonias niger
Blanding's turtle	Emydoidea blandingii
Blue-winged warbler	Vermivora pinus
Bog elfin	Callophrys lanoraieensis
Bog fritillary	Boloria eunomia
Broad sallow	Xylotype capax
Chestnut clearwing moth	Synanthedon castaneae
Citrine forktail	Ischnura hastata
Clayton's copper	Lycaena dorcas claytoni

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Common Name	Scientific Name
Cobblestone tiger beetle	Cicindela marginipennis
Cobweb skipper	Hesperia metea
Comet darner	Anax longipes
Common moorhen	Gallinula chloropus
Common tern	Sterna hirundo
Crowberry blue	Plebejus idas empetri
Delicate emerald	Somatochlora franklini
Early hairstreak	Erora laeta
Eastern buckmoth	Hemileuca maia maia
Edwards' hairstreak	Satyrium edwardsii
Frigga fritillary	Boloria frigga
Golden eagle	Aquila chrysaetos
Graceful clearwing	Hemaris gracilis
Grasshopper sparrow	Ammodramus savannarum
Hemlock woolly adelgid	Adelges tsugae
Hessel's hairstreak	Callophrys hesseli
Incurvate emerald	Somatochlora incurvata
Juniper hairstreak	Callophrys gryneus
Katahdin arctic	Oeneis polixenes katahdin
Laughing gull	Larus atricilla
Least bittern	Ixobrychus exilis
Least tern	Sternula antillarum
Lilypad forktail	Ischnura kellicotti
Little bluet	Enallagma minusculum
New England bluet	Enallagma laterale
New England silt snail	Floridobia winkleyi
Northern black racer	Coluber constrictor constrictor
Northern bog lemming	Synaptomys borealis
Oblique zale	Zale obliqua
Olive-sided flycatcher	Contopus cooperi

Common Name	Scientific Name
Pine barrens bluet	Enallagma recurvatum
Bold-based zale moth	Zale lunifera
Pine barrens zanclognatha	Zanclognatha martha
Pine devil moth	Citheronia sepulcralis
Pine pinion	Lithophane lepida lepida
Southern pine sphinx	Lapara coniferarum
Pink sallow	Psectraglaea carnosa
Piping plover	Charadrius melodus
Purple lesser fritillary	Boloria chariclea grandis
Quebec emerald	Somatochlora brevicincta
Red-winged sallow	Xystopeplus rufago
Eastern ribbon snake	Thamnophis sauritus
Ringed boghaunter	Williamsonia lintneri
Rock vole	Microtus chrotorrhinus
Roseate tern	Sterna dougallii
Rusty blackbird	Euphagus carolinus
Saltmarsh sparrow	Ammodramus caudacutus
Scarlet bluet	Enallagma pictum
Sedge darner	Aeshna juncea
Sedge wren	Cistothorus platensis
Short-eared owl	Asio flammeus
Similar underwing	Catocala similis
Sleepy duskywing	Erynnis brizo
Spartina borer moth	Spartiniphaga inops
Spatterdock darner	Rhionaeschna mutata
Spicebush swallowtail	Papilio troilus
Spotted turtle	Clemmys guttata
Northern spring salamander	Gyrinophilus porphyriticus porphyriticus
Subarctic bluet	Coenagrion interrogatum
Thaxter's pinion moth	Lithophane thaxteri

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Common Name	Scientific Name	
Tomah mayfly	Siphlonisca aerodromia	
Turquoise bluet	Enallagma divagans	
Twilight moth	Lycia rachelae	
Upland sandpiper	Bartramia longicauda	
Western pine elfin	Callophrys eryphon	
Whimbrel	Numenius phaeopus	
Whip-poor-will	Antrostomus vociferus	
White Mountain tiger beetle	Cicindela ancocisconensis	
Wood turtle	Glyptemys insculpta	
Yellow rail	Coturnicops noveboracensis	
Zigzag darner	Aeshna sitchensis	

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Appendix E: Quantitative Analysis Methods

Quantitative analyses were used as the first approach to evaluating the proposed types, and those analyses were supplemented with qualitative information. The detailed field survey data used for the quantitative analyses came from five major sources:

- MNAP natural community surveys in various regions of the state from 1991 - 1999 (170 samples);
- MNAP Ecological Reserves Inventory data from 1995 1997 (330 samples);
- MNAP Acadia National Park vegetation mapping data from 1997 - 1999 (169 samples);
- Peatland data contributed by Dr. Ronald Davis and Dennis Anderson at the University of Maine at Orono (UMO) (441 samples); and
- Alpine data collected and analyzed by Daniel D. Sperduto and Dr. Charles V. Cogbill for the New Hampshire Natural Heritage Inventory (36 samples; Sperduto and Cogbill 1999).

The 705 quantitative vegetation samples, not including the UMO peatland data, were analyzed to help delineate the community types and discern characteristics that make each type unique. The peatland data had already been analyzed and classified (Anderson and Davis 1997, Gawler 1998), and these data were combined with MNAP data on peatland vegetation types for more complete type descriptions.

Once the derivative data sets were assembled and checked, samples-by-species matrices of cover values were analyzed with PC-ORD ordination software (McCune and Mefford 1999). The techniques included ordinations via Detrended Correspondence Analysis (DCA), classifications via Two-way Indicator Species Analyses (TWINSPAN), identification of groups via Multi-Response Permutation Procedures (MRPP), and Indicator Species Analysis. With a project of this scope, where even a fairly large data set does not adequately cover the range of plant community variation across the state, multiple techniques are combined to identify vegetation types. Ordination and classification results are used to identify important gradients or factors in the data, which are then used to develop diagnostics for different vegetation types. Once types have thus been refined, MRPP and Indicator Species Analysis are used, respectively, to look for differences among vegetation types and indicator species for particular types.

The quantitative analyses were supplemented with qualitative information from MNAP files. Hundreds of field forms with notes describing specific examples of natural communities in Maine, as well as journal articles and reports in the primary scientific literature, were reviewed as supplementary materials for the community type delineation.

Appendix F: Glossary

Anastamosing: forming connecting channels.

Barren: a community or ecosystem with irregular tree cover that can range from nearly closed-canopy in some areas to sparse in others. Barrens typically occur on relatively flat sandy or gravelly glacial outwash or till soils. Barrens are prone to fire (given the excessively well-drained soils and predominance of conifers in the canopy), and the time since fire and fire intensity are important determinants in the structure and composition of a particular barren. Most barrens in Maine are pine or spruce dominated.

Brackish: estuary portions with both freshwater and saltwater influences, with salinity intermediate between those extremes.

Broom-mosses: mosses in the genera *Dicranum* and *Dicranella*, which grow in small or large tufts on the forest floor (upright growth form) and whose leaves often appear swept in one direction (hence the name). The growth form is very different from that of feather-mosses (see definition).

Bryoid: the ground layer of mosses, liverworts, and lichens. Those on trees are not included.

Bryophyte: mosses and liverworts; these are non-flowering and non-vascular plants that can be important components of the ground-level flora.

Calciphilic: literally, 'calcium-loving', a plant that tends to grow in areas of comparatively high calcium content (often high in pH), which are uncommon in Maine.

Canopy: the uppermost layer of a forest or woodland, with trees >10 cm dbh. This includes trees emerging above the canopy (often called 'supercanopy' trees); in some vegetation types, certain species will be characteristic as scattered supercanopy trees. It also may include trees that are shorter than the main canopy layer but are still > 10 cm dbh.

Caribou moss: see reindeer lichen.

Circumneutral: having a pH of around 7 (neutral). Usually circumneutral refers to pH 5.5 – 7.5 (higher values rarely seen in Maine ecosystems).

Cirque: a steep-sided rounded basin left in a mountainside after glacial activity. The Chimney Pond basin (South Basin) on Katahdin is Maine's best-known cirque.

Co-dominant: two species that share dominance of a particular layer.

Coniferous, Deciduous, Mixed: describes the proportion of conifers to deciduous tree cover in the canopy. The cutoff used here and in the National Vegetation Classification System (NVC) (Grossman et al. 1998) is 25%. Using this convention, if a forest has 0 - 25% deciduous tree cover it is classed as coniferous, and vice versa, and if both conifers and deciduous trees contribute 26 - 74% of the canopy, the types is mixed. It is important to note, however, that this should be taken as a fairly general indicator rather than a precise percentage.

Cover: the percentage of the ground that would be covered by a vertical projection of a given layer, group of plants, or plant species. Cover can be visually estimated with enough accuracy for this classification system to work. Canopy cover of each tree species can be estimated visually, but may also be determined by using basal area as a surrogate if tree measurements are being collected. The proportional basal area of each species is taken as that species' canopy proportion, and if the total canopy cover is noted then the cover for each species is easily derived.

DBH: diameter at breast height; the diameter of a tree at 4.5 off the ground.

Dominant: a species that is the most abundant, or nearly so, in its layer.

Emergent: coming out of; referring to aquatic plants whose leaves grow mainly above the water, not floating or submerged. Pickerelweed is an emergent plant.

Ericaceous/Ericad: shrubs of the family Ericaceae, or heath family, which are an ecologically important group that includes blueberry, cranberry, sheep laurel, and many bog shrubs. Some are evergreen and others deciduous.

Estuary: the lower portion of a river that mixes with salt water.

Feather-mosses: a group of mosses from several genera that creep laterally over the forest floor (spreading growth form), often covering relatively large areas, with leaves that resemble small feathers. Common species include red-stemmed moss, stair-step moss, hypnum moss, and fern moss. Feather-mosses have a different growth form than broom-mosses.

Forb: a non-woody plant that is not a graminoid (see that definition). Most plants that are commonly called 'wildflowers' are forbs.

Glaciofluvial: pertaining to streams fed by melting glaciers, or the deposits and landforms produced by such streams.

Graminoid: grass-like in growth form, referring collectively to grasses (family *Poaceae*), sedges (family *Cyperaceae*), and rushes (family *Juncaceae*).

Heath shrub: see 'Ericaceous' above.

Herb: the ground layer of vascular plants, including all herbaceous plants plus any dwarf shrubs (those that typically grow less than 1 m tall and often < 0.5 m tall). The herb layer may have both an herbaceous component and a woody component.

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Hydric: characterized by considerable moisture.

Hydromorphic: a plant specially adapted to live in water. Hydromorphic characteristics include presence of large internal air spaces, lack of support tissue (since the water supports the plant), and ability to float on top of the water or be suspended in the water column.

Krummholz: stunted trees, typically at high altitudes (above treeline).

Lepidoptera: order of insects including moths and butterflies

Lichen: non-vascular plants consisting of a symbiotic relationship of algae and fungus. Occurs in three growth forms-fruticose (upright), foliose (leafy), and crustose (thin crusts).

Liverwort: small non-vascular plants related to mosses, but differing from them in certain structural and reproductive characteristics. See 'bryophyte' and 'bryoid' above. The most commonly seen liverwort in Maine forests is three-lobed bazzania, whose tiny leaves split into three teeth at the end, easily seen with a hand-lens.

Matrix forming: natural communities that are dominant in the landscape and are of a large landscape scale, covering hundreds to thousands of acres.

Microsite (microhabitat): small areas within a community that differ in some character (e.g., exposure, soil) and may have slightly different flora.

Minerotropic: wetlands (typically peatlands) that receive all or most of their nutrients from contact with surface or ground water sources.

Morainal: pertaining to boulders, stones, and other debris carried and deposited by a glacier.

Muskeg: general term for peatbog or peatland

Ombrotrophic: wetlands (typically peatlands) that receive all or most of their water and nutrients from precipitation.

Outwash: gravelly to sandy deposits that were carried in glacial meltwater and left behind after the glaciers receded. Outwash includes steep-sided eskers as well as more flat outwash plains and deltas.

Palustrine: of or pertaining to non-tidal wetlands.

Peatland: a wetland that develops where water drainage is blocked, precipitation is retained, and decomposition of organic matter is slow. Peatlands include bogs and fens and are typically characterized by accumulations of peat (*Sphagnum*) moss.

Podzolic: refers to soils that develop in temperate to cold moist climates under conifer or heath vegetation.

Reindeer lichen (reindeer moss): a group of lichen species in the genera *Cladina* and *Cladonia* that are like miniature shrubs or loose cushions in their growth form and often cover extensive areas. Though commonly called reindeer mosses, they are not mosses. Also known as 'caribou moss' or 'caribou lichens'.

Relative cover: the proportion of a layer's cover that is composed of a certain species or group of plants. If the herb layer has 40% total cover, made up of 30% lowbush blueberry and 10% woodland sedge, the relative cover of shrubs in the herb layer is 75%.

Saturated: constantly filled with water, referring to poorly drained soils that are always wet. As the term is used here, it excludes soils that are seasonally flooded.

Sedge: a large family of plants (*Cyperaceae*) related to grasses, with narrow, grass-like leaves.

Senesce: to reach maturity and grow old

Serotinous: cones that remain closed until they are released by heat or fire.

Shrub: woody plants > 1 m but < 3 m tall. Note that the cutoff for shrubs vs. dwarf shrubs is about 1 m but is not intended to be constrained to that exactly. Dwarf shrubs are those that mostly grow under 1 m tall at the particular site, even though some individuals may be somewhat over.

Sphagnum mosses: also known as peat mosses, species in the genus Sphagnum. This is a tremendously important group of mosses, both ecologically and economically, forming the substrate of most peatlands in Maine. Peat mosses differ from other mosses in their growth form (among other characters), with upright stems bearing groups (fascicles) of leaves spaced along them. At the top of the stem, the fascicles form a dense mass called a capitulum, which can look like a button, a star, or something in between, depending on the species. Sphagnum leaves have special cells that hold large amounts of water, making a Sphagnum carpet much like a sponge.

Strata: the vertical arrangement of layers of plants within a community. The strata are defined for this classification as canopy, sub-canopy, shrub, and herb.

Subcanopy: trees > 3 m tall but < 10 cm dbh.

Succession: the natural changes in species composition within a community over time.

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Talus: large blocks of rock that have come loose from a hillside or cliff and accumulate as a talus slope.

Xeric: of, characterized by, or adapted to an extremely dry conditions.

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Maine is a special place. Those who have walked its woods, paddled its waters, or hiked its mountains know there are few places on earth with such vast forests, pristine wetlands, rugged mountains, and majestic coastal headlands all within a day's drive.

This book breaks Maine's unique landscape down in to smaller pieces – 'natural communities' and 'ecosystems' – and assigns names to those pieces based on where they fit in the landscape and on their attendant trees, shrubs, wildflowers, and wildlife species. Through the use of brief descriptions, distribution maps, color pictures, and a diagnostic key, this book serves as an indispensible tool for landowners, conservationists, foresters, and others to recognize, understand, and conserve Maine's special places.

Susan Gawler, Ph. D., was as Regional Vegetation Ecologist for NatureServe and an Ecologist with the Maine Natural Areas Program. Though we lost Sue in 2015 to ALS, her work and spirit live on, and she remains an inspiration to us all. Andrew Cutko is currently the Director of Science at The Nature Conservancy in Maine; previously he was an Ecologist with the Maine Natural Areas Program and Director of the Forest Program for NatureServe. Sue and Andy have had the good fortune of spending many years investigating the woodlands and wetlands of Maine.





