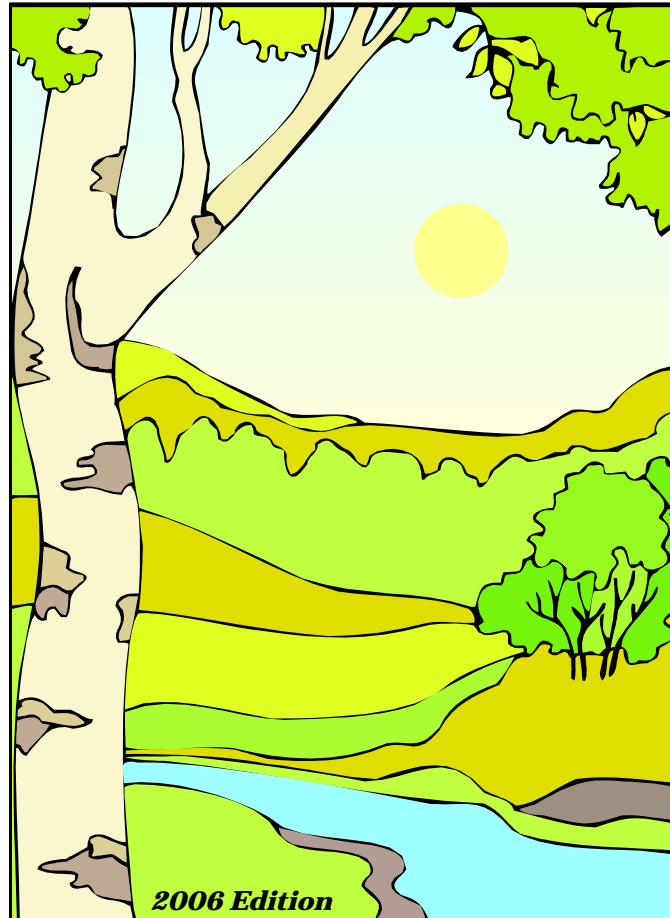


# A Guide to the Natural Communities of Massachusetts



Manomet Center for Conservation Sciences  
Regional Conservation Planning Program  
P.O. Box 1077  
Manomet, MA 02345

[www.manomet.org](http://www.manomet.org)  
[www.conservationmapper.org](http://www.conservationmapper.org)

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## ABOUT THIS DOCUMENT

This guide builds upon a variety of efforts to classify and identify the natural communities of Massachusetts. Foremost is the Massachusetts Natural Heritage and Endangered Species Program's (MNHESP) draft *Classification of the Natural Communities of Massachusetts* (Swain and Kearsley 2001), the standard work for the Commonwealth. Although this classification offers extensive information on the State's 105 described natural communities, it provides no keys to assist in their identification. In 2002, Manomet Center for Conservation Sciences (Manomet) developed a natural communities guide to Southeastern Massachusetts based on the MNHESP's classification. This guide contained a series of flow charts, dichotomous keys, and brief descriptions of natural communities. Recognizing the value of this tool, and the need for a similar one for the entire State, Manomet began expanding its guide to include communities beyond those in Southeastern Massachusetts. In 2004, Manomet was awarded a 3-year grant from the Massachusetts Environmental Trust to expand the guide to include all of Massachusetts, and to offer a series of Natural Community Identification Workshops. In 2004, Manomet's initial guide was expanded to include all of eastern Massachusetts, and in 2005 the guide was again expanded to include all of Massachusetts. This edition contains minor corrections and additions to the 2005 edition..

## ACKNOWLEDGEMENTS

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This guide builds upon the work of others. We thank the MNHESP, especially Pat Swain and Jennifer Kearsley, for developing the State's natural communities classification system. We also wish to thank Pat for encouraging development of this guide, and patiently responding to our numerous e-mails and phone calls about the intricacies of natural communities. We also thank Kasey Rolih, of the University of Massachusetts, for providing insight into the separation of rock summit and outcrop, and cliff communities. We thank Tom O'Shea and John Scanlon of MassWildlife for providing information on Decision Rules used to classify vegetation on Wildlife Management Areas. Thanks also to those who field-tested the original version of this guide: Michele Simoneaux, Katie Konchar, Matt Mariola, Derek Martin, and Rachel Neugarten. Michele Simoneaux, Jennie Robbins, Eve Vidito and Beth Brazil all read and commented on earlier versions of this guide. We would also like to thank all those who participated in our workshops; responding to their questions and comments helped improve this guide. Finally, we wish to thank all those who use this guide to gather and share information on Massachusetts' natural communities, the State is better because of your efforts.

## RECOMMENDED CITATION

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## INTRODUCTION

A natural community is a distinct grouping of plant species that occur together in recurring patterns. They are distinguished by the three following characteristics (Sperduto and Nichols 2004):

1. definite plant species composition;
2. consistent physical structure (e.g., grassland, shrubland, forest); and
3. specific physical conditions (e.g., nutrients, climate).

Typically, natural communities are classified, described, and named on the basis of their dominant or characteristic vegetation.

There are a number of compelling reasons why natural communities should be identified and recorded. These include facilitating communication, identifying the distribution of organisms, informing local conservation planning, and conserving biological diversity. Ecologists, land managers, and others may communicate effectively and reach sound management decisions regarding ecological systems if they are using common terminology (Sperduto and Crowley 2001.) A standard natural community classification system provides such terminology. Because plants and animals may be associated with specific natural communities, information on the distribution of natural communities helps identify the likely distribution of plants and animals, both rare and common. Such distributional information helps inform conservation planning decisions. In Massachusetts, municipal Open Space and Recreation Plans must include a “General inventory” that mentions “important plants and plant communities that characterize the area” (Division of Conservation Services 2001.) A review of Open Space and Recreation Plans (Cavanagh and Simoneaux 2003) revealed that although 94% of plans stated that they contained natural community information, only 3% used the State classification system (i.e., Swain and Kearsley 2001.) Because of this, information could not be compared among towns, prohibiting a regional approach to conservation. Such problems impede the conservation of Massachusetts’ biological diversity.

Conservation efforts in Massachusetts have typically focused on protecting populations of a target species or protecting hunting and fishing areas (Barbour et al. 1998). Although this approach contributes to biodiversity protection, it does not fully protect a “suite of plants and animals and the natural processes that maintain their habitats” (Barbour et al. 1998:26). The holistic protection of biodiversity requires the protection of examples of “...viable natural communities, especially functional assemblages of communities, that retain their full complement of native plants and animals.” By protecting natural communities we preserve those species of which we are already aware, as well as protect biodiversity that we know nothing about.

Preserving Massachusetts’ biodiversity requires protecting multiple viable examples of *all* natural community types. Such an approach “will require a coordinated and focused strategy involving all public and private conservation entities that are working to acquire land...” (Barbour et al. 1998:75). Although the most common of Massachusetts’ natural communities are already represented in protected lands, “the great majority of threatened and uncommon natural

community types are not sufficiently protected.” True biodiversity conservation requires that high-quality examples of these natural community types be protected, especially those that are threatened or presently under-protected in conservation lands. Documenting and conserving natural communities on private lands is also important, as 74% of all rare species and natural community occurrences in Massachusetts have been documented on private land (Barbour et al. 1998). Effective conservation of Massachusetts’ biodiversity requires knowledge of the distribution, abundance, and quality of Massachusetts’ natural communities. We are only beginning to obtain this knowledge.

Massachusetts’ natural community classification was developed so that “a broad conservation audience including writers of town open space plans, land managers, environmental reviewers, and ecologists doing field studies” could record data by natural community type (Swain and Kearsley 2001), and these data be incorporated into conservation planning decisions. However, the State’s official natural community classification system has not yet been widely adopted. Reasons for this include a lack of awareness of the system; the imposing amount of information in the classification (i.e., over 230 pages); and, perhaps most importantly, the absence of keys to identify natural communities. This guide is intended to address this situation by increasing awareness of the classification system and by providing keys and supporting information to permit users to easily, correctly, and consistently identify natural communities. It is intended for conservation agents and conservation commissioners; open space committees; land managers and stewards; foresters, wetland consultants, and other environmental consultants; land trusts, watershed associations, and other conservation groups; and all others with an interest in conservation and a basic knowledge of plant identification.

Those collecting natural community information in the field are *strongly encouraged* to provide this information to their local open space committee, conservation commission, land trust, or other conservation interest. Observations of rare natural communities (i.e., those with a rank of S1-S3; see Page 4 for details) should be reported to the MNHESP.

Natural Heritage & Endangered Species Program  
Massachusetts Division of Fisheries & Wildlife  
North Drive, Westborough, MA 01581  
Phone: (508) 792-7270 ext. 200, Fax: (508) 792-7821

*This guide is intended to increase awareness of Massachusetts’ natural community classification system by providing keys and supporting information that permit you to easily, correctly, and consistently identify natural communities that you encounter.*

## USING THIS GUIDE

Natural communities may be identified through the use of flow charts, keys, and supporting information. These tools help work you through the classification hierarchy so that you may correctly identify the Natural Community Type. The five levels of the hierarchy are:

System

Sub-system

Community Group (*associated with most, but not all, Sub-systems*)

Community Sub-group (*associated with only 2 Community Groups*)

Community Type

*(NOTE: The names of these hierarchical levels are based on terminology in Swain and Kearsley (2001.) They were developed specifically for this guide, as the MNHESP has not yet assigned names to these levels. Heritage's terminology for the hierarchy, if different from terminology used in this guide, will be adopted when it becomes available.)*

**SYSTEM:** To identify the Community Type, begin by identifying the System (i.e., Terrestrial, Palustrine, or Estuarine) in which the community that you wish to identify occurs. (*Definitions of these terms and others may be found in the Glossary, beginning on page 124.*) Once you have identified the System of the community in question, go to the corresponding flow chart to further identify the natural community. In general, communities with the least amount of vegetation are listed at the top of flow charts, while those with the most vegetation are listed at the bottom.

**SUB-SYSTEM:** Flow charts are organized on the basis of Sub-systems, which are analogous to structural dominance. Each System has two or more Sub-systems, which may be readily identified on flow charts by their occurrence in shaded boxes. For example, Terrestrial Sub-systems include: Open, Herbaceous, Shrub, and Forest/Woodland. Supplemental information, to help you select the proper Sub-system, is often included in the shaded boxes. For example, information associated with the Herbaceous Sub-system indicates that these communities are dominated by herbaceous vegetation and have less than 25% tree and shrub cover (page 7.)

**COMMUNITY GROUP:** Continue through the flow chart until you come to a group of related communities (i.e., the Community Group), examples include Deciduous Forest/Woodland, Marshes/Wet Meadows, and Estuarine Intertidal. Two terrestrial Sub-systems (i.e., Herbaceous and Shrub) have no Community Groups associated with them. For these two Sub-systems go directly to the Community Type keys. For ***all other*** Sub-systems you will need to identify the Community Group. From most Community Groups you may proceed directly to the keys to Community Type. However, the Rock Substrate Community Group (Terrestrial System, Open Sub-system) and the Peatlands Community Group (Palustrine System, Non-forested Sub-system) require that you identify the Community Sub-group.

**COMMUNITY SUB-GROUP:** From either the Rock Substrate Community Group (Terrestrial System, Open Sub-system) or the Peatlands Community Group (Palustrine, Non-forested Sub-

system) you will need to identify the appropriate Community Sub-group. Information on separating Community Sub-groups is provided in the flow charts.

**COMMUNITY TYPE:** Community Types (i.e., natural communities) are most often identified through the use of keys. However, keys are only provided when there is more than one Community Type associated with a particular Community Group or Community Sub-group.

Use the key to identify the *most likely* Community Type for your site. Once you have determined the *most likely* natural community, confirm this determination by comparing your site to the description for that community. In many instances supporting information, such as location, understory, and vegetation descriptions, is provided to help you confirm the identity of the community.

**COMMUNITY DESCRIPTIONS:** Community descriptions are in a standard format that includes the following information: community name; the community's state rank (SRANK—an index of rarity within the Commonwealth, with S1 being the most rare and S5 being the most common); a general description of the community; information on topography and soils; and a “top to bottom” listing of the community's structure and component plant species, from tree canopy down to leaf litter. Information contained in these descriptions has been taken directly from Swain and Kearsley (2001), with minor modifications for formatting. A list containing the common name, scientific name, and plant code for plants listed in community descriptions is included in the back of this guide (beginning on page 128.)

As with Swain and Kearsley (2001), descriptions in this guide are for communities in “exemplary condition”; that is, for ideal communities. *Experience identifying natural communities has revealed that natural communities in the real world only occasionally occur in exemplary condition.* Because of this, determination of natural community often involves identifying the natural community with the description that *most closely* matches what you observe in the field.

**A Few Words About State Rank**  
(after Swain and Kearsley 2001)

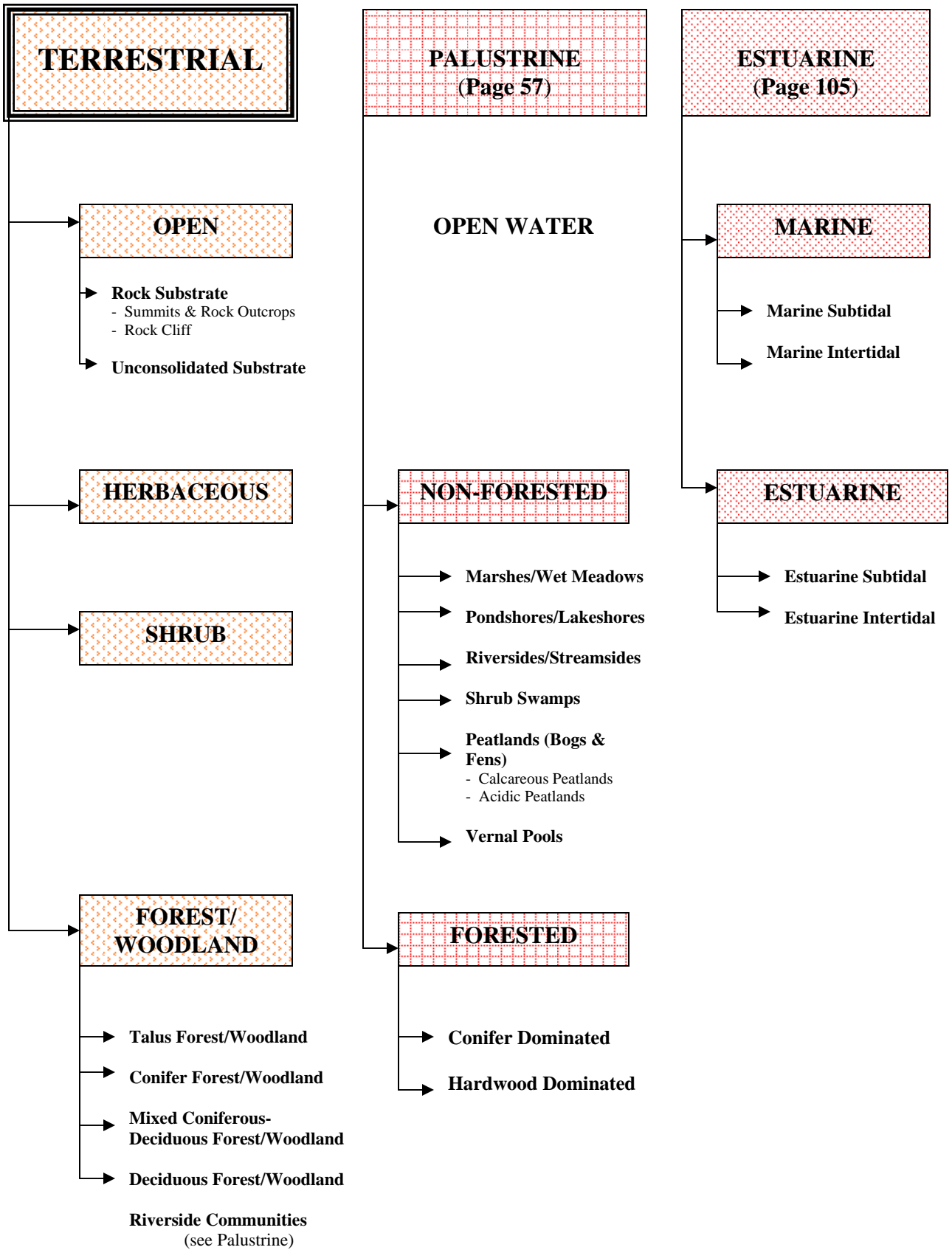
The state rank (SRANK) of a community reflects its rarity and threat within Massachusetts. The SRANKs are defined as follows:

- S1 – Typically  $\leq 5$  occurrences, few remaining acres, or vulnerable to extirpation.
- S2 – Typically 6-20 occurrences, few remaining acres, or vulnerable to extirpation.
- S3 – Typically 21-100 occurrences, or limited acreage.
- S4 – Apparently secure in Mass.
- S5 – Demonstrably secure in Mass.

**Be on the lookout for natural communities with ranks of S1 through S3, report their occurrence, and protect them when possible.**

A list of natural communities, by State Rank, begins on page 141.

**DECISION RULES:** Community descriptions may also contain community codes and decision rules. This information is *not* part of the State's official classification system, but is a system developed by MassWildlife for describing the vegetative cover at Wildlife Management Areas. We have included these decision rules, indicated by square brackets [], not to endorse their use (that is up to the individual user), but because they may provide information on the amount of variability you may encounter within a natural community.



# OPEN

(SPARSE VEGETATION, <25% TREE, SHRUB, AND HERBACEOUS COVER)

## ROCK SUBSTRATE

### **SUMMITS & ROCK OUTCROPS (Mostly horizontal)**

**Page 10**

Acidic Rocky Summit/Rock Outcrop  
Circumneutral Rocky Summit/Rock Outcrop  
Riverside Rock Outcrop  
Serpentine Outcrop  
Calcareous Rocky Summit/Outcrop

### **ROCK CLIFF (Vertical)**

**Page 15**

Acidic Rock Cliff  
Circumneutral Rock Cliff  
Maritime Rock Cliff  
Calcareous Rock Cliff

## UNCONSOLIDATED SUBSTRATE

(Page 19)

Maritime Erosional Cliff  
Maritime Beach Strand  
Maritime Dune

# HERBACEOUS

(DOMINATED BY HERBACEOUS VEGETATION  
<25% TREE AND SHRUB COVER)

(Page 21)

Sandplain Grassland  
Cultural Grassland  
Dry Riverside Bluff

# SHRUB

(< 25% TREE CANOPY)

(Page 23)

Sandplain Heathland  
Maritime Shrubland  
Maritime Pitch Pine on Dunes  
Maritime Juniper Woodland/Shrubland  
Scrub Oak Shrubland  
Pitch Pine – Scrub Oak  
Ridgetop Pitch Pine – Scrub Oak

# FOREST/WOODLAND

(> 25% TREE CANOPY)

## TALUS FOREST/WOODLAND

(Boulder strewn slopes; **Page 28**)

Circumneutral Talus Forest/Woodland  
Acidic Talus Forest/Woodland  
Calcareous Talus Forest/Woodland

## CONIFER FOREST/WOODLAND

(Canopy  $\geq$  75% conifers; **Page 32**)

Successional White Pine Forest  
Hemlock Ravine  
High Elevation Spruce Forest

## MIXED CONIFEROUS-DECIDUOUS FOREST/WOODLAND

(Canopy  $\geq$  25% conifers and  $\geq$  25% deciduous; **Page 34**)

Maritime Oak – Holly Forest/Woodland  
Coastal Forest/Woodland  
Pitch Pine – Oak Forest  
White Pine – Oak Forest  
Oak – Hemlock – White Pine Forest  
Northern Hardwoods – Hemlock – White Pine  
Maritime Juniper Woodland/Shrubland  
Spruce – Fir – Northern Hardwood Forest

## **FOREST/WOODLAND (CONTINUED)**

(> 25% TREE CANOPY)

### **DECIDUOUS FOREST/WOODLAND**

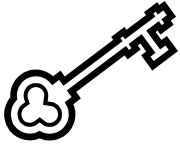
(Canopy  $\geq$  75% deciduous; **Page 43**)

Mixed Oak Forest  
Ridgetop Chestnut Oak Forest/Woodland  
Black Oak – Scarlet Oak Forest/Woodland  
Oak – Hickory Forest  
Dry, Rich Acidic Oak Forest  
Red Oak-Sugar Maple Transition Forest  
Rich, Mesic Forest  
Forest Seep  
Hickory – Hop-hornbeam Forest/Woodland  
Successional Northern Hardwoods Forest  
Coastal Forest/Woodland  
Yellow Oak Dry Calcareous Forest  
Calcareous Forest Seep

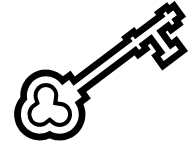
### **RIVERSIDE COMMUNITIES**

(See Palustrine System for Floodplain Forests)

## SUMMIT AND ROCK OUTCROP COMMUNITIES (Mostly Horizontal)



Shortcut Key: Check full descriptions following use



1. Community on outcrop located along river, and showing signs of flood scouring.  
A. Yes – Riverside Rock Outcrop  
B. No – Go to 2
2. Community on outcrop of green (although may also be brown, gray-white, or yellow) rock with a greasy, waxy luster and feel. Rock often fibrous.  
A. Yes – Serpentine Rock Outcrop  
B. No – Go to 3
3. Community on a ridgetop or mid-slope ledge of limestone, marble, dolomite, or other calcareous rock. Surrounding trees characteristic of rich forest. Ferns common if on outcrop.  
A. Yes – Calcareous Rocky Summit/Rock Outcrop  
B. No – Go to 4
4. Community on bedrock outcrop of granite, quartzite, schist, or other acidic rock. Shrubs characteristic of poor soils (e.g., scrub oak, black huckleberry, low bush blueberry) are dominant.  
A. Yes – Acidic Rocky Summit/Rock Outcrop  
B. No – Circumneutral Rocky Summit/Rock Outcrop



These communities can be surprisingly difficult to identify.

Identification to community type may require knowledge of geology. Although serpentine is readily identified, acidic, calcareous, and circumneutral rocks are more difficult to identify.

In general, calcareous rock communities have vegetation characteristic of rich soils, acidic rock communities have shrubs associated with poor soils (e.g., scrub oak, blueberry), and circumneutral rock communities are dominated by grasses.

## Descriptions of Summits and Rock Outcrops (mostly horizontal)

### Riverside Rock Outcrop

S3

Description/Concept	Sparse, mostly herbaceous vegetation on outcrops influenced by river processes. Vegetation is typical of other outcrop communities, but has fewer woody plants. Typically, only a few species of plants are present at a site.
Topography	Flood scoured bedrock along rivers.
Soils/Substrate	Alluvial soil accumulated in flood scoured bedrock.
Canopy	
Sub-canopy	
Shrub layer	
Herb layer	Typical plants include: harebell; Canadian burnet; big bluestem; prostrate dogbane; goldenrods; or smooth (a.k.a. riverside) rose.
Leaf litter	

### Serpentine Outcrop

S1

Description/Concept	Open, sparse, herbaceous vegetation with little tree or shrub growth. Often <1 acre in size.
Topography	Exposed ledges or outcrops.
Soils/Substrate	Exposed ledges or rock outcrops. Serpentine or other rocks high in magnesium.
Canopy	Often from surrounding communities. White pine, eastern hemlock, red maple, red oak, and birches may be present from edges.
Sub-canopy	
Shrub layer	Witch hazel (sparse).
Herb layer	<b>Large-leaved sandwort is an absolute indicator, but isn't always present.</b> Bracken, maidenhair spleenwort, and grasses. Calcium-loving species (e.g., columbine, harebell, rock spikemoss) some times present.
Leaf litter	

### Acidic Rocky Summit/Rock Outcrop

S4

Description/Concept	Widespread, open community of low shrubs, scattered grasses, mosses, lichens, and occasional trees on rocky summits or exposed outcrops. Vegetation discontinuous, concentrated around edges or concentrated in pockets of soil. May have extensive lichen and moss.
Topography	Summit (i.e., ridge tops) or outcrops. Typically found on steep slopes with aspect of SE-SW.
Soils/Substrate	Exposed acidic bedrock or outcrops. Little or no soil.
Canopy	Largely absent. Common adjacent trees include: pitch, white, and red pine; and northern red oak.
Sub-canopy	
Shrub layer	Low. Dominant shrubs include: scrub oak; huckleberry; lowbush blueberries; black chokecherry; and dwarf serviceberry. Dwarf chestnut oak may be present, but is uncommon.
Herb layer	Scattered clumps. Species include: little bluestem; poverty grass; common hairgrass; Pennsylvania sedge; and cow-wheat.
Leaf litter	

**Calcareous Summit/Rock Outcrop****S2**

Description/Concept	Open community of shrubs and herbaceous plants on calcareous ridge tops or mid-slope ledges. <i>RIDGE TOP</i> - support relatively sparse herbaceous vegetation. <i>OUTCROP</i> - tend to be moister and lightly shaded.
Topography	Summit (i.e., ridge tops) or outcrops/ledges.
Soils/Substrate	Exposed calcareous bedrock or outcrops/ledges.
Canopy	<i>RIDGE TOP</i> - trees uproot and pull away from ridge, keeping community open. <i>OUTCROP</i> - adjacent trees characteristic of Rich Mesic Forest, including sugar maple, white ash, and hop-hornbeam.
Sub-canopy	
Shrub layer	<i>RIDGE TOP</i> - round-leaved dogwood, round-leaved shadbush as well as less common northern prickly rose, hairy honeysuckle, and downy arrow-wood. <i>OUTCROP</i> - no shrub layer described.
Herb layer	<i>RIDGE TOP</i> - ivory sedge, purple clematis, long-leaved bluet, balsam groundsel, and lyre-leaved rock-cress. <i>OUTCROP</i> - species characteristic of Rich Mesic Forests, with high proportion of ferns including bulblet, fragile, walking, and blunt lobed wood-fern; and ebony and maidenhair spleenwort. Other plants include ivory, Pennsylvania, and peduncled sedge; harebell, early saxifrage, lyre-leaved rock cress, smooth rock cress, columbine, and balsam groundsel.
Leaf litter	

**Circumneutral Rocky Summit/Rock Outcrop****S2/S3**

Description/Concept	Open community on rocky summits, ridges, and outcrops that is dominated by grasses, sedges, and herbaceous plants. May have extensive lichen and moss. Often found in oak forest matrix near Hickory-Hop-hornbeam Community. May grade into Circumneutral Rock Cliff Community.
Topography	Exposed ledges or outcrops.
Soils/Substrate	Dry, with soil confined to cracks in rocks. Found on circumneutral rock substrates such as traprock (e.g., basalt) or conglomerate.
Canopy	Occasional isolated trees of eastern red cedar, shagbark and sweet pignut hickory, and white ash.
Sub-canopy	
Shrub layer	Shrubs usually restricted to edge openings. Carolina rose, bearberry, and hackberry may be present and found throughout.
Herb layer	Ranges from patchy to continuous. Dominant species include Pennsylvania and parasol sedge, poverty grass, and little bluestem. Other typical species include: rusty cliff-fern; rock spikemoss; early saxifrage; arrow-leaf violet; dry land bittercress; skunk meadow-rue; strawberry; dwarf dandelion, pale corydalis; sleepy catch fly; Venus' looking glass; blue curls; goldenrods; and grasses.
Leaf litter	

## Plants Associated with Summit and Rock Outcrop Communities

	Riverside Rock Outcrop	Serpentine Rock Outcrop	Acidic Summit/Rock Outcrop	Calcareous Summit/Rock Outcrop	Circumneutral Summit/Rock Outcrop
Arrow-wood, Downy				Occurs	
Ash, White				Occurs	Occurs
Bearberry					Occurs
Birch		Occurs			
Bittercress, Dry land					Occurs
Blueberry, Lowbush			Dominant		
Bluestem, Big	Typical				
Bluestem, Little			Occurs		Occurs
Bluet, Long-leaved				Occurs	
Bracken (fern)		Occurs			
Burnet, Canadian	Typical				
Cedar, Eastern Red					Occurs
Chokeberry, Black			Dominant		
Clematis, Purple				Occurs	
Cliff-fern, Rusty					Occurs
Columbine		Occurs		Occurs	
Corydalis, Pale					Occurs
Cow-Wheat			Occurs		
Curls, Blue					Occurs
Dandelion, Dwarf					Occurs
Dogbane, Prostrate	Typical				
Dogwood, Round-leaved				Occurs	
Fern, Bulblet				Occurs	
Fern, Fragile				Occurs	
Fern, Walking				Occurs	
Goldenrod	Typical				Occurs
Grass		Occurs			Occurs
Grass, Poverty			Occurs		Occurs
Groundsel, Balsam				Occurs	
Hackberry					Occurs
Hairgrass, Common			Occurs		
Harebell	Typical	Occurs		Occurs	
Hemlock, Eastern		Occurs			
Hickory, Shagbark					Occurs
Hickory, Sweet Pignut					Occurs
Honeysuckle, Hairy				Occurs	
Hop-hornbeam				Occurs	
Huckleberry, Black			Dominant		
Maple, Red		Occurs			
Maple, Sugar				Occurs	
Meadow-rue, Skunk					Occurs
Oak, Dwarf Chestnut			Uncommon		
Oak, Northern Red		Occurs	Common		
Oak, Scrub			Dominant		
Pine, Pitch			Common		
Pine, Red			Common		
Pine, White		Occurs	Common		
Rock Cress, Lyre-leaved				Occurs	
Rock Cress, Smooth				Occurs	
Rose, Carolina					Occurs
Rose, Northern Prickly				Occurs	
Rose, Smooth	Typical				

## Plants Associated with Summit and Rock Outcrop Communities (continued)

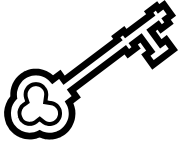
	Riverside Rock Outcrop	Serpentine Rock Outcrop	Acidic Summit/Rock Outcrop	Calcareous Summit/Rock Outcrop	Circumneutral Summit/Rock Outcrop
Sandwort, Large-leaved		Indicator			
Saxifrage, Early				Occurs	Occurs
Sedge, Ivory				Occurs	
Sedge, Parasol					Occurs
Sedge, Peduncled				Occurs	
Sedge, Pennsylvania			Occurs	Occurs	Occurs
Serviceberry, Dwarf			Occurs		
Shadbush, Roundleaf				Occurs	
Sleepy Catchfly					Occurs
Spikemoss, Rock		Occurs			Occurs
Spleenwort, Ebony				Occurs	
Spleenwort, Maidenhair		Occurs		Occurs	
Strawberry					Occurs
Venus' Looking Glass					Occurs
Violet, Arrow-leaf					Occurs
Witch hazel		Occurs			
Wood-fern, Blunt-lobed				Occurs	

**NOTE:** This is not an exhaustive list of plant species that occur in these communities. Rather, it is a list of species associated with these communities as identified in Swain and Kearsley (2001.)

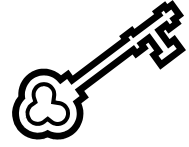
## Known Distribution of Summit and Rock Outcrop Communities

Community Type	Berkshires	Connecticut Valley	Worcester Plateau	Eastern Mass.	Cape & Islands
Riverside Rock Outcrop	X	X		Probable	
Serpentine Outcrop	X			X	
Acidic Rocky Summit/Rock Outcrop	X	X	X	X	
Calcareous Rocky Summit/Rock Outcrop	X	X			
Circumneutral Rocky Summit/Rock Outcrop		X	X	X	

## ROCK CLIFF COMMUNITIES (VERTICAL)

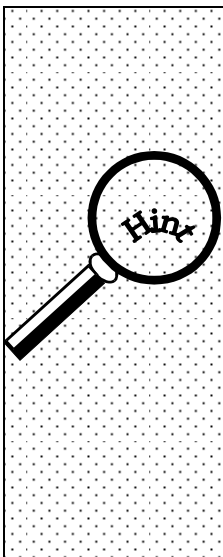


Shortcut Key: Check full descriptions following use of key



There is vegetative overlap between the Acidic Rock Cliff and the Circumneutral Rock Cliff communities. As a result, plants alone may not be enough to identify the community type.

1. Community on rock cliff within the salt spray zone of ocean.
  - A. Yes – Maritime Rock Cliff Community
  - B. No – Go to 2
2. Community on rock cliff of limestone, dolomite, or other calcareous bedrock. Purple cliff-brake, bulblet fern, walking fern, blunt-lobed cliff-fern, and/or maidenhair spleenwort occur.
  - A. Yes – Calcareous Rock Cliff Community
  - B. No – Go to 3
3. Community on cliff of granite, quartzite, schist, or other acidic rock.
  - A. Yes – Acidic Rock Cliff
  - B. No – Circumneutral Rock Cliff



As with summits and rock outcrops, these communities can be surprisingly difficult to identify.

The Maritime Rock Cliff Community may be identified on the basis of location, and the Calcareous Rock Cliff Community on the basis of its distinct vegetation. However, the Acidic Rock Cliff Community's vegetation is not distinctive and may overlap that of the Circumneutral Rock Cliff Community. In general, the latter community will have plants associated with rich(er) soils, while the Acidic Rock Cliff Community will have plants associated with nutrient-poor soils.

Identify the community to the *lowest level possible*, but recognize that you may not be able to conclusively separate acidic and circumneutral communities solely on the basis of vegetation.

## Descriptions of Rock Cliff Communities

### Maritime Rock Cliff

S2

Description/Concept	Sparsely vegetated rock areas with plants in cracks and ledges. Species from top of headland occur in less exposed ledges. Above the tidal zone but <b>within salt spray zone</b> .
Topography	Ocean side of rocky headlands.
Soils/Substrate	A vertical substrate of rock.
Canopy	
Sub-canopy	
Shrub layer	
Herb layer	Low, scattered wind and salt hardy plants including: knotted pearlwort, saltworts, common rush, seaside plantain, poison ivy, and mosses.
Leaf litter	

### Calcareous Rock Cliff

S3

Description/Concept	Extremely sparse vegetation in cracks and small ledges. More diverse than Acidic Rock Cliff community. Lichen and mosses may be present.
Topography	A vertical, or near vertical, substrate of rock.
Soils/Substrate	Limestone, dolomite, or other calcareous bedrock.
Canopy	Surrounding trees associated with northern hardwood forest or Rich Mesic Forest, such as sugar maple, white ash, basswood, butternut, and black and yellow birches.
Sub-canopy	
Shrub layer	
Herb layer	Distinct and specific to habitat. <b>Purple cliff-brake, bulblet fern, walking fern, blunt-lobed cliff-fern, maidenhair spleenwort, and columbine are characteristic.</b> Other plants include bearberry, harebell, early saxifrage, rock-pellitory, small enchanter's nightshade, and rock-cresses.
Leaf litter	

### Acidic Rock Cliff

S4

Description/Concept	Scattered vascular plants on small ledges and in crevices. Lichens occasionally dense. Vascular vegetation sparse and <b><i>plant association not distinctive</i></b> .
Topography	A vertical substrate of rock, with little soil and few nutrients.
Soils/Substrate	Acidic rock.
Canopy	May be shaded by trees of surrounding forest. Highly variable; including oak forests, northern hardwoods, and hemlocks.
Sub-canopy	
Shrub layer	
Herb layer	Common polypody and rusty cliff fern are often present in crevices. Harebell, bristly sarsaparilla, marginal wood fern, fringed bindweed, stout goldenrod, and Virginia creeper are common. Purple-flowering raspberry occurs in northern and western part of state.
Leaf litter	

**Circumneutral Rock Cliff****S3**

Description/Concept	Extremely sparse, scattered vascular plants on small ledges and in crevices. Lichens occasionally dense. More diverse than Acidic Rock Cliff community.
Topography	A vertical substrate of rock.
Soils/Substrate	Sandstone, traprock, conglomerate, or other non-acidic, non-calcareous rock.
Canopy	May be shaded by trees of surrounding forest.
Sub-canopy	
Shrub layer	Chestnut and scrub oak, red cedar, pasture rose, and prickly ash may be in area.
Herb layer	Species of dry open areas, including: pale corydalis, bearberry, plantain-leaved pussytoes, columbine, marginal wood-fern, little bluestem, ebony spleenwort, rusty cliff-fern, and mosses.
Leaf litter	

**Known Distribution of Rock Cliff Communities**

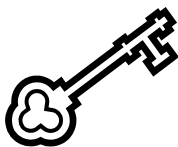
Community Type	Berkshires	Connecticut Valley	Worcester Plateau	Eastern Mass.	Cape & Islands
Acidic Rock Cliff	X	X	X	X	
Circumneutral Rock Cliff		X	X	X	
Maritime Rock Cliff				X	X
Calcareous Rock Cliff	X	X			

## Plants Associated with Rock Cliff Communities

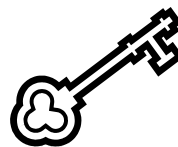
	Maritime Rock Cliff	Acidic Rock Cliff	Calcareous Rock Cliff	Circumneutral Rock Cliff
Ash, White			Occurs	
Basswood			Occurs	
Bearberry			Occurs	Occurs
Bindweed, Fringed		Occurs		
Birch, Black			Occurs	
Birch, Yellow			Occurs	
Bluestem, Little				Occurs
Butternut			Occurs	
Cedar, Eastern Red				Occurs
Cliff-brake, Purple			Characteristic	
Cliff-fern, Blunt-lobed			Characteristic	
Cliff-fern, Rusty		Occurs		Occurs
Columbine			Characteristic	Occurs
Corydalis, Pale				Occurs
Fern, Bulblet			Characteristic	
Fern, Walking			Characteristic	
Goldenrod, Stout		Occurs		
Harebell		Occurs	Occurs	
Hemlock, Eastern		Occurs		
Lichen		Occurs	Occurs	Occurs
Maple, Sugar			Occurs	
Moss	Occurs		Occurs	Occurs
Nightshade, Small Enchanter's			Occurs	
Oak, Chestnut				Occurs
Oak, Scrub				Occurs
Pearlwort, Knotted	Occurs			
Plantain, Seaside	Occurs			
Poison Ivy	Occurs			
Polypody, Common		Occurs		
Prickly Ash				Occurs
Pussytoes, Plantain-leaved				Occurs
Raspberry, Purple-flowering		Occurs		
Rock-Cress, Hairy			Occurs	
Rock Cress, Lyre-leaved			Occurs	
Rock Cress, Smooth			Occurs	
Rock-pellitory			Occurs	
Rose, Pasture				Occurs
Rush, Common	Occurs			
Saltwort	Occurs			
Sarsaparilla, Bristly		Occurs		
Saxifrage, Early			Occurs	
Spleenwort, Ebony				Occurs
Spleenwort, Maidenhair			Characteristic	
Virginia Creeper		Occurs		
Wood-fern, Marginal		Occurs		Occurs

**NOTE:** This is not an exhaustive list of plant species that occur in these communities. Rather, it is a list of species associated with these communities as identified in Swain and Kearsley (2001.)

## UNCONSOLIDATED SUBSTRATE COMMUNITIES



**Shortcut Key: Check full descriptions following use of keys**



1. Coastal Community on a vertical or near vertical cliff being actively eroded by the sea.      A. Yes – Maritime Erosional Cliff  
B. No – Go to 2
2. Community located between fore dunes and wrack line.      A. Yes – Maritime Beach Strand  
B. No – Go to 3
3. Community on sand dunes with patches of herbaceous plants interspersed with areas of bare sand and shrubs.      A. Yes – Maritime Dune



Unconsolidated Substrate Communities are easily differentiated.

A community's location, relative to the water's edge, and physical structure permit positive identification.

## Descriptions of Unconsolidated Substrate Communities

### Maritime Erosional Cliff

**S2**

Description/Concept	Extremely sparse vegetation on cliffs being actively eroded by the sea. In salt spray zone. Vegetation typical of surrounding areas.
Topography	Seaward unconsolidated cliff faces.
Soils/Substrate	Clay or sand.
Canopy	
Sub-canopy	
Shrub layer	Bayberry, beach-plum, black cherry, sweet fern, huckleberry.
Herb layer	Poison ivy, Virginia creeper, roses, bearberry, catbrier.
Leaf litter	

### Maritime Beach Strand

**S3**

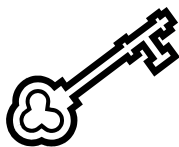
Description/Concept	Sparsely vegetated, long, narrow community between wrack line and fore dunes. Subject to overwash.
Topography	Seaward of dunes but above high tide.
Soils/Substrate	Sand.
Canopy	
Sub-canopy	
Shrub layer	
Herb layer	Sea-rocket, beach grass, beach pea, sea beach orache, seabeach sandwort, seaside flatsedge, seabeach saltwort, seaside goldenrod.
Leaf litter	

### Maritime Dune

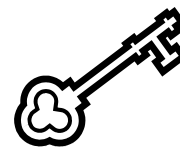
**S2**

Description/Concept	Classic community of sand dunes. Patches of herbaceous plants interspersed with areas of bare sand and shrubs. Within salt spray zone.
Topography	Windswept dunes.
Soils/Substrate	Sand.
Canopy	Scattered pitch pine (possible.)
Sub-canopy	
Shrub layer	Bearberry, bayberry, lowbush blueberries, sweet fern, beach-plum.
Herb layer	Beach grass, seaside goldenrod, beach pea, heathers, poison ivy. Salt hay, hair grass, little bluestem, and poverty grass are common. Pinweed, nutrush, and sand jointweed grow with heathers.
Leaf litter	

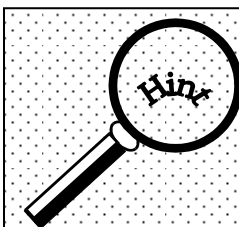
## HERBACEOUS COMMUNITIES



**Shortcut Key: Check full descriptions following use of key**



1. Community on cliff face next to river or in floodplain.  
A. Yes – Dry Riverside Bluff  
B. No – Go to 2
2. Community dominated by grasses, but with forbs and shrubs, on flat outwash plain with droughty low nutrient soils. Indicator species, such as goat's rue, yellow wild indigo, bird's foot violet, and butterfly weed are typically present.  
A. Yes – Sandplain Grassland  
B. No – Go to 3
3. A human created and maintained grass-dominated community (e.g., pastures, hay fields, capped landfills, airport grasslands.)  
A. Yes – Cultural Grassland <sup>a</sup>



Herbaceous communities may generally be identified correctly. However, in some instances human created and/or maintained grasslands will contain plants that are indicators of a Sandplain Grassland.

When an herbaceous community is dominated by a variety of native species, and contains indicators of Sandplain Grasslands, it is most appropriate to describe that community as a Sandplain Grassland.

- a. The Cultural Grassland is the exception to the rule for classifying Massachusetts' natural communities. This is the only cultural community recognized by the classification system.

## Descriptions of Herbaceous Communities

### Sandplain Grassland

S1

Description/Concept	An open community dominated by grasses although forbs and shrubs are important. Most occur near the ocean within the influence of salt spray. Often occurs as openings in pitch pine/scrub oak communities. Great species overlap with sandplain heathlands.
Topography	Flat, outwash plain.
Soils/Substrate	Droughty, low nutrient soils.
Canopy	
Sub-canopy	
Shrub layer	Shrub clones often form patches. Bearberry, scrub oak, bayberry, lowbush blueberry, and black huckleberry.
Herb layer	<b>Goat's rue, yellow wild indigo, butterfly weed, and bird's foot violet are good indicators.</b> Dominated by little bluestem, Pennsylvania sedge, and poverty grass.
Leaf litter	

**[Decision Rules: GR category = >90% grass, forbs, and sedges, and <10% shrub/tree cover.]**

### Cultural Grassland

N/A

Description/Concept	Human created and maintained community. Dominated by grasses. Includes pastures, hayfields, abandoned fields, airports, cemeteries, recreation fields, and utility rights of way.
Topography	
Soils/Substrate	Sand, or other droughty low nutrient soils.
Canopy	
Sub-canopy	
Shrub layer	
Herb layer	Often little bluestem, Pennsylvania sedge, poverty grass, and non-native species. Some have herbaceous species, such as goldenrods and milkweeds.
Leaf litter	

**[Decision Rules: GR category = >90% grass, forbs, and sedges, and <10% shrub/tree cover.**

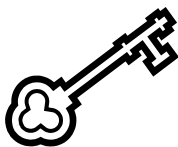
**MassWildlife further interprets Cultural Grasslands to include pastures (PA) and hayfields (HA.)]**

### Dry Riverside Bluff

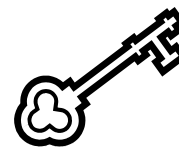
S2

Description/Concept	<b>Erosional sandy cliff face next to rivers or floodplains;</b> often 20-40 feet high. Species present associated with dry habitats, in open conditions.
Topography	Cliff face.
Soils/Substrate	Gravel.
Canopy	
Sub-canopy	
Shrub layer	Individuals or thickets of: scrub oak, American hazelnut, gray birch, and quaking aspen. Lowbush blueberry and sweet fern may be present between patches of shrubs.
Herb layer	Little bluestem, goat's rue, stiff aster, woodland sunflower, and lupine may be present between patches of shrubs.
Leaf litter	

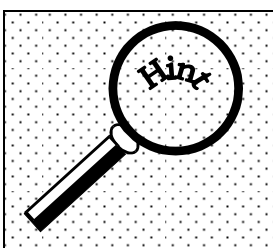
## SHRUB COMMUNITIES



Shortcut Key: Check full descriptions following use of key



1. Pitch pine common or dominant.  
A. Yes – Go to 2  
B. No – Go to 6
2. Scrub oak common or dominant.  
A. Yes – Go to 3  
B. No – Go to 4
3. Pitch pine-scrub oak community located on ridge, steep slope, or rocky outcrop.  
A. Yes – Ridgetop Pitch Pine – Scrub Oak  
B. No – Pitch Pine-Scrub Oak
4. Scattered pitch pine on active sand dune.  
A. Yes – Maritime Pitch Pine on Dunes  
B. No – Go to 5
5. Area within direct influence of salt spray, red cedar dominates.  
A. Yes – Maritime Juniper Woodland/  
Shrubland
6. Scrub oak common or dominant.  
A. Yes – Go to 7  
B. No – Maritime Shrubland
7. Community uniformly dominated by scrub oak.  
A. Yes – Scrub Oak Shrubland  
B. No – Sandplain Heathland



There is considerable overlap among shrub communities, and some may occur as patches within other shrub communities.

Use the supporting information to help identify the correct community type, and read the descriptions carefully.

## Locations of Shrub Communities

Location	Community Type
Within Daily Salt Spray Influence	Maritime Juniper Woodland/Shrubland
Coastal, But Beyond Daily Salt Spray Influence	Sandplain Heathland (possible)
	Maritime Shrubland
	Maritime Pitch Pine on Dunes
Beyond Reach of Salt Spray	Sandplain Heathland (possible)
	Scrub Oak Shrubland
	Pitch Pine–Scrub Oak
Ridgetops, Steep Slopes, or Rocky Outcrops	Ridgetop Pitch Pine–Scrub Oak

## Descriptions of Shrub Communities

### Sandplain Heathland

S1

Description/Concept	An open, <b>shrub dominated</b> , primarily coastal community. Often have sparse clumps of plants with bare soil or lichens between vascular plants. Grade into Sandplain Grasslands; differs in proportion of herbaceous vs. woody vegetation and structure of community. Less species rich than grasslands, and appear taller. Often occur in openings of Maritime Shrubland, Pitch Pine-Scrub Oak, and Scrub Oak communities.
Topography	
Soils/Substrate	Acidic, nutrient poor, droughty soils.
Canopy	
Sub-canopy	
Shrub layer	<b>Scrub oak</b> , black huckleberry, bearberry, and/or lowbush blueberries may dominate. <b>Other characteristic plants include bayberry, golden heather, chokeberry, dwarf chinquapin oak, and sweet fern.</b> Tall shrubs include beaked hazelnut, beach-plum, and dewberry.
Herb layer	<b>Hairgrass, Pennsylvania sedge, little bluestem, and stiff aster are characteristic.</b>
Leaf litter	

**Maritime Shrubland****S3**

Description/Concept	Patches of dense shrubs with scattered, more open areas of low growth or bare ground. Often dense patches of shrubs, with different species dominating in different areas. Coastal, but <b>out of daily range of salt spray</b> .
Topography	Rocky headlands or behind dunes in protected areas of barrier beaches.
Soils/Substrate	Rocky headlands, sand dunes.
Canopy	
Sub-canopy	
Shrub layer	Huckleberry, bayberry, and eastern red cedar areas often distinctive. Black cherry, beach-plum, chokeberry, lowbush blueberry, and bearberry may be abundant. Catbrier and poison ivy often cover other plants or grow on dense patches of their own.
Herb layer	
Leaf litter	

**Maritime Pitch Pine on Dunes****S1**

Description/Concept	Scattered pitch pine on active sand dunes, with trunks at least partially buried. Open canopy with bare ground, scattered shrubs, herbaceous plants, and patches of lichens. Coastal, but <b>out of daily range of salt spray</b> .
Topography	Occurs on moderately stabilized back dunes.
Soils/Substrate	
Canopy	Short, scattered individual pitch pine.
Sub-canopy	
Shrub layer	Scattered. Beach heather and bearberry common.
Herb layer	Patches of lichen common.
Leaf litter	

**[Decision Rules: PP dn = >75% pitch pine on dunes.]****Maritime Juniper Woodland/Shrubland****S1**

Description/Concept	Predominantly evergreen woodland/shrubland. <b>Within direct influence of ocean salt and spray.</b> Shorter than interior forests. May be protected from direct spray by crests of dunes.
Topography	Tend to occur in interdunal areas, backs of dunes, exposed bluffs, salt marsh borders, and, to a lesser extent, on rocky headlands.
Soils/Substrate	Sand, rocky headlands.
Canopy	Trees short (<5 m) and sculpted by wind and salt spray. Red cedar dominates but occurs in variable, usually low densities. In association with pitch pine, oaks, American holly, black cherry, and red maple.
Sub-canopy	
Shrub layer	Bayberry, winged sumac, and beach heather often in association with canopy species listed above.
Herb layer	Highly variable. Little bluestem, American beach grass, and sedges.
Leaf litter	

**[Decision Rules for Ju ms community: >50% of 1, 2, or 3 species: red cedar, pitch pine, central hardwoods, and 25-75% red cedar.]****NOTE:** This community is listed in both the Shrublands and the Forest/Woodlands sections of this guide.

## Scrub Oak Shrubland

S1

Description/Concept	Shrubland dominated by scrub oak. Essentially no pitch pine. Occurs within Pitch Pine-Scrub Oak areas (e.g., frost pockets or ridge tops.)
Topography	
Soils/Substrate	
Canopy	
Sub-canopy	
Shrub layer	Scrub oak and dwarf chinquapin oak dominated shrublands. Variety of other heathland plants occur (huckleberry, lowbush blueberry.)
Herb layer	Significant component of graminoid cover (e.g., Pennsylvania sedge, little bluestem) interspersed with lichens.
Leaf litter	

[Decision Rules: SBOK community = >50% scrub oak.]

## Pitch Pine – Scrub Oak

S2

Description/Concept	Shrub dominated community with scattered to dense trees and scattered openings.
Topography	
Soils/Substrate	Droughty, low nutrient soils; usually deep, coarse, well drained sands of glacial origin.
Canopy	<b>Pitch pine forms open canopy</b> over shrub oaks (usually scrub oak.) Inland variants may have gray birch, trembling aspen, black cherry, or fire cherry.
Sub-canopy	
Shrub layer	Scrub oak, may be impenetrable (3-4 m) or open and shorter. Huckleberry occurs between the oaks. Scattered openings support heathland vegetation (e.g., lowbush blueberry, bearberry, beach heather, mayflower.)
Herb layer	Scattered openings support grassland vegetation (little bluestem, sedges, cow-wheat.)
Leaf litter	

[Decision rules permit up to 67% canopy for this community. PpOK sb Category = > 50% pitch pine and oaks, with >25% and <75% pitch pine, and >25% and <75% oaks.]

## Ridgetop Pitch Pine – Scrub Oak

S2

Description/Concept	Pitch pine – scrub oak community occurring on acidic bedrock on a ridgetop. Open to closed canopy of pitch pine. Extremely xeric conditions.
Topography	Ridgetops, steep upper mountain slopes, and exposed rock outcrops. Aspects may range from N to S; most have S to SW aspect.
Soils/Substrate	Acidic bedrock. Soil accumulation is slow, and soil depths are shallow.
Canopy	Characteristically contains dwarf pitch pines. Scattered taller trees include red, black, scarlet, and rock chestnut-oak. Hickories occasionally present. White pine may dominate in areas not exposed to fire.
Sub-canopy	Hickories occasionally present.
Shrub layer	Patchy and often interspersed with large areas of exposed bedrock. Common shrubs include blueberry, scrub oak, and huckleberry.
Herb layer	Sparse. May include Canada mayflower, bastard toad-flax, cow-wheat, tall corydalis, and goldenrod.
Leaf litter	May consist of a thin layer of duff and decomposed leaves over bedrock.

[Decision rules permit up to 67% canopy for this community. PpOK sb community = > 50% pitch pine and scrub oak, with >25% and <75% pitch pine, and >25% and <75% scrub oak.]

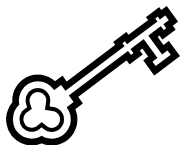
## Plants Associated with Shrub Communities

	Sandplain Heathland	Maritime Shrubland	Maritime Pitch Pine on Dunes	Maritime Juniper	Scrub Oak Shrubland	Pitch Pine - Scrub Oak	Ridgetop Pitch Pine – Scrub Oak
Aster, Stiff	Char.						
Bayberry	Char.	Dominant		Occurs			
Beachgrass, American				Occurs			
Bearberry	Dominant	Occurs	Char.			Occurs	
Birch, Gray							Occurs
Blueberry, Lowbush	Dominant	Occurs			Char.	Occurs	Occurs
Bluestem, Little	Char.			Occurs	Char.	Occurs	
Catbrier		Occurs					
Cedar, Eastern Red		Dominant		Dominant			
Cherry, Black		Occurs		Occurs			
Chokeberry, Black	Char.						
Corydalis, Tall							Occurs
Cow-wheat						Occurs	Occurs
Dewberry	Occurs						
Goldenrod							Occurs
Hairgrass, Common	Char.						
Hazelnut, Beaked	Occurs						
Heather, Beach			Char.	Occurs		Occurs	
Heather, Golden	Characteristic						
Hickory							Occurs
Holly, American				Occurs			
Huckleberry, Black	Dominant	Dominant			Char.	Occurs	Occurs
Lichen	Char.		Char.		Char.	Occurs	
Maple, Red				Occurs			
Mayflower						Occurs	
Mayflower, Canada							Occurs
Oak				Occurs			
Oak, Black							Occurs
Oak, Dwarf Chinquapin	Char.				Dominant	Occurs	
Oak, Northern Red							Occurs
Oak, Rock Chestnut							Occurs
Oak, Scarlet							Occurs
Oak, Scrub	Dominant				Dominant	Dominant	Char.
Pine, Pitch			Dominant	Occurs		Dominant	Char.
Pine, Red							
Pine, White							Occurs
Plum, Beach	Occurs	Occurs					
Poison Ivy		Occurs					
Sedge						Occurs	
Sedge, Pennsylvania	Char.				Char.		
Sumac, Winged				Occurs			
Sweet Fern	Char.						
Toadflax, Bastard							Occurs

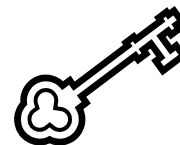
Char. = Characteristic

**NOTE:** This is not an exhaustive list of plant species that occur in these communities. Rather, it is a list of species associated with these communities as identified in Swain and Kearsley (2001.)

## TALUS FOREST/WOODLAND COMMUNITIES (BOULDER STREWN SLOPES)



**Shortcut Key: Check full descriptions following use**



These communities represent a **continuum** of vegetation, from plants associated with nutrient-poor soils to plants associated with nutrient-rich soils. Because of this, **there is considerable vegetative overlap**. As a result, plants alone **may not** be enough to identify the community type.

- |  |  |
|--|--|
| <p>1. Plants typical of nutrient poor soils, such as gray birch, bracken, currants, eastern hemlock, white pine, Pennsylvania sedge, and silverrod.</p>  | <p>A. Yes – Acidic Talus Forest/Woodland<br/>B. No – Go to 2</p>     |
| <p>2. Plants typical of nutrient rich soils, such as downy arrow-wood, Jack-in-the-pulpit, white avens, bottle-brush grass, broad-leaved woodland-sedge, and walking fern. Sugar maple is <u>usually</u> dominant in canopy. Soil between boulders <u>usually</u> moist and loamy.</p> | <p>A. Yes – Calcareous Talus Forest/Woodland<br/>B. No – Go to 3</p> |
| <p>3. Community has plants associated with both nutrient-poor and nutrient-rich soils. White ash, hickories, and witch-hazel may be present. Marginal wood-fern, common polypody, and herb Robert are major components of herb layer.</p>  | <p>A. Yes – Circumneutral Talus Forest/Woodland</p>                  |



All three Talus Forest/Woodland communities may have sugar maple present in the canopy, so be careful in using it as a diagnostic feature.

You can narrow your choices (in most instances) by considering where you are located in Massachusetts.

You may wish to consider identifying the community by identifying the type of rock in the talus, or by going upslope (if practical) and identifying the type of rock cliff, summit, or outcrop from which the talus was derived.

## Descriptions of Talus Forest/Woodland Communities

### Circumneutral Talus Forest/Woodland

S3

Description/Concept	Open to closed canopy on boulder-strewn slopes. Often a gradient of vegetation, with exposed rocks at the base of the cliff above the talus slope, and gradually more trees to the base of the slope. Small slopes may have canopy coverage from surrounding trees.
Topography	Slopes, often below cliffs or rock outcrops.
Soils/Substrate	Dry to mesic, not very acidic talus slopes of basalt or traprock.
Canopy	Open to closed. Scattered and clumped trees. Mixture of deciduous forest species, including: sugar maple, red maple, black birch, paper birch, white ash, pignut hickory, sweet pignut hickory, and northern red oak.
Sub-canopy	Species include hop-hornbeam and striped maple.
Shrub layer	Tall shrubs. Shrubs include round-leaved dogwood, hazelnut, witch-hazel, maple-leaf viburnum, bush honeysuckle, Virginia creeper, and poison ivy.
Herb layer	Sparse. Dominated by vines and ferns. Includes marginal wood-fern, common (rock) polypody, and herb Robert; occasionally clematis and climbing fumitory. Scattered grasses and sedges. Lichens may be present in open conditions.
Leaf litter	

### Calcareous Talus Forest/Woodland

S3

Description/Concept	Open to closed canopy on boulder-strewn slopes. Often a gradient of vegetation, with exposed calcareous rocks at the base of the cliff above the talus slope, and gradually more trees to the base of the slope. Small slopes may have canopy coverage from surrounding trees.
Topography	Slopes, often below cliffs or rock outcrops.
Soils/Substrate	Loose talus composed of calcareous boulders such as limestone or dolomite. In rich woods, soil between boulders is usually moist and loamy.
Canopy	Scattered and clumped trees. <b>Sugar maple usually dominant.</b>
Sub-canopy	Species include hop-hornbeam and striped maple.
Shrub layer	Tall shrubs. Shrubs abundant if canopy is open. Shrubs include round-leaved dogwood, downy arrow-wood, and purple flowering raspberry.
Herb layer	Dominated by vines and ferns. Includes meadow rue, Jack-in-the-pulpit, white avens, bottlebrush-grass, broad-leaved woodland-sedge, and walking fern.
Leaf litter	

**Acidic Talus Forest/Woodland**

**S4**

Description/Concept	Open to closed canopy on boulder-strewn slopes. Often a gradient of vegetation, with exposed rocks at the base of the cliff above the talus slope, and gradually more trees to the base of the slope. Small slopes may have closed canopy coverage from surrounding trees.
Topography	Loose rocky slopes, often below cliffs or rock outcrops.
Soils/Substrate	Talus derived from acidic bedrock.
Canopy	Open to closed. Scattered and clumped trees. Mixture of deciduous forest species, including: northern red oak, sugar maple, red maple, black birch, paper birch, yellow birch, gray birch, American beech, hemlock, and white pine.
Sub-canopy	
Shrub layer	Tall, scattered shrubs. Shrubs include currants, purple-flowering raspberry, mountain maple, striped maple, and maple-leaf viburnum.
Herb layer	Dominated by vines and ferns. Includes marginal wood-fern, common (rock) polypody, bracken, Pennsylvania sedge, pale corydalis, silverrod, Virginia creeper, and poison ivy. Scattered grasses and sedges. Lichens often cover exposed rocks.
Leaf litter	Ground cover of moss or lichen covered boulders and deciduous litter.

**Known Distribution of Talus Forest/Woodland Communities**

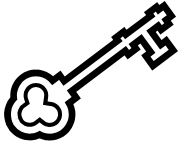
Community Type	Berkshires	Connecticut Valley	Worcester Plateau	Eastern Mass.	Cape & Islands
Acidic Talus Forest/Woodland	X	X	X		
Calcareous Talus Forest/Woodland	X	X			
Circumneutral Talus Forest/Woodland		X	X	X	

## Plants Associated with Talus Forest/Woodland Communities

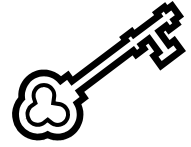
	Acidic Talus Forest/Woodland	Circumneutral Talus Forest/Woodland	Calcareous Talus Forest/Woodland
Arrow-wood, Downy			Occurs
Ash, White		Occurs	
Avens, White			Occurs
Beech, American	Occurs		
Birch, Black	Occurs	Occurs	
Birch, Gray	Occurs		
Birch, Paper	Occurs	Occurs	
Birch, Yellow	Occurs		
Bottlebrush-grass			Occurs
Bracken (fern)	Occurs		
Bush Honeysuckle		Occurs	
Clematis		Occurs	
Corydalis, Pale	Occurs		
Currant	Occurs		
Dogwood, Round-leaved		Occurs	Occurs
Fern, Walking			Occurs
Fumitory, Climbing		Occurs	
Grass	Occurs	Occurs	
Hazelnut		Occurs	
Hemlock, Eastern	Occurs		
Herb Robert		Occurs	
Hickory, Pignut		Occurs	
Hickory, Sweet Pignut		Occurs	
Hop-hornbeam		Occurs	Occurs
Jack-in-the-pulpit			Occurs
Lichen	Occurs	Occurs	
Maple, Mountain	Occurs		
Maple, Red	Occurs	Occurs	
Maple, Striped	Occurs	Occurs	Occurs
Maple, Sugar	Occurs	Occurs	Dominant (usually)
Meadow-rue			Occurs
Moss	Occurs		
Oak, Northern Red	Occurs	Occurs	
Pine, White	Occurs		
Poison Ivy	Occurs	Occurs	
Polypody, Common (Rock)	Occurs	Occurs	
Raspberry, Purple-flowering	Occurs		Occurs
Sedge	Occurs	Occurs	
Sedge, Pennsylvania	Occurs		
Silverrod	Occurs		
Viburnum, Maple-leaf	Occurs	Occurs	
Virginia Creeper	Occurs	Occurs	
Witch-hazel		Occurs	
Woodland-sedge, Broad-leaved			Occurs
Wood-fern, Marginal	Occurs	Occurs	

**NOTE:** This is not an exhaustive list of plant species that occur in these communities. Rather, it is a list of species associated with these communities as identified in Swain and Kearsley (2001.)

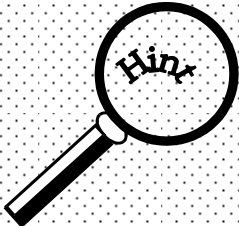
## CONIFER FOREST/WOODLAND COMMUNITIES



Shortcut Key: Check full descriptions following use of keys



1. Hemlock dominated community with 80-100% canopy closure.      A. Yes - Hemlock Ravine <sup>a</sup>  
B. No – Go to 2
2. Balsam fir dominated community located at high elevation.      A. Yes – High Elevation Spruce – Fir Forest/Woodland  
B. No – Go to 3
3. White pine dominated community.      A. Yes – Successional White Pine Forest

	<p>Successional White Pine communities are more variable than indicated in the community description. By default, <b>any</b> conifer forest dominated by white pine must be classified as Successional White Pine. However, pure stands of mature white pine likely represent past human activities and are, therefore, a cultural community</p> <p>Timber stands dominated by conifers not listed in the key cannot be identified to community under the State's classification system as they are cultural, not natural, communities. <sup>b</sup></p>
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- a. At present, hemlock dominated areas other than ravines must be identified as either the Oak-Hemlock-White Pine or the Northern Hardwoods-Hemlock-White Pine community type.
- b. [Decision Rules permit the classification of stands of conifers. If the canopy is >75% conifers, and the boundaries of the stand are geometrically regular or the trees are in rows, the stand may be classified as a plantation (PLT.)]

## Descriptions of Conifer Forest/Woodland Communities

### Hemlock Ravine

**S4**

Description/Concept	A hemlock dominated community with 80-100% closure. Little understory. Usually occurs as community within oak-hemlock-white pine community.
Topography	Usually on North-facing slopes or ravines.
Soils/Substrate	Usually on acidic rock or outcrops.
Canopy	Hemlock dominated. Other species at low percentages include red, scarlet, white, and black oaks, and red maple.
Sub-canopy	
Shrub layer	Sparse. Occasional individuals of canopy species and small patches of mountain laurel.
Herb layer	Essentially non-existent.
Leaf litter	Covered by needles, twigs, and small branches.

**[Decision Rule: He rv category = >75% hemlock canopy closure on ravines and north-facing slopes.]**

### Successional White Pine Forest

**S5**

Description/Concept	Old field white pine, several decades after establishment. Other species co-occur, but seldom share dominance.
Topography	
Soils/Substrate	Abandoned agricultural land, usually pasture.
Canopy	White pine, with scattered white oak, northern red oak, and red maple.
Sub-canopy	
Shrub layer	Variable density, from sparse to thick. Includes elderberry, black cherry, and maple-leaved viburnum. Often includes non-native species such as buckthorn, multiflora rose, and honeysuckle. Lowbush blueberry forms patches mixed with black huckleberry on less disturbed sites.
Herb layer	“Thin” or variable. Canada mayflower, starflower, and clubmosses common on formerly plowed soil. Partridgeberry, fringed polygala, and pink lady’s slipper grow in long established sites. Bracken is often common.
Leaf litter	Forest floor carpeted with needles. Blackberry vines and poison ivy often cover ground near openings in formerly open, disturbed areas.

**[Decision Rule: WP s category = >75% white pine.]**

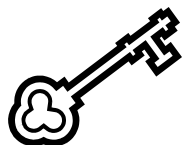
### High Elevation Spruce – Fir Forest/Woodland

**S2**

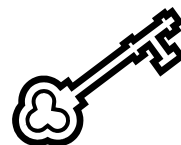
Description/Concept	Low diversity coniferous forest of high-elevations, dominated by balsam fir and red spruce. Trees often stunted from wind exposure.
Topography	Located on stony slopes or ridgetops of tallest, most exposed mountains in Massachusetts.
Soils/Substrate	
Canopy	Balsam fir dominant, in association with red spruce, and birches (paper, heart-leaf paper, and yellow.)
Sub-canopy	
Shrub layer	Where there is light, mountain maple, mountain holly, American mountain-ash, and hobblebush may grow.
Herb layer	Bluebead lily, mountain wood sorrel, bunchberry, and clubmoss may be present.
Leaf litter	Mosses or thick layer of needles.

**[Decision Rule: SF hi category = >75% spruce-fir (combined) on high elevations.]**

## MIXED CONIFEROUS-DECIDUOUS FOREST/WOODLAND COMMUNITIES




**Shortcut Key: Check full descriptions and supporting  
information following use of key**



- |   |  |
|---|--|
| 1. Red spruce dominant or co-dominant.  | A. Yes – Spruce – Fir Northern Hardwood Forest<br>B. No – Go to 2          |
| 2. Hemlock present, may range from scattered to dominant.   | A. Yes – Go to 3<br>B. No – Go to 5  |
| 3. Northern hardwoods (e.g., sugar maple, yellow birch, paper birch) present, likely characteristic. Shrub layer open, often with clumps of hobblebush, red-berried elderberry, fly honeysuckle, and striped maple. | A. Yes – Northern Hardwoods – Hemlock-White Pine Forest<br>B. No – Go to 4 |
| 4. White, chestnut, and/or red oaks in association with hemlock and white pine. Beech is a common associate. Chestnut commonly occurs in shrub layer.   | A. Yes – Oak – Hemlock – White Pine Forest <sup>a</sup>                    |
| 5. White pine constitutes 25-75% of canopy.   | A. Yes – White Pine – Oak Forest <sup>b</sup><br>B. No – Go to 6           |
| 6. Red cedar constitutes 25-75% of canopy.  | A. Yes – Maritime Juniper Woodland<br>B. No – Go to 7                      |
| 7. Pitch pine constitutes 25-75% of canopy.   | A. Yes – Pitch Pine – Oak Forest<br>B. No – Go to 8                        |
| 8. Mixed oak community with pitch pine, red maple, American holly, and sassafras possibly present.  | A. Yes – Go to 9   |
| 9. Community is within direct influence of salt spray, tree tops sculpted by wind and salt.   | A. Yes – Maritime Oak-Holly Forest<br>B. No – Go to 10                     |
| 10. Community is sheltered from daily salt spray, tree tops not sculpted by wind and salt.  | A. Yes – Coastal Forest/Woodland <sup>c</sup>                              |

*Footnotes and hints are provided on the next page.*

- a. “Pure” stands of American beech are classified as Oak-Hemlock-White Pine, even if there is no oak, hemlock, or white pine present. This is a function of American beech being a component of the oak-hemlock-white pine community that varies both in space and time.
- b. In Southeastern Massachusetts a variant of this community, dominated by terrestrial red maple with white pine and oak, is common. This variant extends from Wrentham south and east toward the coast.
- c. Swain and Kearsley (2001) identify the Coastal Forest/Woodland community as a Mixed Coniferous-Deciduous Forest/Woodland community. However, there are examples of this community that have virtually no coniferous component. As a result, this community may not key out as a Mixed Coniferous-Deciduous Forest/Woodland community. To address this, the community has also been included in the section on Deciduous Forest/Woodlands.

	<p>Some Mixed Coniferous-Deciduous Forest/Woodland communities are not easily identified solely on the basis of vegetation. For example, the Coastal Forest/Woodland Community has vegetation that is similar to both the Pitch Pine-Oak Forest and the White Pine-Oak Forest communities.</p> <p>Because of this you must consider where the community is located to arrive at a correct identification.</p>
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## Locations of Mixed Coniferous-Deciduous Forest/Woodland Communities

Location	Community Type
Within daily salt spray influence	Maritime Oak-Holly Forest/Woodland
	Maritime Juniper Woodland/Shrubland
Coastal, but beyond daily salt spray influence	Coastal Forest/Woodland
Beyond reach of salt spray, not coastal	Pitch Pine – Oak Forest
	White Pine – Oak Forest
	Oak – Hemlock – White Pine Forest
	Northern Hardwoods – Hemlock – White Pine
	Spruce – Fir – Northern Hardwood Forest

## Understory Characteristics of Mixed Coniferous/Deciduous Forest/Woodland Communities

Understory	Community Type
Ericaceous shrub layer (e.g., blueberry and huckleberry)	Coastal Forest/Woodland
	Pitch Pine – Oak Forest
	White Pine – Oak Forest (possible)
Maritime Shrub Layer (e.g., bayberry, winged sumac)	Maritime Oak – Holly Forest/Woodland
	Maritime Juniper Woodland
Blueberry present with witch hazel, mountain laurel, and maple-leaved viburnum present.	Oak – Hemlock – White Pine Forest
Blueberry and huckleberry absent or nearly so. Diverse understory characteristic of moderately rich soils: hobblebush, red-berried elderberry, fly-honeysuckle, striped maple, intermediate wood-fern, Christmas fern, occasionally spring herbaceous species.	Northern Hardwoods – Hemlock – White Pine
Blueberry and huckleberry absent or nearly so. Diverse understory with mountain maple, red-berried elderberry, northern mountain ash, hobblebush, bunchberry, creeping snowberry, and (occasionally) twinflower. Herb layer tends to be sparse.	Spruce – Fir – Northern Hardwood Forest

## Descriptions of Mixed Coniferous-Deciduous Forest/Woodland Communities

### Spruce – Fir – Northern Hardwood Forest

S4

Description/Concept	A northern and higher elevation mixed spruce – northern hardwood forest. A community of variable dominance. Grades into Northern Hardwoods – Hemlock – White Pine Forest on moister, warmer slopes.
Topography	
Soils/Substrate	Cool and typically rocky soils, nutrient poor, somewhat dry and acidic.
Canopy	<b>Red spruce dominant or...</b> <b>Red spruce co-dominant with sugar maple and America beech, or...</b> <b>Sugar maple and American beech dominant, with abundant yellow birch and smaller amounts of red spruce and/or balsam fir.</b> Hemlock may be abundant or scattered. Paper birch and heart-leaf paper birch usually occur as scattered individuals.
Sub-canopy	
Shrub layer	<b>Characteristic shrubs include mountain maple, red-berried elderberry, northern mountain-ash, and hobblebush.</b> Low shrub layer of bunchberry, creeping snowberry, and occasionally, twinflower.
Herb layer	Sparse, especially when spruce is abundant. Includes intermediate fern, mountain wood-fern, bluebead lily, painted trillium, and wood-sorrel.
Leaf litter	

[Decision Rules: NHS category = >25% and <75% hardwoods, of which >75% is northern hardwoods, and >25% and <75% conifers.]

SFNH category = >75% spruce-fir-hemlock (combined) and >50% spruce-fir combined and <50% hemlock.]

NHSF category = >25% and <75% hardwoods and >25% and <75% spruce-fir.]

### Oak – Hemlock – White Pine Forest

S5

Description/Concept	A mixed conifer-hardwood forest often occurring on dry, acidic slopes.
Topography	Mid-slope on shallow, well-drained soils. Not sensitive to aspect.
Soils/Substrate	
Canopy	Canopy has oaks (red, white, chestnut), black birch, black cherry, and red maple in association with hemlock and white pine. Relative proportions vary among sites. Beech is a common associate, and may form a monoculture in some instances.
Sub-canopy	
Shrub layer	Patchy and sparse. <b>Witch-hazel, mountain laurel, lowbush blueberry, and maple-leaf viburnum characteristically present.</b> Chestnut sprouts are common.
Herb layer	Sparse, with low diversity. Indian cucumber, wintergreen, wild sarsaparilla, wild oats, starflower, and Canada mayflower typical.
Leaf litter	

[Decision Rules: OKHeWP category = 50-75% hardwoods; 25-50% hemlock; 0-25% white pine;

HeWpOk category = 25-75% hemlock; 0-50% white pine; 25-50% hardwoods.]

**Northern Hardwoods – Hemlock – White Pine Forest**

**S5**

Description/Concept	Closed canopy forest dominated by a mix of evergreen and deciduous trees. Sparse shrub and herb layer. Variable species composition: ranges from hemlock in pure stands to a deciduous forest with scattered hemlocks.
Topography	North facing slopes and ravines (and northern areas).
Soils/Substrate	Dry to mesic, moderately acidic conditions.
Canopy	Variable combinations of hemlock, sugar maple, yellow birch, black cherry and northern red oak, and white pine. Paper birch, quaking aspen, red maple, and yellow birch are often scattered among the canopy.
Sub-canopy	
Shrub layer	Open, with scattered clumps of shrubs. Hobblebush, red-berried elderberry, fly-honeysuckle, and striped maple typical of shrubs.
Herb layer	Sparse but diverse. Intermediate wood-fern, Christmas fern, clubmosses, Canada mayflower, white wood-aster, and wild sarsaparilla typical. Occasional spring herbaceous species including: painted trillium; early yellow violet, broad-leaved spring beauty; and trout-lily.
Leaf litter	

**[Decision Rules: NHHwP category = 50-75% hardwoods, 25-50% hemlock, and 0-25% white pine.  
HeWpNH category = 25-75% hemlock, 0-50% white pine, and 25-50% hardwoods.  
NHwP category = 50-75% hardwoods and 25-50% white pine.  
WpNH category = 50-75% white pine and 25-50% hardwoods.  
HeWp category = >75% hemlock-white pine (combined) of which >25% hemlock.]**

**White Pine – Oak Forest**

**S5**

Description/Concept	A forest of mixed dominance with oaks and white pine in the canopy. Often in successional sequence from white pine forest.
Topography	On moraine or till.
Soils/Substrate	
Canopy	White pine and oaks (red, scarlet, black, white, chestnut) dominate the canopy in varying proportions. Pitch pine, white birch, red maple, and black birch occur regularly in low numbers. Southern areas have pignut hickory and sassafras.
Sub-canopy	
Shrub layer	Chestnut present as shrubby tree. <b>Usually prominent heath shrub layer</b> , including lowbush blueberry, huckleberry, mountain, laurel, and sheep laurel. Maple-leaf viburnum may also be present.
Herb layer	Sparse. Characteristic species include bracken, wild sarsaparilla, Canada mayflower, wintergreen, partridge-berry, pink lady’s slipper, cow-wheat, and whorled loosestrife.
Leaf litter	

**[Decision Rules: WpOk category = 50-75% white pine; 25-50% hardwoods;  
CHWp category = 50-75% hardwoods; 25-50% white pine.]**

**Maritime Juniper Woodland/Shrubland**

**S1**

Description/Concept	<b>Predominantly evergreen</b> woodland/shrubland. <b>Within direct influence of ocean salt and spray.</b> Shorter than interior forests. May be protected from direct spray by crests of dunes.
Topography	Tend to occur in interdunal areas, backs of dunes, exposed bluffs, salt marsh borders, and, to a lesser extent, on rocky headlands.
Soils/Substrate	Sandy, rocky headlands.
Canopy	Trees short (<5 m) and sculpted by wind and salt spray. Red cedar dominates but occurs in variable, usually low densities. In association with pitch pine, oaks, red maple, American holly, and black cherry.
Sub-canopy	
Shrub layer	Bayberry, winged sumac, and beach heather often in association with canopy species listed above.
Herb layer	Highly variable. Little bluestem, American beach grass, and sedges.
Leaf litter	

**[Decision Rules: Ju ma community = >50% of 1, 2, or 3 species: red cedar, pitch pine, central hardwoods, and 25-75% red cedar.]**

**NOTE:** This community is listed in both the Shrublands and the Forest/Woodlands sections of this guide.

**Pitch Pine – Oak Forest**

**S5**

Description/Concept	Dry oak/pine forest. This is <b>the matrix forest in Southeastern Massachusetts.</b> Inland, away from regular oceanic influences. Proportion of species variable, ranging from predominantly pine to predominantly oaks. Open canopy with thick understory to closed canopy with scattered clumps of shrubs.
Topography	Moraines, till, outwash, southerly exposures and rocky slopes.
Soils/Substrate	Dry, low nutrient acidic soils.
Canopy	Pitch pine and tree oaks (black, scarlet, chestnut, and white). White pine and red maple occasionally contribute to the canopy.
Sub-canopy	
Shrub layer	Scattered, often continuous, openings of scrub oak and dwarf chinquapin oak. Often continuous, low ericaceous shrub layer. Common species are black huckleberry and lowbush blueberries. Briers may form dense barriers around openings.
Herb layer	Sparse, with bracken, wild sarsaparilla, wintergreen, Pennsylvania sedge, and pink lady’s slipper.
Leaf litter	

**[Decision Rules: PpOK category = >50% pitch pine and oaks; with 25-75% pitch pine and 25-75% oak;  
PpOk sb category = >50% pitch pine and scrub oak; with 25-75% of each;  
PP/OK category = >75% pitch pine.]**

**Maritime Oak – Holly Forest/Woodland****S1**

Description/Concept	Mixed deciduous/evergreen forest/woodland within salt spray zone. Treetops sculpted by wind and salt. Trees tend to be <10 m.
Topography	Bluffs, backs of dunes, interdunal areas, salt marsh borders, and rocky headlands.
Soils/Substrate	
Canopy	Scarlet oak, black oak, other oaks, American holly, sassafras, black gum, black cherry are commonly present in variable amounts. Pitch pine and eastern red cedar occur in variable amounts.
Sub-canopy	
Shrub layer	Includes bayberry, winged sumac, and sweet pepper-bush. Vines may be dense on edges; including catbrier, poison ivy, Virginia creeper, and/or grape. In low (i.e., wet) areas may include azaleas, viburnums, high bush blueberry, and winterberry.
Herb layer	Highly variable, may include grasses and sedges. In low (i.e., wet) areas species may include columbine, starry Solomon's seal, and skunk meadow-rue.
Leaf litter	

**Coastal Forest/Woodland****S3**

Description/Concept	Occurs near the ocean, but sheltered from daily salt spray. Shorter than inland forests and taller than maritime forests. Found in more protected areas along the coast (e.g., behind dunes, behind maritime forests). Coastal and maritime forests grade into each other. Vines on edges and openings.
Topography	
Soils/Substrate	
Canopy	Scarlet, black, white, and chestnut oaks are dominant. Post oak important in Buzzards Bay area and along portions of Cape Cod Bay. Red maple, sassafras, black cherry, black gum, American beech, pitch pine, and white pine commonly occur. (Usually low %, but may be abundant.)
Sub-canopy	American holly is a regular associate in Southeastern Massachusetts. (If abundant it is a Maritime Oak/Holly Forest.)
Shrub layer	A low shrub, heath layer. Often dense, particularly near edges. Dominated by lowbush blueberries and black huckleberry. Sweet pepper-bush abundant at some sites.
Herb layer	Typically sparse. Typical species include Pennsylvania sedge, bracken, wintergreen, wild sarsaparilla. Greater species diversity under canopy openings, little bluestem, Canadian rockrose, bush clovers, milkworts, and bearberry occur.
Leaf litter	

**NOTE:** This community has been included in both the Mixed Coniferous-Deciduous and Deciduous Forest sections. This has been done to reflect the variation observed in this community. Officially, MNHESP lists it as a Mixed Coniferous – Deciduous community.

## Plants Associated with Mixed Coniferous – Deciduous Forest/Woodland Communities

	Spruce-Fir - Northern Hardwoods	Northern Hardwood - Hemlock - White Pine	Oak - Hemlock - White Pine	White Pine - Oak	Maritime Juniper	Pitch Pine Oak	Maritime Oak - Holly	Coastal Forest
Aspen, Quaking		Occurs						
Bayberry					Occurs		Occurs	
Azalea							Occurs	
Beachgrass, American					Occurs			
Bearberry								Occurs
Beech, American	(Co-)Dominant		Common					Occurs
Birch, Black			Char.	Occurs				
Birch, Heart-leaf Paper	Occurs							
Birch, Paper	Occurs	Occurs						
Birch, White				Occurs				
Birch, Yellow	Abundant	Common						
Blueberry, Highbush							Occurs	
Blueberry, Lowbush			Char.	Occurs		Char.		Char.
Bluestem, Little					Occurs			Occurs
Bracken (fern)				Char.		Occurs		Occurs
Bunchberry	Occurs							
Bush-clover								Occurs
Catbrier						Occurs	Occurs	
Cedar, Eastern Red					Dominant		Occurs	
Cherry, Black		Common	Char.		Occurs		Comm. Pres.	Occurs
Chestnut, American			Common	Occurs				
Clubmoss		Occurs						
Columbine							Occurs	
Cow-wheat				Char.				
Elderberry, Red-berried	Char.	Common						
Fern, Christmas		Occurs						
Fern, Intermediate	Occurs							
Fir, Balsam	Occurs							
Fly Honeysuckle		Common						
Grape							Occurs	
Grass							Occurs	
Gum, Black							Comm. Pres.	Occurs
Heather, Beach					Occurs			
Hemlock, Eastern	Occurs	Common	Char.					
Hickory, Pignut				Occurs				
Hobblebush	Char.	Common						
Holly, American					Occurs		Comm. Pres.	Occurs
Huckleberry, Black				Occurs		Char.		Char.
Indian Cucumber			Typical					
Lady's Slipper, Pink				Char.		Occurs		
Laurel, Mountain			Char.	Occurs				
Laurel, Sheep				Occurs				
Lily, Blue-bead	Occurs							
Lily, Trout-		Occurs						
Loosestrife, Whorled				Char.				
Maple, Mountain	Char.							
Maple, Red		Occurs	Char.	Occurs	Occurs	Occurs	Comm. Pres.	Occurs
Maple, Striped		Common						

**Plants Associated with Mixed Coniferous – Deciduous  
Forest/Woodland Communities (continued)**

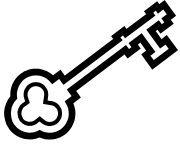
	Spruce – Fir Northern Hardwoods	Northern Hardwood - Hemlock - -White Pine	Oak- Hemlock- White Pine	White Pine Oak Forest	Maritime Juniper	Pitch Pine Oak	Maritime Oak-Holly	Coastal Forest
Maple, Sugar	(Co-)Dominant	Common						
Mayflower, Canada		Occurs	Typical	Char.				
Meadow-rue, Skunk							Occurs	
Milkwort								Occurs
Mountain-Ash, Northern	Char.							
Oak					Occurs		Occurs	
Oak, Black				Dominant		Dominant	Comm. Pres.	Dominant
Oak, Chestnut			Char.	Dominant		Dominant		Dominant
Oak, Dwarf Chinquapin						Occurs		
Oak, Northern Red		Common	Char.	Dominant				
Oak, Post								Occurs
Oak, Scarlet				Dominant		Dominant	Comm. Pres.	Dominant
Oak, Scrub						Occurs		
Oak, White			Char.	Dominant		Dominant		Dominant
Oats, Wild			Typical					
Partridge Berry				Char.				
Pepper-bush, Sweet							Occurs	Occurs
Pine, Pitch				Occurs	Occurs	Dominant	Occurs	Occurs
Pine, White		Common	Char.	Dominant		Occurs		Occurs
Poison Ivy							Occurs	
Rockrose, Canadian								Occurs
Sarsaparilla, Wild		Occurs	Typical	Char.		Occurs		Occurs
Sassafras				Occurs			Comm. Pres.	Occurs
Sedge					Occurs		Occurs	
Sedge, Pennsylvania						Occurs		Occurs
Snowberry, Creeping	Occurs							
Solomon's Seal, Starry							Occurs	
Sorrel, Wood	Occurs							
Spring Beauty, Broad-leaved		Occurs						
Spruce, Red	(Co-)Dominant							
Starflower			Typical					
Sumac, Winged					Occurs		Occurs	
Trillium, Painted	Occurs	Occurs						
Twinflower	Occurs							
Viburnum, Maple-leaf			Char.	Occurs				
Violet, Early Yellow		Occurs						
Virginia Creeper							Occurs	
Winterberry							Occurs	
Wintergreen			Typical	Char.		Occurs		Occurs
Witch-Hazel			Char.					
Wood-Aster, White		Occurs						
Wood-fern, Intermediate		Occurs						
Wood-fern, Mountain	Occurs							

Comm. Pres. = Commonly Present

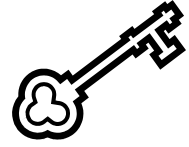
Char. = Characteristic

**NOTE:** This is not an exhaustive list of plant species that occur in these communities. Rather, it is a list of species associated with these communities as identified in Swain and Kearsley (2001.)

## DECIDUOUS FOREST/WOODLAND COMMUNITIES



**Shortcut Key: Check full descriptions following use of key**



1. Shrub and herbaceous layer typical of wetlands and/or mesic areas. Water flowing or seeping from ground.  
A. Yes – Go to 2  
B. No – Go to 4
2. Calcareous indicator species, (e.g., shrubby cinquefoil, alder-leaf buckthorn, wild black currant, yellow sedge) present.  
A. Yes – Calcareous Forest Seep  
B. No – Go to 3
3. Shrub and herb layer characteristic of typical (i.e. not calcareous) wetlands present.  
A. Yes – Forest Seep
4. Sugar maple present and/or dominant.  
A. Yes – Go to 5  
B. No – Go to 9
5. Yellow oak present and/or dominant, site located on shallow rock.  
A. Yes – Yellow Oak Dry Calcareous Forest  
B. No – Go to 6
6. Hickories in canopy and hop-hornbeam present as regular and abundant sub-canopy tree. Layer of nearly continuous graminoids.  
A. Yes – Hickory – Hop-hornbeam Forest  
B. No – Go to 7
7. Northern red oak, American beech, and black birch characterize canopy.  
A. Yes – Red Oak – Sugar Maple Transition Forest  
B. No – Go to 8
8. Elm and/or basswood present and characteristic. Oaks do not dominate canopy.  
A. Yes – Rich Mesic Forest  
B. No – Dry, Rich Acidic Oak Forest
9. Quaking aspen, white birch, red maple and/or black cherry dominate community. Oaks are not dominant.  
A. Yes – Successional Northern Hardwoods  
B. No – Go to 10

*Key continued on next page.*



## Descriptions of Deciduous Forest Communities

### Calcareous Forest Seep

**S2**

Description/Concept	Within forests on slopes, with springs or seeps containing water with dissolved calcium. Canopy similar to surrounding forest, shrub and herb layer species typical of calcareous wetlands.
Topography	Slope.
Soils/Substrate	
Canopy	Usually occur within rich northern hardwoods, such as sugar maple, white ash, American beech, black birch, and white oak. Also occurs within white pine and hickories. Black ash may be present.
Sub-canopy	
Shrub layer	Witch-hazel, ironwood, alternate-leaved dogwood, striped maple, and young of canopy species.
Herb layer	Varies from sparse to continuous. Includes many widespread wetland species, such as sensitive fern, yellow jewelweed, and Jack-in-the-pulpit. Key indicators include: shrubby cinquefoil, alder-leaf buckthorn, wild black currant, yellow sedge, porcupine sedge, hoary willow, autumn willow, purple avens, rough-leaved goldenrod, and grass-of-Parnassus.
Leaf litter	

### Forest Seep

**S4**

Description/Concept	Forest on slopes with springs or seeps. Canopy similar to surrounding forest.
Topography	Slope.
Soils/Substrate	
Canopy	Usually northern hardwood species, such as sugar maple, white ash, red maple, yellow birch, and paper birch. Hemlock, red spruce, and white pines may occur scattered among hardwoods.
Sub-canopy	
Shrub layer	Typical of wetlands or mesic areas.
Herb layer	Typical of wetlands or mesic areas. Ferns typical, including cinnamon fern; ostrich fern; silvery spleenwort, rattlesnake fern, and Christmas fern. Golden saxifrage, scouring rush, false hellebore, water avens, and sedges also occur.
Leaf litter	

**Yellow Oak Dry Calcareous Forest****S2**

Description/Concept	A dry, often open, oak – sugar maple forest with a rich understory.
Topography	Well-drained slopes or low ridges underlain with calcareous rocks.
Soils/Substrate	Shallow rock.
Canopy	Yellow oak (characteristic) growing mixed with sugar maple, white oak, and black oak; associated with white ash and shagbark hickory. Scattered white pine and northern red oak occur regularly.
Sub-canopy	Hop-hornbeam, hackberry, and flowering dogwood, and bladderwort.
Shrub layer	
Herb layer	Rich in species, including four-leaved milkweed, sickle-pod, thread-leaved sedge, broad-leaved ragwort, and wild geranium. In disturbed areas, eastern red cedar, and quaking aspen may occur.
Leaf litter	

**Hickory – Hop-hornbeam Forest/Woodland****S2**

Description/Concept	Open, mixed hardwood forest. Great variation in environmental conditions among sites. Occurs in pockets of larger oak forests.
Topography	Generally located in mid-slope on southern or eastern exposures below balds, outcrops, and traprock ridges.
Soils/Substrate	Deep, moist soils.
Canopy	Variable mixture of hardwoods, including: sugar maple, white ash, and northern red oak.
Sub-canopy	<b>Hickories (shagbark, pignut, sweet pignut) and hop-hornbeam regular and abundant.</b>
Shrub layer	
Herb layer	Nearly continuous cover of graminoids, including: Pennsylvania sedge, other sedges, grasses (e.g., bottlebush grass), poverty grass, and Canada bluegrass, with scattered three-lobed violets, hepaticas, and tick-trefoils.
Leaf litter	

**Red Oak – Sugar Maple Transition Forest****S4**

Description/Concept	Mix of northern (maples) and southern (oaks) hardwoods. May be old field successional or formerly managed woodlots.
Topography	Mid-slope.
Soils/Substrate	Moderate nutrients. Not very acidic.
Canopy	<b>Red oak, sugar maple, beech, and black birch with admixture of white pine and hemlock.</b> White oak, red maple, white ash, and yellow birch are regular associates.
Sub-canopy	
Shrub layer	Striped maple, maple-leaf viburnum, hobblebush and witch-hazel are typical shrubs. Lowbush blueberry is abundant in more coniferous dominated sites.
Herb layer	Neither dense nor sparse; often with patches of clonal species. Wild sarsaparilla, bracken, hay-scented fern, clubmosses, Indian cucumber, Canada mayflower, whorled wood aster, and broad-leaved woodland sedge.
Leaf litter	

**[Decision Rule: RoHm = >25% red oak and >25% sugar maple.]**

**Rich, Mesic Forest Community****S3**

Description/Concept	Dominated by sugar maple. <b>Understory species may be diagnostic.</b>
Topography	North or east facing concave middle to lower slopes.
Soils/Substrate	Enriched by down slope movement. Usually deep, rich in nutrients.
Canopy	Dominated by sugar maple. White ash, bitternut hickory, elm, and basswood characteristic.
Sub-canopy	Hop-hornbeam common.
Shrub layer	Sparse. Alternate-leaved dogwood, leatherwood, or red-berried elderberry may be present.
Herb layer	Diverse, with abundant spring ephemerals in moist, nutrient rich environment. Combinations of any of the following indicates a rich, mesic forest community: bloodroot, maidenhair fern, blue cohosh, sweet cicely, Dutchman's breeches, squirrel corn, toothwort, wild leek, wild ginger, white baneberry, Goldie's fern, and zigzag goldenrod. <b>Plantain-leaf sedge is a good indicator of this community, and is visible year-round.</b>
Leaf litter	<1 year's accumulation; quickly incorporated into soil.

**Dry, Rich Acidic Oak Forest****S4**

Description/Concept	Deciduous forest with rich understory of herbs and grasses.
Topography	Mid-slope and coves, overwash and down-slope movement produce enriched soil.
Soils/Substrate	Slightly acid, often rocky of intermediate fertility. Well-drained loams.
Canopy	Dominated by a mixture of oaks (red, white, scarlet), maples (red and sugar), white ash, and hickories (shagbark, pignut, sweet pignut.)
Sub-canopy	Open. Flowering dogwood and hop-hornbeam.
Shrub layer	Fairly sparse. Fewer ericaceous plants than other oak forests. Maple-leaf viburnum and saplings of canopy species.
Herb layer	Rich. Perfoliate bellwort, four-leaved milkweed, early meadow rue, false foxgloves, wild coffee, bush clovers, tick trefoils, and sedges.
Leaf litter	

**Successional Northern Hardwoods****S4**

Description/Concept	A broadly defined time sequence of forest communities, ranging from young sprouts to mature. Occurs in areas with past disturbance (e.g., cutting, hurricane, or fire) within northern hardwood areas.
Topography	Slope.
Soils/Substrate	
Canopy	Seldom closed. Quaking aspen, white birch, red maple, and/or black cherry dominate. Gray birch common on well drained soils. Pin cherry is a common associate.
Sub-canopy	Young trees of shade tolerant species.
Shrub layer	May be dense or open. Species variable, depending on surrounding seed sources and disturbance history.
Herb layer	Species variable, depending on surrounding seed sources and disturbance history.
Leaf litter	

**[Decision Rules: NHs = >50% shade intolerant northern hardwood species (singly or combined.)]**

**Ridgetop Chestnut Oak Forest/Woodland****S4**

Description/Concept	Open forest of dry ridge tops.
Topography	On upper south or southwest facing slopes.
Soils/Substrate	Dry sites with thin soil over bedrock.
Canopy	Dominated by chestnut oak. Associates include black, red, scarlet, and/or white oaks; shagbark and pignut hickories, red maple, hemlock, and white and pitch pines.
Sub-canopy	
Shrub layer	Often dense red cedar, scrub oak, dwarf chinquapin oak, lowbush blueberries, huckleberry, and mountain laurel.
Herb layer	Sparse. Includes false foxgloves, sedges, bracken, and wintergreen.
Leaf litter	Deep oak leaf litter.

**Oak – Hickory Forest****S4**

Description/Concept	Hardwood forest dominated by oaks, hickories mixed in at lower density. Broadly defined, variable, forest type. <b>Hickory seldom dominant enough to warrant being part of community name.</b>
Topography	Upper slopes, ridge tops, usually with west and south facing aspects.
Soils/Substrate	Well drained sites.
Canopy	Dominated by one or more oak species (red, white, black, scarlet). One or more hickories mixed in at lower densities. Other trees include ash, black birch, sassafras, and red maple.
Sub-canopy	Hop-hornbeam, flowering dogwood, shadbush, chestnut, and witch-hazel.
Shrub layer	Low, common, diverse. Maple-leaved viburnum, blueberries, New Jersey tea, hazelnuts, and gray dogwood are characteristic.
Herb layer	Richer than many oak forests. Typical plants include hepatica, silverrod, tick-trefoil, wild sarsaparilla, rattlesnake weed, false Solomon's seal, and Pennsylvania sedge.
Leaf litter	

**Black Oak – Scarlet Oak Forest/Woodland****S3/S4**

Description/Concept	Fairly open, oak/heath community; maintained by regular light fire.
Topography	Dry, sandy, or rocky slopes; other xeric sites.
Soils/Substrate	Sand/rock.
Canopy	<b>Dominated by black and scarlet oak.</b> White oak and red maple are common associates.
Sub-canopy	Sparse. Gray birch, black cherry, sassafras, flowering dogwood, and shadbush.
Shrub layer	Dense and clumped. Lowbush blueberry, huckleberry, scrub oak; also maple-leaf viburnum and American hazelnut.
Herb layer	Scattered and open. Sedges (including Pennsylvania), bracken, and pink lady's slipper.
Leaf litter	Deep oak leaf litter.

**Coastal Forest/Woodland****S3**

Description/Concept	Occurs near the ocean, but sheltered from daily salt spray. Shorter than inland forests and taller than maritime forests. Found in more protected areas along the coast (e.g., behind dunes, behind maritime forests). Coastal and maritime forests grade into each other. Vines on edges and openings.
Topography	
Soils/Substrate	
Canopy	Scarlet, black, white, and chestnut oaks are dominant. Post oak important in Buzzards Bay area and along portions of Cape Cod Bay. Red maple, sassafras, black cherry, black gum, American beech, pitch pine, and white pine commonly occur. (Usually low %, but may be abundant.)
Sub-canopy	American holly is a regular associate in Southeastern Massachusetts. (If abundant it is a Maritime Oak/Holly Forest.)
Shrub layer	A low shrub, heath layer. Often dense, particularly near edges. Dominated by lowbush blueberries and black huckleberry. Sweet pepper-bush abundant at some sites.
Herb layer	Typically sparse. Typical species include Pennsylvania sedge, bracken, wintergreen, wild sarsaparilla. Greater species diversity under canopy openings, little bluestem, Canadian rockrose, bush-clovers, milkworts, and bearberry occur.
Leaf litter	

**NOTE:** This community has been included in both the Mixed Coniferous-Deciduous and Deciduous Forest sections. This has been done to reflect the variation observed in this community. Officially, MNHESP lists it as a Mixed Coniferous – Deciduous community.

**Mixed Oak Forest****S5**

Description/Concept	Broadly defined community of tree oaks.
Topography	
Soils/Substrate	Dry soils or exposed slopes.
Canopy	A variable mix of oaks (black, scarlet, red, white, chestnut) dominates the canopy. Somewhat open.
Sub-canopy	Dense patches. Saplings of canopy species plus gray birch, quaking and big-toothed aspen, black birch, red maple, and chestnut in dense patches.
Shrub layer	Dense patches. Blueberries, huckleberry, sweet fern, scrub oak, and mountain laurel.
Herb layer	Scattered. Pennsylvania sedge, poverty grass, wild sarsaparilla, pinweed, and pale corydalis.
Leaf litter	

**Plants Associated with Deciduous Forest/Woodland Communities**  
**Part 1. Seeps and communities with sugar maple**

	Calcareous Forest Seep	Forest Seep	Yellow Oak Dry Calcareous Forest	Hickory Hop-hornbeam	Red Oak - Sugar Maple Transition	Rich Mesic Forest	Dry, Rich Acidic Oak Forest
Ash, Black	Occurs						
Ash, White	Occurs	Occurs	Occurs	Dominant	Occurs	Char.	Dominant
Aspen, Quaking			Occurs				
Avens, Purple	Indicator						
Avens, Water		Occurs					
Baneberry, White						Occurs	
Basswood						Char.	
Beech, American	Occurs				Dominant		
Bellwort, Perfoliate							Occurs
Birch, Black	Occurs				Dominant		
Birch, Paper		Occurs					
Birch, Yellow		Occurs			Occurs		
Bladderwort			Occurs				
Bloodroot						Occurs	
Bracken (fern)					Occurs		
Buckthorn, Alder-leaf	Indicator						
Bush Clover							Occurs
Cedar, Eastern Red			Occurs				
Cicely, Sweet						Occurs	
Cinquefoil, Shrubby	Indicator						
Clubmoss					Occurs		
Coffee, Wild							Occurs
Cohosh, Blue						Occurs	
Currant, Wild Black	Indicator						
Dogwood, Alternate-leaved	Occurs					Occurs	
Dogwood, Flowering			Occurs				Occurs
Dutchman's Breeches						Occurs	
Elderberry, Red-berried						Occurs	
Elm						Char.	
False Foxglove, Downy							Occurs
False Foxglove, Fern-leaf							Occurs
False Foxglove, Smooth							Occurs
False Hellebore		Occurs					
Fern, Christmas		Occurs					
Fern, Cinnamon		Occurs					
Fern, Goldie's (Wood)						Occurs	
Fern, Hay-scented					Occurs		
Fern, Maidenhair						Occurs	

**Plants Associated with Deciduous Forest/Woodland Communities**  
**Part 1. Seeps and communities with sugar maple (continued)**

	Calcareous Forest Seep	Forest Seep	Yellow Oak Dry Calcareous Forest	Hickory Hop-hornbeam	Red Oak - Sugar Maple Transition	Rich Mesic Forest	Dry, Rich Acidic Oak Forest
Fern, Ostrich		Occurs					
Fern, Rattlesnake		Occurs					
Fern, Sensitive	Occurs						
Geranium, Wild			Occurs				
Ginger, Wild						Occurs	
Goldenrod, Rough-leaved	Indicator						
Goldenrod, Zigzag						Occurs	
Grass, Bottlebrush				Char.			
Grass, Canada Blue				Char.			
Grass, Poverty				Char.			
Grass-of-Parnassus	Indicator						
Hackberry			Occurs				
Hemlock, Eastern		Occurs					
Hepatica				Occurs			
Hickory	Occurs						
Hickory, Bitternut						Char.	
Hickory, Pignut				Regular			Dominant
Hickory, Shagbark			Occurs	Regular			Dominant
Hickory, Sweet Pignut				Regular			Dominant
Hobblebush					Occurs		
Hop-hornbeam			Occurs	Regular		Occurs	Occurs
Indian Cucumber					Occurs		
Ironwood	Occurs						
Jack-in-the-pulpit	Occurs						
Jewelweed	Occurs						
Leatherwood						Occurs	
Maple, Red		Occurs			Occurs		Dominant
Maple, Striped	Occurs				Occurs		
Maple, Sugar	Occurs	Occurs	Occurs	Dominant	Dominant	Dominant	Dominant
Mayflower, Canada					Occurs		
Meadow-rue, Early							Occurs
Milkweed, Four-leaved			Occurs				Occurs
New Jersey Tea							
Oak, Black			Occurs			None	Dominant
Oak, Chestnut						None	
Oak, Northern Red			Occurs	Dominant	Dominant	Occurs	Dominant
Oak, Scarlet						None	Dominant

**Plants Associated with Deciduous Forest/Woodland Communities**  
**Part 1. Seeps and communities with sugar maple (continued)**

	Calcareous Forest Seep	Forest Seep	Yellow Oak Dry Calcareous Forest	Hickory Hop-hornbeam	Red Oak - Sugar Maple Transition	Rich Mesic Forest	Dry, Rich Acidic Oak Forest
Oak, Swamp White						None	
Oak, White	Occurs		Occurs		Occurs	None	Dominant
Oak, Yellow			Characteristic				
Pine, White	Occurs		Occurs				
Ragwort, Broad-leaved			Occurs				
Rush, Scouring		Occurs					
Sarsaparilla, Wild					Occurs		
Saxifrage, Golden		Occurs					
Sedge		Occurs		Char.			
Sedge, Pennsylvania				Char.			
Sedge, Plantain-leaf						Indicator	
Sedge, Porcupine	Indicator						
Sedge, Thread-leaved			Occurs				
Sedge, Yellow	Indicator						
Sicklepod			Occurs				
Spleenwort, Silvery		Occurs					
Spruce, Red		Occurs					
Squirrel Corn						Occurs	
Tick-trefoil				Occurs			Occurs
Toothwort						Occurs	
Viburnum, Maple-leaf					Occurs	Occurs	
Violet, Three-lobed				Occurs			
Willow, Autumn	Indicator						
Willow, Hoary	Indicator						
Witch-hazel	Occurs						
Wood-Aster, Whorled					Occurs		
Woodland-sedge, Broad-leaved					Occurs		

Char. = Characteristic

**NOTE:** This is not an exhaustive list of plant species that occur in these communities. Rather, it is a list of species associated with these communities as identified in Swain and Kearsley (2001.)

**Plants Associated with Deciduous Forest/Woodland Communities**  
**Part 2. Communities without sugar maple**

	Successional Northern Hardwoods	Ridgetop Chestnut Oak	Oak - Hickory	Black Oak – Scarlet Oak	Mixed Oak	Coastal Forest/ Woodland
Ash, White			Occurs			
Aspen, Big toothed					Occurs	
Aspen, Quaking	Dominant				Occurs	
Bearberry						Occurs
Beech, American						Occurs
Birch, Black			Occurs		Occurs	
Birch, Gray	Common			Occurs	Occurs	
Birch, White	Dominant					
Blueberry, Lowbush		Occurs	Char.	Occurs	Occurs	Dominant
Bluestem, Little						Occurs
Bracken (fern)		Occurs		Occurs		Occurs
Bush-clover						Occurs
Cedar, Eastern Red		Occurs				
Cherry, Black	Dominant			Occurs		Occurs
Cherry, Pin	Common					
Chestnut, American			Occurs		Occurs	
Corydalis, Pale					Occurs	
Dogwood, Flowering			Occurs	Occurs		
Dogwood, Gray			Char.			
Foxglove, Downy False		Occurs				
Foxglove, Fern-leaf False		Occurs				
Foxglove, Smooth False		Occurs				
Grass, Poverty					Occurs	
Gum, Black						Occurs
Hazelnut, American			Char.	Occurs		
Hazelnut, Beaked			Char.			
Hemlock, Eastern		Occurs				
Hepatica			Occurs			
Hickory, Mockernut			Occurs			
Hickory, Pignut		Occurs	Occurs			
Hickory, Shagbark		Occurs	Occurs			
Hickory, Sweet Pignut			Occurs			
Holly, American						Occurs
Hop-hornbeam			Occurs			
Huckleberry, Black		Occurs		Occurs	Occurs	Dominant
Lady's Slipper, Pink				Occurs		
Laurel, Mountain		Occurs			Occurs	
Maple, Red	Dominant	Occurs	Occurs	Occurs	Occurs	Occurs
Milkwort						Occurs
New Jersey Tea			Char.			

**Plants Associated with Deciduous Forest/Woodland Communities**  
**Part 2. Communities without sugar maple (continued)**

	Successional Northern Hardwoods	Ridgetop Chestnut Oak	Oak - Hickory	Black Oak – Scarlet Oak	Mixed Oak	Coastal Forest/ Woodland
Oak, Black		Occurs	Dominant	Dominant	Dominant	Dominant
Oak, Chestnut		Dominant			Dominant	Dominant
Oak, Dwarf Chinquapin		Occurs				
Oak, Northern Red		Occurs	Dominant		Dominant	
Oak, Post						Occurs
Oak, Scarlet		Occurs	Dominant	Dominant	Dominant	Dominant
Oak, Scrub		Occurs		Occurs	Occurs	
Oak, Swamp White						
Oak, White		Occurs	Dominant	Occurs	Dominant	Dominant
Pepper-bush, Sweet						Occurs
Pine, Pitch		Occurs				Occurs
Pine, White		Occurs				Occurs
Pinweed					Occurs	
Rattlesnake Weed			Occurs			
Rockrose, Canadian						Occurs
Sarsaparilla, Wild			Occurs		Occurs	Occurs
Sassafras			Occurs	Occurs		Occurs
Sedge		Occurs		Occurs		
Sedge, Pennsylvania			Occurs	Occurs	Occurs	Occurs
Shadbush			Occurs	Occurs		
Silverrod			Occurs			
Solomon's Seal, False			Occurs			
Sweet Fern					Occurs	
Tick-trefoil			Occurs			
Viburnum, Maple-leaf			Char.	Occurs		
Wintergreen		Occurs				Occurs
Witch-Hazel			Occurs			

Char. = Characteristic

**NOTE:** This is not an exhaustive list of plant species that occur in these communities. Rather, it is a list of species associated with these communities as identified in Swain and Kearsley (2001.)

## Hierarchical classification of natural communities within the Terrestrial System

Sub-System	Community Group	Community Sub-group	Community Type
<b>Open</b>	Rock Substrate	Summits and Rock Outcrops	Riverside Rock Outcrop Serpentine Outcrop Acidic Rocky Summit/Rock Outcrop Calcareous Rocky Summit/Rock Outcrop Circumneutral Rocky Summit/Rock Outcrop
		Rock Cliff	Maritime Rock Cliff Calcareous Rock Cliff Acidic Rock Cliff Circumneutral Rock Cliff
	Unconsolidated Substrate	N/A	Maritime Erosional Cliff Maritime Beach Strand Maritime Dune
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<b>Herbaceous</b>	N/A	N/A	Sandplain Grassland Cultural Grassland Dry Riverside Bluff
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<b>Shrub</b>	N/A	N/A	Sandplain Heathland Maritime Shrubland Maritime Pitch Pine on Dunes Maritime Juniper Woodland/Shrubland Scrub Oak Shrubland Pitch Pine-Scrub Oak Ridgetop Pitch Pine-Scrub Oak

## Hierarchical classification of natural communities within the Terrestrial System (continued)

Sub-System	Community Group	Community Sub-group	Community Type
<b>Forest/Woodland</b>	Talus Forest/Woodland	N/A	<ul style="list-style-type: none"> <li>Circumneutral Talus Forest/Woodland</li> <li>Calcareous Talus Forest/Woodland</li> <li>Acidic Talus Forest/Woodland</li> </ul>
	Conifer Forest/Woodland	N/A	<ul style="list-style-type: none"> <li>Hemlock Ravine</li> <li>Successional White Pine</li> <li>High Elevation Spruce – Fir Forest</li> </ul>
	Mixed Coniferous-Deciduous Forest/Woodland	N/A	<ul style="list-style-type: none"> <li>Spruce – Fir Northern Hardwood Forest</li> <li>Oak – Hemlock – White Pine Forest</li> <li>Northern Hardwoods – Hemlock – White Pine</li> <li>White Pine – Oak Forest</li> <li>Maritime Juniper Woodland/Shrubland</li> <li>Pitch Pine – Oak Forest</li> <li>Maritime Oak-Holly Forest/Woodland</li> <li>Coastal Forest/Woodland</li> </ul>
	Deciduous Forest/Woodland	N/A	<ul style="list-style-type: none"> <li>Calcareous Forest Seep</li> <li>Forest Seep</li> <li>Yellow Oak Dry Calcareous Forest</li> <li>Hickory – Hop-hornbeam Forest/Woodland</li> <li>Red Oak – Sugar Maple Transition Forest</li> <li>Rich, Mesic Forest</li> <li>Dry, Rich Acidic Oak Forest</li> <li>Successional Northern Hardwoods Forest</li> <li>Ridgetop Chestnut Oak Forest/Woodland</li> <li>Oak – Hickory Forest</li> <li>Black Oak – Scarlet Oak Forest/Woodland</li> <li>Mixed Oak Forest</li> </ul>

